



NEW TRENDS AND PROMISING DIRECTIONS IN MODERN EDUCATION

NEW PERSPECTIVES 2021

Edited by
Mevlüt Aydoğmuş

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MEVLÜT AYDOĞMUŞ

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PREFACE

In the age of science and technology of the 21st century, the Covid-19 pandemic has had significant effects on all aspects of human life. Undoubtedly, these diseases caused by infectious viruses have directly affected all dimensions of the educational system as well as their negative effects on human life. The Covid-19 pandemic will lead to significant and meaningful changes in educational sciences, especially in social, economic, health and sociocultural fields. Thus, under these conditions, there is a need for scientific studies on the current development, change and transformation of the school, teacher, student, family, teaching approaches, teaching materials and practices in order to improve the quality of education and to design effective learning-teaching processes. In addition, there is no doubt that the current and future rapid and contemporary developments in science and technology, politics, economy, information and international relations, which we all witness, will affect the quality of education and therefore all fields of education. There are many factors that influence educational systems, educational objectives and methods, families, children and teachers. These include urbanization, population growth, personal freedom, social value orientations of individuals and families during times of crises, local government and cultural development desires, increasing demand for education and contemporary problems and methods.

When we look at today's education, it can be understood more easily from the standpoint of where we came from. Although significant progress has been made, we know that we still have many problems. Along with the problems that arise, parents, teachers, students, and many people have complaints, expectations and opinions about education. There are searches in education, they will not be temporary, they should be permanent and these searches should be spread. Therefore, one of the aims of this study is to continue these searches systematically on a scientific basis and to convey these searches to education stakeholders. Educators can read the future well in this fast-changing environment. Consequently, they inevitably have to reconsider their understanding of education to help children and young people adapt effectively to the new situations that the future will bring.

“New Trends and Promising Directions in Modern Education - New Perspectives 2021' is a is a peer-reviewed book that scientifically questions, researches, discusses and presents ideas about the processes of emerging problems, developments and changes in the educational system, concepts, practices and approaches.” In this book, the topics that will be discussed under the title of new orientations in education contribute to the solution of new problems that arise in education. Suggestions developed in this direction contribute to employing new approaches to the planning of the educational process in a more qualified way. For all these reasons, experts of their own subject areas came together in the content of ‘New Trends and Promising Directions in Modern Education - New Perspectives 2021'.

We aim to develop different perspectives on the colors of life by opening windows in education with the opinions and criticisms of you, our valuable education stakeholders. And so, we are proud to present ‘New Trends and Promising Directions in Modern Education – New Perspectives 2021,’ a work of diverse scientific approaches that focuses on problems of education. We hope that this book will provide a space where everyone can, to some extent, find meaning about themselves in a wide range of educational sciences.

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TECHNOLOGY INTEGRATION IN POST COVID-19 LEARNING ENVIRONMENTS: RESEARCH-BASED PRACTICES

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Introduction

The COVID-19 pandemic during the 2020 academic year has altered all aspects of teaching and learning in schools, colleges, and universities across the world. The problems resulted from this new reality did not just force educators to move instruction from in-person to fully online, but also exposed the vulnerability of the educational infrastructure to adequately serve our students and created a wider impact on our education systems. Immediately after the termination of in-person instructions, many problems have surfaced that affected teaching and learning spaces and highlighted the issues of inequality, inaccessibility, and equity, especially for students with exceptionalities.

The shift to online instruction has widened the persistent disparities between students across races, income groups, opportunities, academic achievement, and the ability to access technology tools and support. Additionally, many teachers were unfamiliar with the use of appropriate pedagogy for remote teaching. Other teachers found it difficult to modify their online classes to enhance students' interactions to mitigate the social isolation in this unique environment. Therefore, as we continue to engage in evolving conversations to shape guidelines for the field of education in the post-COVID-19 era, this chapter attempts to initiate a discussion regarding the best practices to integrate technology in online and blended learning settings while considering the issues of accessibility and equity for all students. Specifically, this chapter utilizes three different frameworks to ensure that the process of technology integration is inclusive, intentional, and collaborative (Figure 1). The three discussed frameworks in this chapter are the Universal Design for Learning (UDL), the Technological Pedagogical Content Knowledge (TPACK) and the Professional Learning Community (PLC) (Mishra & Koehler, 2006).

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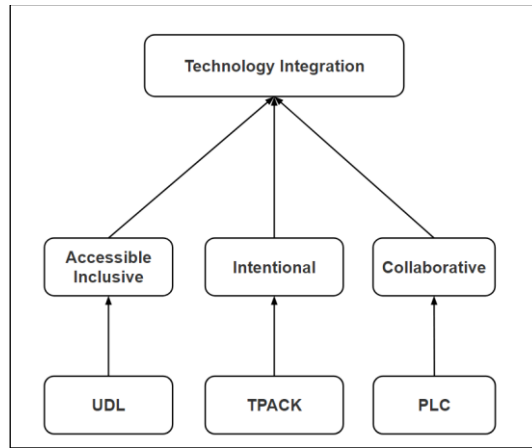


Figure 1. Technology Integration Framework Impact of Academic Interruption

The critical moment of the COVID-19 pandemic called our attention to engage an open dialogue into the education problems we encountered during 2020. This conversation brought to the forefront many issues in education related to the use of technology in online and blended learning environments. Two of these issues are particularly relevant to this chapter: First, teachers' lack of online pedagogy and, second, the absence of inclusive process of technology integration. Unfortunately, the post-COVID-19 situation revealed a deeper digital divide than previously thought, where many students were the first to be affected in multiple ways. Additionally, many technology tools, digital devices, and resources were needed for learning due to the increase demand for using the online learning environment.

Since the online learning environment depended heavily on technology integration to replace the in-person instructions, there were large disparities in students' access to the devices and technical supports they used to have in their schools. For example, while some students had access to devices and connectivity before and during COVID-19, other students have barely been able to connect with their teachers via online conferencing during COVID-19 due to issues of technology access. Consequently, many students became unable to function in the online learning environment due to the lack of access to technology devices and the needed support. This learning environment reinforced further the existing inequality between students based on their socio-economic status. Additionally, many students, especially learners with exceptionalities, came under heavy social and psychological stress because of the extended home isolation, as well as the lack of the normal social interaction with their peers and teachers. Furthermore, many parents and guardians were

unable to support their children with the needs of distance learning due to either their lack of knowledge or the inadequate economic means.

Universal Design for Learning (UDL)

The post-COVID-19 environment offered a great opportunity to leverage the power of instructional technology and rethink more in terms of creating inclusive learning environments. Further, the development of technology-rich, accessible, and inclusive online instruction became an imperative requirement in the post-COVID-19 era. Therefore, the intentional integration of technology tools guided by best practices in the online learning environment holds great potential to create accessible learning environments for all students. Thus, one of the most practical frameworks that could be considered to integrate technology in the post-COVID-19 online learning environment is the use of the Universal Design for Learning (UDL). This framework provides a guided pathway for teachers to design learning environments and help all learners engage successfully with the curriculum (Cochrane et al., 2020; Dickinson & Gronseth, 2020).

The UDL framework consists of three main principles for designing inclusive learning environment: First, engaging all students with the learning materials using multiple means of representation. Second, presenting the learning content in ways that reach all learners by providing students with multiple means of action. Finally, offering purposeful options for students to show what they know by allowing multiple means of expression. The appeal of the use of the UDL framework stems from its ability to be applied to any learning domain to support diverse learners. Specifically, the UDL guidelines address all students, including those students who have historically been overlooked in traditional educational settings and learners with exceptionalities (Lowrey & Smith, 2018; Sims & Desmarais, 2020; Super et al., 2020). Therefore, applying the UDL guidelines to the technology integration process could transform the one-size-fits-all instruction into more diverse and accessible learning environments.

UDL Technology Integration Strategies

Many applications of the UDL framework depends on technology to create an equitable learning space for all students (Rao et al., 2021). There are several UDL instructional strategies that can be employed in online courses. These strategies focus on using wide selection of technology tools to improve the course usability, diversity, and help organize the learning content. To address the diversity issue, it is recommended that instructors should first conduct learners' analysis and then organize the technology tools and the learning materials around their variation. Since the online course content is based on the use of diverse digital materials than on direct personal interactions, the UDL

design principles can guide instructors through the appropriate steps to produce or select good multimedia materials and integration (video, images, audio, etc.).

Organizing the online learning materials can be achieved by segmenting the course topics into modules or units to help learners scaffold the course materials. Segmentation can be accomplished by dividing the course content into small units with outlines and summaries to emphasize the important information (Chen & Yen, 2021; Ginns & Leppink, 2019; Rey et al., 2019). It is also recommended to use visual representation in the course materials, such as headings and subheadings to help learners understand the course structure and the relationship of its components (Alpizar et al., 2020; Kutbay & Akpinar, 2020; Meng, 2019). The course layouts should also follow a consistent pattern of navigation, font size, color, naming conventions, and the use of inclusive language suited for diverse students. All reading materials should be accessible to all students by making word documents and pdf files readable (McKeown & McKeown, 2019; Rae & Frey, 2021). While the visual elements and graphics in online courses are highly recommended, these elements must include descriptions and follow the standards for online course design (Boothe et al., 2018; Gronseth et al., 2020) (e.g., Quality Matters Higher Education Course Design).

The use of well-developed learning materials in an online course is a key component for students' success. To create effective content in an online learning course, it is therefore essential to make learning materials accessible to all students, suitable to their level of independent learning, particularly for those with special learning needs. In this case, teachers become mentors between the content and learners by generating different routes for all students to learn and allowing them different methods of interaction and expressions with the learning content. Therefore, the wide selection of technology tools guided by UDL principles can provide learners with activities and alternative formats of the learning materials. The selection of these tools should be governed by its relevance to the course content, the level of its accessibility by all learners and the help it would provide to students to maintain their engagement.

The online course activity sections are the main area to engage students with the learning content. Therefore, it is highly recommended to include variety of technology tools to stimulate learners' interest and increase their participation. For example, the material section could include technology resources to help students reflect on their learning by using audio, video, journals, wikis, blogs, or discussion boards. These types of technology tools can provide students with alternative platforms to showcase their level of understanding of the course content. Other technology tools could be used in the learning mate-

rials section, such as digital tutorials and virtual tours, games, interactive simulations, interactive videos, and virtual manipulatives.

Many researchers stressed the importance of the use of various tools to promote students' engagement with content (Attard & Holmes, 2020; Bond & Bedenlier, 2019; Bond et al., 2020; Heflin et al., 2017). The learning materials could also include a wide variety of multimedia elements to support visual learners, such as videos of teaching lectures or guest speakers, or the use of animations (Alemdag & Cagiltay, 2018; Knoop-van Campen et al., 2020; Wang et al., 2018). Another example of an effective way of using multimedia is creating instructor welcome videos to establish social presence. Instructional videos should be segmented in increments of five to seven-minute clips and include closed captions and transcription to meet the UDL design guidelines and the cognitive theory of multimedia learning. Many studies highlight the positive effect of using multimedia on students' learning, such as video, audio, and recorded lectures. However, it is recommended to ensure that the audio and videos are clear and with good quality to promote students' engagement and learning (Fiorella & Mayer, 2018; Ou et al., 2019; Strouse & Samson, 2021).

In addition to the careful planning for learning materials in an online course, it is important for instructors and course designers to include components of interpersonal interaction for all participants (Al Mamun et al., 2020; Muzammil et al., 2020). Although students in online learning environments are autonomous in managing their time, they rely heavily on instructors' mediated interaction for learning guidance. The active interactions between all participants in an online course help develop the sense of learning community and prevent students from feeling alone or lost in cyberspace. Therefore, the success in online learning should include careful design of active involvement of all learners.

Researchers identified three types of interaction in an online course, namely: student-content, student-student, and student-instructor. The systemic integration of each of these types of interaction were found to enhance students' learning outcomes (Fiock, 2020; Kokoç & Altun, 2021; Mehall, 2020; Zheng et al., 2020). Therefore, online teaching requires careful consideration of different technologies to facilitate these types of interaction. For example, instructor's regular monitoring and participating in discussion forums can help assess students' comprehension and performance. Interaction activities could also include formal and informal peer collaboration, such as the use of group assignments, peer-teaching, or peer-assessment. Research showed that interaction between students and instructor can enhance students' self-efficacy, motivation and provide the emotional and social support needed for effective online learning. Additionally, another type of interaction is to connect with students' families and guardians to establish open lines of communication and create

opportunities for families to support their children (Abernathy & Thornburg, 2020; Fiock, 2020; Mehall, 2020; Strauß & Rummel, 2020).

Without clear interaction channels between the student and instructor, the online course will lack the sense of community. Effective interaction with students should include well-explained tasks and listening carefully to students' needs. As such, the course instructor must use several technology tools to allow students alternative ways of communication, both at the course and individual level. Effective virtual communication and collaboration can include information about the course schedule, assignments, and provide encouragement and feedback to learners. The course interaction can also include regular feedback from instructor to students regarding their progress towards the learning outcomes, reflections on assignments, and support of students' discussions and reflections. There are many widely used technology tools to support the course communication via video conference tools, such as Zoom, WebEx, GoToMeetings, and Microsoft Teams. Sometimes, these conferencing tools are more flexible than being in class and can be powerful tools to engage students in live interaction sessions (Marhami et al., 2020; Starr-Glass, 2020; Themelis & Sime, 2020). The use of video conferencing can include Q&A, feedback, project reviews, and short sessions with small groups.

TPACK and Online Technology Integration

A non-intentional integration of technology in an online course does not automatically improve students' learning (Calhoun et al., 2017; Poyo, 2018). The Technological Pedagogical Content Knowledge (TPACK) presents an effective design framework that would enhance teaching with technology in the post-COVID-19 era. According to Mishra & Koehler (2006), the successful technology integration in learning is the complex interplay of three primary forms of knowledge: Content (CK), Pedagogy (PK), and Technology (TK). First, content knowledge is the knowledge of concepts and the field's best practices within a particular subject. Second, pedagogical knowledge includes different methods of teaching, lesson planning, assessments, and classroom management skills. Third, technological knowledge is the teachers' ability to use various technological tools in a specific subject area. A large body of research showed that the use of TPACK framework would help instructors to integrate technology effectively and purposefully into their teaching. Further, TPACK could help instructors to identify the three types of knowledge, as well as how to evaluate the possibilities and limitations of the use of the new technologies in teaching. Although there are many technology tools and apps utilized in teaching and learning, not all these tools will improve students' learning. Therefore, instructors should evaluate the technology tool before using it in their course.

Instructors should also know how to select and use appropriate technology to facilitate learning and to improve students' experience in an online course. There are three components for successful planning for the use of technology tools in a course module. The steps include the need to examine how the information is presented (pedagogical features), what information is presented (content knowledge), and how the technology tool is designed to influence pedagogy and content knowledge (technology). For example, to integrate technology tools to enhance the pedagogical knowledge, instructors must investigate to what extent these tools would teach the material to students. To examine the pedagogical need of technology tools, teachers can try the tool first to evaluate its pedagogical features. The evaluation can include examining the way the information is presented to learners, the formats of the content provided (e.g., text, audio, video, manipulatives), the information organization, its accessibility by all students, its effectiveness in enhancing students' learning, and the level of security to protect students' privacy. After addressing these issues, teachers need to evaluate the technology tools themselves to experience how it could be used by students.

The TPACK framework assumes that instructors' pedagogical approaches are the main guiding principles in selecting and using technology. Therefore, the TPACK framework is particularly helpful in directing teachers in systematically evaluating digital tools before integrating into teaching. Unfortunately, many teachers lack pedagogical understanding to utilize digital technologies for the purpose of improving students' learning (Barton & Dexter, 2020; Ertmer & Ottenbreit-Leftwich, 2010). Therefore, teacher's TPACK competencies are crucial for effective technology integration in instruction (Mishra & Koehler, 2006; Tondeur et al., 2016). In today's educational market, there are a wide selection of technology tools that can be used in teaching and learning. However, instructors should not focus on the use of the tool, but rather on the pedagogical purpose for their students. For example, some teachers fail to integrate technology in their course successfully because they tend to select the technology tool first before identifying the pedagogical issues. To maximize the effectiveness of the technology integration process, it is therefore critical for teachers to identify the pedagogical needs and features of the technology tool before the integration process. For example, the instructor may check different features related to the relevance of the tool to the subject at hand, the level of its ease when the tool is used by students, students' ability to control the pace of the learning materials, the presence of feedback function, the quality of the feedback, and the ability of students to use a self-assessment feature to guide their progress.

Professional Learning Community (PLC)

Many researchers highlight the importance of teachers' peer collaboration in successful online teaching and learning (e.g., Aliyyah et al., 2020). Thus, many teachers utilized widely the Professional Learning Community (PLC) during the COVID-19 academic interruption to find technology tools, answer questions, and share best practices to support students' learning. Furthermore, PLC is considered one of the most successful informal teacher training platforms to connect with other teachers (Vangrieken et al., 2017). The PLC concept is defined as inclusive groups of people who continuously seek, share, and act on their learning to enhance their student-centered effectiveness (Stoll et al., 2006). The focus of teachers' PLCs is their collective inquiry regarding teaching practices and student learning. In the PLCs, teachers work together collaboratively to discuss critical issues about teaching and learning and to share ideas, best practices, and curated resources (DuFour & Eaker, 1998). The teachers' resource-sharing platform can be created on cloud-based drives across different departments in a university, college, school district, or a single school. Many researchers indicated that this type of teacher learning community has been connected to improvement in students' academic achievement and teachers' job satisfaction (Dexter et al., 2016; Reeves et al., 2017).

Conclusion

The academic interruption caused by the COVID-19 pandemic required educators to reexamine the technology integration process. This chapter attempted to discuss the use of three different frameworks to guide teachers' technology integration that focuses on the issues of accessibility and equity for all students in online or blended learning settings. The first framework is the Universal Design for Learning (UDL). UDL holds a great promise to create accessible learning environments for all students that embraces students' variation. The second framework is the Technological Pedagogical Content Knowledge (TPACK). The TPACK framework provides a pathway for teachers to integrate technology effectively and purposefully into their teaching. Furthermore, the technology integration process would help instructors to evaluate the possibilities and limitations of the use of the technologies in teaching. Finally, the Professional Learning Community (PLC) is a great platform that allows teachers to collaborate and work together to share ideas and resources that support technology integration in teaching and learning. The chapter's main purpose is to encourage more teachers to apply these frameworks in the technology integration process to maximize students' learning.

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THE QUANTUMIFICATION OF DIGITAL INFORMATION: THE STRUCTURAL AND ORGANIZATIONAL MICROCOSM OF THE SYSTEM OF INFORMATION

Constantine ANDONIOU*

'In civilizations without boats, dreams dry up, espionage takes the place of adventure, and the police take the place of pirates' (Foucault, 1986:27)

Prologue

In the era of *'postmodernity-and-beyond'* where electronic communication and digital technologies reign, the organization of information and knowledge is characterized of a constant digital reorganization (*'virtual implosion'*²) and a subsequent fractalization (*'fractal dynamics'*³) of its content and meaning (Andoniou, 2008). In the light of such drastic transformations we need to reconsider our conceptual framework of how information and knowledge are organized and how technology is affecting the digital construction, and the essence itself, of knowledge (*'quantumification'*⁴).

In this respect I am introducing a series of theoretical approximations (Lefevre, 1991) and proposals about the structural and processual organization of the system of information and I contend that the analytical model described and termed here as *'Infogramic Analysis'*, 'can be applied to investigate the in-depth structural and processual organization, the microcosm of the system of information but also any (up or down) organizational scale of any such system.

I focus on the analysis of informational constructs and patterns of informational organization. These constructs and patterns refer to what would often account for elementary or intricate ideas, definitions, concepts, opinions, beliefs, ideologies, theoretical positions, bodies of knowledge, in general, for any ordered or non-ordered (in relation to meaning) system of information.¹

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¹ 'Virtual implosion' is defined as a process of a series of continuous, infinite loops of dynamic change, expressed in distinctive phase spaces, and repeated in alternating and interrelated iterative cycles. It is characterized by three phase spaces of fractal mutation: 'syghysis' (deconstruction), 'molymsis' (infection), and, 'photococciasis' (reconstruction) (Andoniou, 2008).

Infograms And Infogramic Analysis

Datagrams

The simplest form of an infogram is a '*datagram*'. Datagrams are elementary and non-complex informational constructs, such as symbols, icons, signs, figures, characters, letters, numbers, archetypes, and so on. Datagrams can combine into infinite systemic groups within their originating environment and add, eliminate or modify additional informational units to their structure. They are characterized by self-similarity and plurality² of their constituent components and this adds to the 'meaning' entailed in the datagram. Datagrams are in potential state of interaction with other, similar or dissimilar informational constructs, in infinite series of possible combinations, to generate new infograms.³

A more accurate representation of the concept of the datagram would be in the form of a three-dimensional model which exemplifies the complexity, and at the same time simplicity, of the organization of information within information systems, consequently, of the knowledge constructed out of these systems.

Infograms

An '*infogram*' is a higher level of complexity informational construct than the datagram. Interacting datagrams can produce new infograms but the later are not necessarily the sum of the originating datagrams, their final form rather depends of the level of virtual implosion and fractalization of information.

Infograms are characterized by diverse multi-dimensional organizational patterns, which in turn are expressed along spatial symmetries and structural non-linear curves.

In comparison to the datagram, an infogram is characterized by varying levels of complexity, and can be said to represent advanced concepts, complex definitions, a plurality of ideas, perceptions and explanations, sets of information, bodies of knowledge, and so on. Infograms are organized around a 'theme' which is characterized by specific content and relationships.

Depending on their source of their fundamental components (the result of interactional arrangements of datagrams or other infograms), infograms can be categorized as: (a) '*authentic*' infograms (*A-infograms*), (b) '*simulated*' infograms (*Σ -infograms*), and (c) '*fractal*' infograms (*Φ -infograms*).

² The three phase spaces of the 'virtual implosion' of the system of information to fractalization, are controlled and interconnected by five powerful micro-processes hereby collectively termed as 'fractal dynamics': 'catastrophe' (destruction), 'orgasm' (excitement), 'metamorphosis' (transformation), 'epigenesis' (rebirth), and 'anomia' (lawlessness) (Andoniou, 2008).

³ 'Quantumification' is a term referring to the application of 'quantum mechanics' on the organization of the system of information ... "quantum mechanics explains how the universe works at a scale smaller than atoms... quantum mechanics describes how the particles that make up atoms work" (Wikipedia.org. 2021).

Authentic Infograms

An '*authentic*' infogram (*A-infogram*) is an informational construct concerning original and discrete concepts and ideas, facts, events, and so on, which are innately present and exist without any interference or interaction from outside the systemic environment of the infogram. An authentic infogram shows strong relations of meaning that is, well built associations among its constituent components, which also accounts for its powerful resistance to foreign interactions.

Simulated Infograms

A '*simulated*' infogram (Σ -*Infogram*) refers to an informational construct that has originated in, and has been produced in the environment, that is, outside the boundaries of the infogramic system. Collectively and individually considered, the components of a simulated infogram consist one of many visible imaginary versions of the components of an authentic infogram. A simulated infogram need not relate to a specific authentic infogram; it may be generated and claim authenticity *in absentia* of a probably existing, but not visible existing, authentic infogram. Simulated infograms are characterized by strong self-reference of meaning, they refer to themselves.

Fractal Infograms

A '*fractal*' infogram (Φ -*infogram*) is an informational construct that is the result of the fractalization of an authentic or simulated or of a combination of these types of infograms. What is important is that this type of infogram is a simplified, distorted, and programmable version of 'dubious' meaning, which can replace (by extinction) the original meaning of the authentic infogram. The fractal infogram is the result of repeated iterations and continuous regenerations of the system of information. The meaning of the original theme is being replaced in the fractal infogram by several possible relations of meaning, to several possible existing and imaginary associations. The meaning is distorted and confused. The fractal infogram is virtually imploded and is regenerated as 'a digital illusion' of the present, which, like an act of magic, can be manipulated and programmed to excite and entertain.

Organizational Patterns of Infograms

The distinctive patterns of organization of infogramic constructs (datagrams and infograms) are responsible for the dynamic inter-relativity and interactivity of infogramic systems. The inter-relativity here refers to the internal built-in or 'naturally' evolved associations among the component elements of the system. The interactivity is expressed in the external interactions of datagrams and infograms, which are partly accountable for the fractalization of the infogramic system. These organizational patterns are here defined as: (a) '*endogenesis*', and (b) '*exogenesis*' respectively.

Endogenesis

'*Endogenesis*' describes the native tendencies of the structural tendencies of the infogramic system to self-relate, create and sustain constant and permanent structural architecture of relations of meaning linked to the core meaning of the system. Infogramic endogenous associations can be defined in three levels of structural order: (a) *organization* (⊙), (b) *lethargy* (⊗), and (c) *disorganization* (⊛). Endogenous, then, associations within the same informational unit can be organized, stable and uninterested, and/or totally disorganized. In each case of course, there are analogous repercussions to the organization and the 'fate' of meaning within the infogramic system. Endogenous associations can be organized, in the sense that, they may progress to meaningful connections or coordination of the constituent parts, in order that some distinct path of orderly connection is established and maintained in existence. At the other extreme, in disorganized endogenous associations, a systematic breakdown of meaning-related interconnections and associations takes place, and non-coordination and non-synchronization prevail. In lethargic endogenous associations, the negotiated exchanges of interconnections do not lead to any systematic organization or breakdown, rather the preserve stability and motionlessness, and non-interest, as in a prolonged inert narcosis.

Exogenesis

'*Exogenesis*' refers to the structural and dynamic tendencies of the infogramic system to interconnect or respond to external communication with its surrounding environment. Exogenesis is a manifestation of the tendency of the system of information to interact and establish networks, and to evolve to diverse levels of communicative patterns. During this process, losses or disturbances in the established associations of meanings are unavoidable. Infogramic exogenous interactions are defined by three levels of structural involvement: (a) *simplicity* (*), (b) *apathy* (✕), and (c) *complexity* (⚙). Therefore, endogenous associations within the infogramic environment can be simple, apathetic (indifferent), and/or complex. Simple exogenous interactions show preoccupation with simple form and structure, absence of intricacy, and free of artifice, deceit, or duplicity. Apathetic exogenous interactions show a tendency for independence of form, or insensibility to, active, positive or negative, involvement, a state of indifference, un-interest or inaction. Finally, complex exogenous interactions present the tendency to complicate form and structure, and to produce artificial and sophisticated relations of extreme obscurity.

The possible combinations among endogenous associations and exogenous interactions, either within an individual infogramic system or among interacting systems, may indeed be infinite. In this sense, the systemic inter-relativity and interactivity are reflected in the form, image, and behaviour of

the infogram, and infograms can be described to show: *organized complexity, disorganized simplicity, organized simplicity, disorganized complexity, lethargic complexity, lethargic simplicity, lethargic apathy, organized apathy, disorganized apathy*, and so on.

Infogramic endogenous associations and exogenous interactions, whether they are in a state of forceful infogramic activity or passive indecision, they tend to balance along two conditions of '*heterogeneous homogenization* 'or '*homogenous heterogeneity*, 'which despite the logical paradox, it ensures stability of disorder and at the same time order of instability.

Infogramic Analysis

'*Infogramic analysis*' utilizes all the proposed theoretical approximations so far and applies them to certain concepts to account for their virtual implosion, or fractalization, that is, their gradual deconstruction, differentiation and reconstruction, from authentic and original infogramic systems, to abstract fractal systems of multi-dimensional levels of meaning.

The Emergence of Authentic Experience

At any time, for any subject, there exist the possibilities for the generation of various forms of original and inexperienced programmes of planned action. These programmes (potential organizational patterns) are composed of organized authentic systems of information, in the form of authentic infograms.

This would represent all the potential spatial organization interconnections available to the specific infogram and to the subject itself. Some of these possible interconnections will be exploited by other interacting infogramic systems.

The native to the authentic infogramic systems endogenous and exogenous tendencies generate possible combinations of organizational patterns using these (and other) related authentic infograms.

The Exploitation of Imitation

Simulated infograms originate in the environment, as copies and regenerations of originals, for example from global media texts. They are characterized by endogenous internal associations varying between complexity and apathy, and exogenous dynamic interactions varying between a lethargic state and disorganization. Depending on the global geographic position, the environmental arrangements, and the selective accessibility of the subject to media texts, different interactions will be generated and reproduced. The result is seemingly different simulated infograms, still, although the content may differ, depending on local conditions, the simulated infograms present self-similar patterns of organization.

Each one of these simulated infogramic systems can exist on its own as a valid proposal. In the contemporary age of global electronic communication and digital technologies, though, exogenous interactions among two or more

simulated infograms (usually many) take place fast and almost in an invisible way. They may interlink in a chaotic variety of possible blends and mutually exchange and replace components without changes in their general organizational patterns.

The Fractalization of Originality

Simulated infogramic systems are characterized by strong self-referentiality and potential exogenous interactivity. Compared to their respective authentic infogramic system (of authentic targets), they present redundant and simplified, if not distorted, information regarding widely acceptable choice, taste and originality of experience. More importantly, they are inherently characterized by their vulnerability to programmability. When extremely programmable simulated systems of this kind, develop exogenous interactions with authentic or other simulated infograms the result is a fractal manipulation of the original authentic intentions and objectives, or to put in another way, the regulation of information, knowledge, action and experience.

An original authentic infogram can be made redundant, to an artificial version of disorganized and fragile organizational patterns. Authentic components are indiscriminately replaced by media generated versions, and appear to claim originality and legal status, by registering themselves in the existing acquired libraries of knowledge and experience. The fractal reality, such infograms create, is an artificial system of information, a digital illusion, where 'reality', 'truth' and 'meaning', are redefined to actually 'mean' nothing more than referring to themselves; furthermore, they remain unchallenged, become stabilized and exempt from being offended or provoked, and they are, finally, mentally digested, as valued informational nectar to the satisfaction and excitement of the senses.

Digital Illusions

The representational model of concepts and definitions as infogramic systems can provide a fresh new way to analyze and discuss social issues. The concepts of the 'datagram' and 'infogram' can account for the organizational structure of information systems which represent component units or the totality of the content of an issue. The organizational patterns of 'endogenesis' and 'exogenesis', can account for the relationships among the parts that comprise the intellectual context, within which an issue is discussed, and also for the logic of the development of possible relativities with other issues.

In any case, the various stages of the analysis can be represented by two- and three-dimensional computer models, which can only exemplify and stress the complexity of the impact of digital technologies on the flow of information and on the digital construction of knowledge at all the stages and levels of information systems organization. In the era of electronic communication and digital technologies, infogramic analysis suggests that social formations and

configurations are increasingly imploding into programmable fractal hyper-realities; the world is becoming a digital artifact, a world of digital illusions.

Epilogue

It is suggested that the digital construction of knowledge, consequently of social reality and the digital regeneration of hyper-reality, can be further analyzed and that our understanding can be further advanced with the utilization of a philosophical model of theoretical approximations. To this end I have put forward the model of infogramic analysis to examine the digital reorganization and fractalization of information and knowledge in the hyper-real landscapes of postmodernity-and-beyond. Infogramic analysis consists an open theoretical suggestion which can apply to microcosmic to macrocosmic organizational patterns of information and needs further exploration and development as digital technologies quantumify the nature of our 'reality 'and challenge the essence of human consciousness and thought.

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BALANCING THE ART AND SCIENCE OF TEACHING

John ESSINGTON*

Introduction

I immediately knew I made a fatal mistake with my decision to sit at the front, right corner of the class behind my desk. It seemed to be such a simple and inconsequential decision five or six minutes earlier.

My first opportunity to work as a mentor to a student-teacher had just begun. The student-teacher, whom we will call Narek, was from a local university in St. Louis, Missouri in the United States. In fact, not only was Narek local, but he was repudiated to be at the top of his education class and primed to succeed in any educational environment.

Narek wrote exceptionally intricate and flowing lesson plans filled with student background context, objectives that seamlessly melded with state and national standards, and assessments that would work simultaneously as formative and summative. He could develop data-assessment tools and expertly analyze the students' results following a given lesson to measure whether parts of a lesson were mastered or needed reteaching. More impressive to me, as I always struggled with staying current with the ever-evolving education lingo, was his ability to effortlessly put into writing his activities and goals for each task the students would embark upon during our ninety minutes of honors world history.

However, there was one small aspect of Narek's pedagogy I had negligently overlooked or possibly taken for granted, and the university had yet to measure: could he stand in front of a group of fifteen and sixteen-year-olds and deliver a lesson? It took five or six minutes into the inaugural lesson before looks of confusion, exasperation, and dread drifted towards my corner desk from the rows of students and the future educator at the center of the room.

Before Narek's clinical, I taught for the previous seven years in various capacities from a substitute teacher, teacher's aid, graduate teaching assistant, master tutor, and finally, a teacher of record. I was an experienced educator but not as skilled as I would become after more years of experience, and it would

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be no exaggeration to suggest Narek was better at the science of teaching as a student-teacher than I was at that time as the headteacher.

Narek truly wanted to be an exceptional educator, and his drive to utilize the scientific and research-based best practices was second to none. Unfortunately, the university he attended was so fixated on making sure students understood the theoretical aspects of teaching that they had skipped over the most vital element for educators, and that is their rapport-building capabilities.

It was not just nervousness with Narek; although he was, he did not understand how to speak to teenagers and individuals who were not his peers or elders. The lesson and future lessons he had spent hours crafting were stunted by his inability to disperse content or even facilitate learning in a familiar manner to your average teenager.

The current tunnel vision by teacher education programs fixates on the tools and checklists of great educators and neglects the fundamental nature of first-rate teachers. We need to focus on how teachers utilize their tools rather than just what tools are selected. We know the great Italian Renaissance artist Michelangelo utilized a mallet and various chisels when sculpting the statue of David out of marble, but this knowledge alone will not allow me to become one of the great sculptors of human history. We must acknowledge that there is more to crafting a breathtaking sculpture or an efficacious lesson than just the tools. Tools assisted Il Divino, but they did not define Michelangelo's genius.

Narek had been taught that tools alone could create an ideal educator. The utilization of scientific precepts within a teacher education classroom, similar to working in laboratory conditions, conquered the bastion of teaching and education. Regrettably, a classroom filled with diverse students with varying worldviews and personal histories is the antithesis of laboratory conditions.

This chapter will focus on exposing the spaces inundated with educational, scientific dogma. Meanwhile, I will simultaneously illustrate how we can move to a more artistic version of teaching supported and enhanced by methods and tools found in the science of teaching rather than supplanted by them.

We will delve through the ideas of the data-driven school, the rebirth of the efficiency wonder that is the factory model of education, and the reliance upon standardized and norm-referenced testing for accountability purposes. It should be noted the chapter is seeking to find a balance between the art and the science of teaching and not banishing the idea of scientific tools as useful for educating.

Data-Driven

Educator Dan McConnell provided an excellent analogy in a blog response discussing the current fixation on data-driven instruction: "A good driver glances occasionally at the speedometer and dashboard gauges, keeping in

mind the destination, the traffic around them, prepared to react to any surprises, lane shifts, weather changes. But imagine driving from A to B ignoring the road, the weather, the traffic around you...only staring at the gauges on the dashboard” (2013). Our trip data helps us reach our destination safely and timely, but they are not the sole element in a successful venture and should be seen as secondary to the larger picture of the journey.

The idea of traveling without looking at the road or paying attention to the weather or traffic seems ludicrous and even deadly. Why then are we okay with being told to do this with our children’s education? The links to academic success and higher qualities of life have been well researched for over a century, and the demarcation between the successful and struggling becomes more evident with every passing year. The need to quantify academic performance, mainly for teacher and school accountability rather than individual student growth, mutates the entire education ethos.

Has the introduction of data science into schools ’everyday workings shifted our focus away from students and towards numbers? Is it the accountability movement sweeping the United States and the world that refocused our attention from student growth to data points?

The usual starting position in the United States centers around the *No Child Left Behind Act* (NCLB, 2001). It should not be surprising the shift towards data-driven schools coincided with the mandatory influx of standardized testing. Teachers are now responsible for analyzing numerous data sets based on their students ’diagnostic tests, benchmark tests, and high-stakes tests. These assessments are constructed through a broad swath of education hierarchies: “NCLB mandated teachers ’systematic analysis of data collected from standardized, state- or national-level assessments and use of the findings in their instructional decision making” (Schifter et al., 2014; Mandinach, 2012).

As a secondary school teacher of social studies, specifically government, I was responsible for teaching one of the state-mandated high-stakes tests. The high-stakes were exclusively leveled at the school and district because the End of Course (EOC) examination had no bearing on the students. The test was not required for passing the class, students did not have to pass it to graduate from secondary school, and it felt almost akin to teacher malpractice to use a random, fifty-question, multiple-choice trivia test as an assessment worthy of affecting a student’s grade.

To highlight the lack of usefulness of the test for the students, I must digress and explain the test results were not returned to my school or myself until roughly seven to eight months later. Thereupon, the students who had taken the previous year’s examination had advanced to the next grade, and my ability to adjust instruction from the data was void. We shall return to the issues of standardized testing later in the chapter.

Previously, I had taught in a different state. The United States does not enforce a mandatory national curriculum, and my experiences with standardized testing were limited as a student, having graduated from secondary school the year NCLB was passed, and even more so as a teacher. The school administrator handed me a book and informed me that I was responsible for a quarter of the school's testing regime and a new member of the EOC data team.

I was now venturing into the world of data teams for the first time, with my only expectation being that I would be reviewing student scores to help my students. Quickly, I realized the data team's primary goal was to assist my course, and thus vicariously, the school and district earn more points on the state-required examination. Bubble students on the edge of either moving up or down a quartile became the center of our universe. We were implicitly told that higher-achieving students should be left alone, and students that were scoring well below a designated tier were analytically considered a waste of time. Our focus was concentrated on that smaller segment of students that could gain us extra points or cost us points if we did not intervene.

During professional development, the social studies teachers would break into our course specialties either by grade-level or if you taught an EOC. We would be repeatedly told that our district and our schools do not teach to the test. We are student-focused, and teaching to the test does not create well-rounded students and citizens. Immediately following this pep talk, the EOC teachers would be whisked away to our separate room, where we would breakdown the state assessment standards and items analysis with the frequency that these questions would be asked on the test. If this was not teaching to the test, it was at minimum planning your course around the test.

Susan Neuman, a professor of childhood education and literacy at New York University, identified similar data-driven exploits when looking at a 4th-grade classroom: "...there is an alphabet soup of measures that include running records and degrees-of-reading assessments along with an array of math tests...In all, she [Ms. Franklin] has created more than 10 data sets" (2016). Tracking students into particular courses may be publicly frowned upon, but tracking students' assessment scores is booming and normatively seen with a sense of professional pride for those that create personalized versions of trackers. Accolades and exemplars are hoisted upon the educator with the most complex and sophisticated trackers. In a perverse transformation, teachers with data-filled trackers are hailed as role models for incoming educators rather than their higher-performing colleagues who utilize an artistic version of improving student growth.

The conventional inclination of educators would typically be to treat all our students as bubble students. We should focus our attention on what we can do to help each student's learning and see that any threat of decline and any hope

of improvement is thoroughly observed and treated with our attention. Unfortunately, an educator's natural tendency is student-driven and data-informed rather than simply data-driven.

Tracking and analyzing student data is critical for helping each student achieve their potential. However, the data that teachers should be monitoring is their students' daily work and activities, which can then be utilized to adapt lessons and interventions immediately. Creating professional development focused on standardized state and national testing limits what can be done for students whose data is being investigated. Even the idea of analyzing testing data is not inherently wrong, but as we see data after a student has left our class, our adaptations will always be a year behind schedule. The scientific method of teaching is based on the idea of standardized students and standardized learning. Education has made tremendous gains in recognizing the differences that every student presents to educators, and now we have to use that knowledge to reclaim student data as a tool for improving student learning rather than student testing.

Factory Model Education

The previous section noted the tremendous strides mass education and teacher preparation programs have made to understand learning diversity within classrooms. Differentiation has become a common theme of student-teaching, and student voice in classroom structure and curricula have been gaining ground. Even the COVID-19 pandemic shed light on students' differences, even in seemingly homogenous areas and schools. The customization and individualization of learning is a movement espoused by researchers and educators alike (Deunk, 2018; Newman et al., 2000).

Nevertheless, there is also a counter-movement amongst educators who argue differentiation and customization are unfair to students and creates incentives for students to give up when challenges become too complex (Duckworth, 2016; Wai, 2014). The argument focuses on the idea that all students achieve the same high standards if teachers taught adequately and followed the basic scientific teaching methods that will enhance every educator.

The debate surrounding academic achievement and the need to differentiate, customize, or individualized education can be seen in the acrimonious discussion prompted by a cartoon known as "Now climb that tree" (Figure 1). The drawing itself was spread virally throughout public and educational circles to represent the inequities in education systems. However, detractors correctly illuminate that students are not different species and have more commonalities than fish, monkeys, and elephants.

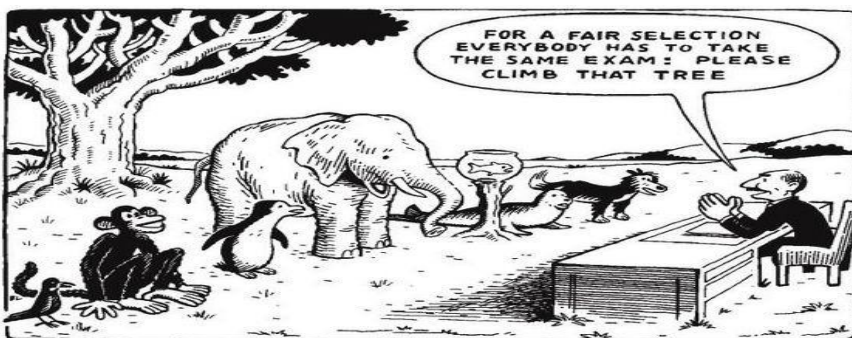


Figure 1: Now Climb that Tree, Source Unknown.

What has been missed in the discussion is the idea of what it means to succeed in school. If we only have one definition of what it means to succeed in school, earning a 4.0 GPA, an A+ in a course, or 1600 on an SAT, then there is indeed one standard. Thankfully, we can see success in academics through many lenses that create a more inclusive idea and realistic view of achievement (Gardner, 1983).

The idea every student can achieve the same intellectual level of accomplishment is a divisive issue within education. If you argue that not every human being can be equally intelligent, which defining intelligence is problematic on its own, you are labeled a pariah or even a bigot (de Boer, 2020). It should be noted that those labeling people bigots for stating a scientific fact are the ones injecting race into an issue that affects all people universally.

Rather than accept these natural limitations of unnatural and socially constructed definitions of success, proponents of the new science of teaching prefer to standardize teaching and learning while returning to the outdated and thoroughly debunked method of the factory model of education. All students should be taught the same way, and all educators should teach identically because our measure of success is solely based on how well you perform on a standardized test.

During the spring of 2019, I took a trip to Minneapolis, Minnesota, and was fortunate enough to visit and observe classrooms at Prodeo Academy, a Pre-K-8th charter school¹. The school was billed and lived up to its reputation

¹ The United States of America has multiple versions of schools for early childhood through secondary school. Traditional public schools are the most frequent and are locally controlled and available to all students residing within their borders. Recently, public schools have been divided into traditional, charter and magnet schools. Charter schools are public/private entities that are open without charge but are not required to follow all of the same requirements as public schools and can select students to attend while rejecting other students. Magnet schools are similar to traditional public schools but can enroll students from outside their traditional neighborhood borders. Lastly, private schools are not funded by the government but are sustained through student tuition and require applications and acceptance.

as an educational institution built on structure and efficiency. The school's co-founder, Chancey Anderson, explained that you could walk down the hall, and every teacher within each grade level would be speaking on the same topic and possibly on the same sentence. If educational experience's goal is to standardize the learning, then schools like Prodeo are successes.

The factory model of education has evolved beyond being a helpful analogy and can now be seen as a literal description of many classrooms and schools. Educators are now given turn-key curricula and forced to teach from scripts rather than developing their lessons, which could be altered for their particular students (Demko & Hendrick, 2010; Ede, 2012; Eisenbach, 2012; MacGillivray et al., 2006).

Accountability and more rigorous curricula are the drivers for the new push for standardized classrooms. Liberal educators traditionally lambaste the factory model of education, but the need to place blame within current schooling led to a melding between conservative ideas of colorblindness and liberal notions of complete equality. Tom Nichols' book *The Death of Expertise* (2019), succinctly elucidates this point by writing: "C.S. Lewis saw much of this coming over a half-century ago when he lamented the curdling of 'democracy' into the misconception--a lie if we are to be accurate--that all people are not just equal before the law, but are equal in all respects" (p. xvi-xvii).

The scripted classroom takes the idea of equality to absurd levels of fruition. The scripted curriculum deems all students equal from a learning ability perspective, but the concept of differentiation and customization as being intentionally discriminatory. Therefore, the educational, industrial complex began to utilize new forms of technology.

One of the newer methods for creating standardized educators and factory model schools can be seen with bug-in-ear (BIE) coaching. National Education Policy Center Executive Director Carol Burris called it "unnerving and demeaning," while Research Professor of Education Diane Ravitch said it "assumes teachers know nothing" (NFLANAGAN, 2020). For those unfamiliar with BIE, it is a technique where a teacher wears an earpiece as they teach and a coach or administrator tells them what they are doing incorrectly or should try as the teacher is interacting with students (Ottley et al., 2015; Regan & Weiss, 2019; Rosenberg et al., 2020). I will not digress into the mountains of research that point out the flaws with multitasking, but BIE is not merely for novice educators.

Several years ago, a colleague of mine was persuaded to leave our public school district to teach at a local Knowledge Is Power Program (KIPP) charter school. The charter school offered a handsome signing bonus and advancement opportunities that appeared limited within our school district. James was a ten-year veteran of the St. Louis Public Schools system and was recognized as

the district's math educator of the year only one year prior. Even with such qualifications, James was required to participate in the organization's BIE training. He did not need assistance in becoming a quality educator, but he did need reeducation in becoming an educator who followed a specific curriculum and used particular language, such as referring to students now as scholars.

Not surprisingly, this form of standardized instruction and invasive coaching did not coalesce with James' experiences with teaching diverse students. The creative aspect of James' teaching was the factor that promoted individualized student growth. James' experiment in BIE and teaching at a factory model of education institution lasted less than two months before he sent in his letter of resignation, which also required him to return his signing bonus and return money from a teaching salary is a powerful anecdotal indictment.

KIPP administration required educators to dismiss elements of a student's background, such as parental engagement, living conditions, systemic oppressions, socioeconomic status, and even school funding inequities. As Frederik deBoer (2020) wrote: "...to act as though every human being has the same potential in academic life is no more sensible than expecting every sapling to grow to the same height. It's a fiction, a pleasant fiction, and one we can't keep believing" (p. 31).

Why do we want to believe this fiction continually? Isn't the familiar phrase that the most unfair thing we can do is treat everyone the same, equally true? Today's social justice movement and the recognition of certain educational systemic prejudices should be opening the eyes of those supporting the factory model of education. We can no longer utilize the argument "all things being equal" because we are slowly starting to wake up and realize that all things are not even close to being equal.

The utilization of science in teaching is not to be shunned. Science and research-based practices need to be continually studied and implemented within districts, schools, and classrooms when applicable. However, all teachers should follow a strict protocol for how best to teach is detrimental to our teaching ranks and equally damaging to students.

One of St. Louis Public Schools' priorities for teachers is called their Blackboard Configuration (BBC). Teachers are evaluated on whether their BBC is present and updated when being observed by the administration. The BBC consists of visual representations of a class agenda, current date, lesson objectives, homework assignments, course resources, and school information. Teachers can be deemed to be proficient if they have these posted within their classroom. There is no determination required on how these "non-negotiables" are utilized by the educator but simply present.

The district followed best-practices and research-based practices to locate these six elements to a successful classroom. It becomes evident to anyone

with an educational background that the posting of successful elements does not lead to success but rather their implementation. This proposition is similar to a policy implemented in Illinois that wanted to send home all newborns with a book because studies found that houses with more books led to more literate families. The policy failed to recognize that it was not the number of books a family had but the inclination towards reading within a household that increased literacy.

Districts and schools across the United States and the world are returning to the idea that there is one best way to teach. Scientific research and aggregated research can present us with those premiere methods, and rapid repetition and induction into these pedagogical tools will clear the way for student growth no matter the backgrounds or unique stories of individual students. Teachers will then be judged on how well they implement a set of obligatory tasks rather than how effectively they teach. The dramatic shift backward in time for educators correlates perfectly with the rise in the importance of standardized testing.

Standardized Testing

Perhaps there has been no more significant catalyst for the rise of teaching as a science like standardized testing. The testing regimes created a singular focus within education towards student assessments rather than the complex nature of individualized learning and growth. The tests themselves are even described as highly sophisticated scientific instruments that are then aggregated or disaggregated into datasets for analytical and forensic analysis by committees led by assessment coordinators. Take a moment and reread the previous sentence and notice what word was not mentioned: students.

During the COVID-19 pandemic, the American Academy of Pediatricians continually warned about the effects online learning was having on the social-emotional learning and development of K-12 students. However, when American schools began to reopen, one of the most prominent debates was the controversy surrounding why state departments of education were seriously considering reinstituting mandated testing for students in the spring of 2021. The obsession and addiction to standardized testing within the education community have become obstacles for students and teachers. Administrators may laud the availability of testing data and data trackers, but you will be hard-pressed to find a classroom teacher who even supports the idea of standardized testing.

If everyday frontline educators are so against the requirement of standardized testing, then why do they continue to thrive and invade every aspect of schooling? The simple yet equally dispiriting answer is standardized testing is the easiest and most efficient way to compare students, schools, and districts (Kaukab & Mehrunnisa, 2016; Wiliam, 2010; Zucker, 2003). On the flip side, testing companies such as Pearson suggest their testing measures what stu-

dents know, what instruction needs to be improved, and how to help students achieve higher scores (Zucker, 2003).

One of the most robust defenses by those supporting the continued utilization of standardized tests is that the tests have been scientifically created to be reliable, valid, and unbiased. When proponents of testing use these terms, they state the tests produce consistent results, measure what they are supposed to measure, and do not place specific demographics of students at disadvantages. There are several critical areas of concern with the three bulwarks of standardized testing.

The idea that a test is helpful because it produces similar results each time it is taken does not tell us if it is suitable for student learning or growth. Suppose you are receiving consistent results from a faulty premise, then the fact they are similar time and again is invalid. An analogy would be to create a device that can measure which hexagon or pentagon my foot makes contact with every time I kick a soccer ball. Now the instrument itself brings back excellent data on which specific part of the ball I boot, but it does not consider my foot velocity, skill level, training regiment, wind, or playing surface. Have I learned anything about my soccer playing ability by understanding consistently which hexagon or pentagon I kick?

Then we must focus our attention on the equally misaligned concept of validity. Do our standardized tests measure what we want them to count? On this point, standardized tests do measure what they are designed to measure. The problem with this portion of the scientific element of standardized testing is they do not measure the right attributes in our students. Measuring how well millions of students perform on a multiple-choice, norm-referenced assessment will specifically tell us how well they performed on a multiple-choice, norm-referenced examination. Standardized tests will not tell you about students' creative abilities or the inequities of their education but rather demonstrate if they have memorized certain content and can recall it under timed conditions.

We can bring back our hypothetical soccer ball and realize our test will continually tell us which hexagon or pentagon we are hitting, and the data will always tell us if we hit the same or different with each kick. However, it will not tell us if we are kicking the ball well or if our overall ability to kick the soccer ball is improving. We're so fixated on collecting data that we never stopped to ask ourselves if we measure the right questions.

The final leg of the standardized test defense is its unbiased nature. The first and most explicit argument against this notion is that there can be no such thing as an impartial test because human beings create these tests, and we are biased by nature. However, to clarify, the claim that standardized tests are unbiased has been proved false year after year (Arewa, 1977; Clawson et

al., 1981; Garg et al., 2020; Valdes & Figueroa, 1994). Standardized testing has been proven to be biased against race, gender, socioeconomic statuses, secondary language speakers, and the neuro-diverse. It is pretty hard to find a demographic group that has not faced bias from standardized testing outside of the economically and educationally elite. The College Board, which facilitates the annual Scholastic Aptitude Test, created an adversity index to accompany their standard test scores because their test was biased against lower socioeconomic classes.

However, millions of students find themselves forced to spend hours throughout the school year sitting for these biased examinations. Once the tests are complete, an equally non-educational experience is undertaken. Data teams and administrators focus on whether the data matches the bell curve. According to the science of education tenets, students should fall along a path resembling a bell, such as in Figure 2.

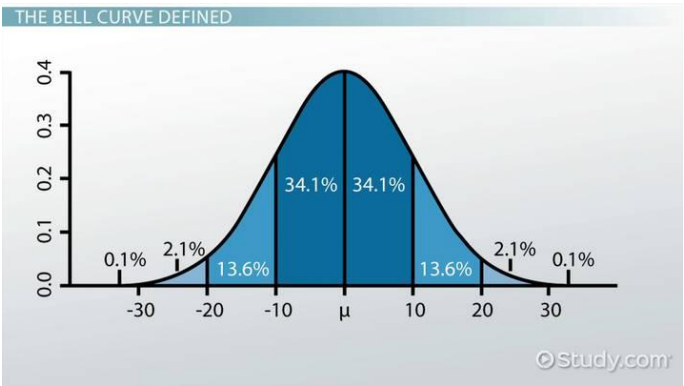


Figure 2: The Bell Curve. Source: Study.com

Students 'individuality is weeded out of the process, and natural randomization of intelligence will be spread between the quartiles with 68% of students within one standard deviation, 95% within two standard deviations, and 99.7% within three standard deviations (Herrnstein & Murray, 1996).

The issue with the bell-shaped curve in education, whether on standardized tests or even classroom grades, is that the normal distribution is randomly occurring. In reality, a teacher would want their curve to skew to the right as scores should increase with teaching. If you teach a class and your classes derive a normal distribution, you need to look at your practice and why it is not adequate for more students. We are forcing more scientific means and measurements into education to lie to ourselves that education is objective and unbiased when it is not either of those.

Our fixation on data and scientific analysis of student scores on standardized tests removes us from the individualization of student learning and

growth. Not only are we fixating on the data, but we become duplicitous in maintaining the Anglo-American norm of education. The unfounded belief that standardized testing is unbiased allows schools and districts to remain colorblind and ignorant of classroom diversity. The science of teaching forces us to objectify our students and see them as data points and bubble kids rather than unique individuals with their perspectives and worldviews requiring differentiated knowledge construction.

The objectifying of student achievement is seen most clearly by another College Board assessment, the Advanced Placement (AP) tests. Whereas the AP test has all of the same flaws as the SAT and state high-stakes testing, it also includes norm-referencing. With a norm-referenced assessment, the student's score is no longer being scored against an objective standard but relatively to other test takers (de Boer, 2020). AP tests have now combined erroneous standardization with abject relativity. Therefore, if two students took the same test one year apart and answered the same number of questions correctly, then it is pretty likely they would obtain different scores due to the outside influence of other students. Your overall performance is subject to your peers' ability rather than your own and is perhaps one of the most inequitable academic achievement measures.

Conclusion

The impetus behind teaching as science can lead to tragic consequences for students who do not fit the academic norm. The science of teaching is more appropriately focused upon the science of learning (Skinner, 1954). Neuro-education is a blossoming field with collaboration between university departments of education, psychology, and neuroscience. Education departments are beginning to offer certificates in neuro-education that highlight neuroscience's application in improving student achievement within the classroom.

Therefore, there should be and needs to be a place for science within the field of education. Data-informed instruction offers educators beautiful insights into their students' strengths and weaknesses, but the focus should be on the growth of all students rather than aggregated data and school accountability assessments. Student learning should not be measured and compared through norm-referenced grading and plotted on normal distributed bell-shaped curves. One of the predominant flaws with the science of teaching is the erasing of the individual student.

Our focus in classrooms should always be student-driven and science or data-informed. The students are our subjects, and as a teacher, the artistic element allows each individual to succeed through their potential. To achieve this success, we need to remember that we are in classrooms to teach students and not simply teach content or teach to a test.

Analytically tested scripted curricula remove teachable moments from the daily equation. I had spent four years teaching our school's state-mandated high-stakes examination. Over the course of those years, I had assisted students in scoring school records on their end-of-course exams. Even when producing results that were wanted, I was called out by an administrator because a student wanted to understand her income tax a little better, and I went off topic to discuss how personal income tax works in Missouri and the United States. To make matters worse, our class was discussing government spending, which is intimately related to personal income taxes.

We must never forget whom we teach, and the purpose for teaching is educating young individuals and not scoring on standardized tests. I began this chapter with a story about a student-teacher who exemplified the science of teaching. Christopher Emdin (2016) wrote about a similar experience:

The more I read what the principal had described as 'model 'lesson plans, the more concerned I was about how he planned to connect with his students. The lessons were so structured and inflexible that they restricted student involvement to a set time period for questions, and even these were planned for-the lessons featuring answers to students' 'expected questions. (p. 47)

Classrooms are not laboratories, and the number of variables and changes may be reminiscent of chaos theory, but that does not mean we replace our artists with standardized models of educators. Our students deserve compassionate and artistic teachers with the capability of utilizing scientific tools.

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ETHNIC/RACIAL DIFFERENCES IN PROFESSIONAL DEGREE ATTAINMENT OVER TIME: A TEXAS, STATEWIDE ANALYSIS

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Introduction

A graduate education has become increasingly important in terms of employment, financial stability, economic health, and in remaining competitive in the global marketplace. Indeed, graduate degree programs prepare individuals to “teach in our schools and universities, drive innovation, attract intellectual and commercial investment, and strengthen American prestige and economic power” (Wendler et al., 2010, preface). According to Wendler et al. (2012), from 2010 to 2020, 2.6 million jobs would require a graduate degree and occupations requiring a doctoral or professional degree would increase by 20%. Further predicted was that the majority of all new occupations from 2010-2020 would be in the professional and service sectors (Wendler et al., 2010). Some of these occupations require a professional degree—an advanced degree that is different from a master’s or doctoral degree. A professional degree can be defined as “discipline specific, including, but not limited to, degrees such as Dentistry (DDS or DMD), Medicine (MD), Osteopathic Medicine (DO), Veterinary Medicine (DVM), Law (LLB, JD), Optometry (OD), [and] Pharmacy (PharmD)” (Texas Higher Education Coordinating Board, 2017, p. 32).

The aforementioned professional degrees typically involve extensive study in one or more areas of science, technology, engineering, and mathematics—fields commonly referred to by those individuals in the academic community as STEM fields. The importance of a graduate educated workforce in STEM areas has been emphasized by several researchers. These researchers have also noted that to realize projected labor demands, the workforce of the future

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must be educated in STEM areas (Dika & D'Amico, 2016; Griffin & Muniz, 2011; Holley & Gardner, 2012; Jones et al., 2018; Okahana et al., 2018; Sowell, Allum, & Okahana, 2015; Smith, Turner, Osei-Kofi, & Richards, 2016). Indeed, according to Jones et al. (2018),

... science, technology, engineering, and mathematics (STEM) underpin the government's ability to defend the nation and to assure the vitality of the economy. STEM jobs are the fastest growing occupational category and, by 2020, 65% of all jobs in the U.S. will require a post-secondary degree with STEM literacy skills. (p. 40)

Along with the increasing importance of a graduate education, particularly in professional degree STEM fields, is the importance of promoting and sustaining racial/ethnic diversity in graduate degree programs as well as in the workforce. However, although an increasing number of underrepresented students in higher education has been documented, these students still remain underrepresented in postsecondary institutions across the nation (American Council on Education, 2019). Similarly, the American Council on Education (2019) noted that, in Fall 2018, 24.1% of the graduate student population belonged to underrepresented groups. Although this percentage reflects an increase in underrepresented graduate students, this population continues to remain substantially underrepresented (American Council on Education, 2019).

Identifying the paucity of research on underrepresented students in advanced degree programs, Franklin (2013) investigated an education and diversity initiative implemented in the State of Texas known as Closing the Gaps by 2015. Franklin (2013) focused on the numbers and percentages of advanced degrees awarded to White, Hispanic, and Black students by postsecondary institutions in the State of Texas from the 2000 through the 2011 academic years. Although Franklin (2013) analyzed master's, doctoral, and professional degree attainment, for purposes of this article, only professional degree attainment will be discussed. Readers should note that Asian students were not included in Franklin's (2013) work due to their very low percentages in the Texas population.

Franklin (2013) documented that from the 2000 academic year through the 2011 academic year, a total of 20,579 professional degrees were awarded to White, Hispanic, and Black students by Texas 4-year postsecondary institutions. White students were awarded the highest number of professional degrees for each individual year from 2000 to 2011. The number of degrees awarded to White students fluctuated throughout the 12-year period, ranging from a low of 951 in 2007 to a high of 1,182 in 2005. The number of professional degrees awarded to Hispanic students increased steadily from 2000 to 2011, climbing from a low of 153 in 2000 to a high of 253 in 2011. Similar to

the number of professional degrees awarded to White students, the number of professional degrees awarded to Black students fluctuated throughout the 2000-2011 academic years. The fewest professional degrees (n= 172) were awarded to Black students in 2000 and the most professional degrees (n= 226) were awarded in 2003.

Regarding the percentage of professional degrees awarded to White, Hispanic and Black students from 2000 to 2011, White students earned the highest percentage of professional degrees throughout the 12-year period from 2000-2011, as well as in each individual academic year. The percentage of professional degrees awarded to White students fluctuated throughout the 12-year period, with the highest percentage awarded in 2000 (66.42%) and the lowest percentage awarded in 2011 (55.80%). The percentage of professional degrees awarded to Hispanic students and to Black students also varied throughout the 2000 and 2011 academic years. Hispanic students earned the lowest percentage of professional degrees in 2002 (9.46%) and the highest percentage in 2011 (14.10%). Overall, with the exception of the percentage of degrees awarded in 2002, a steady increase was observed in the percentage of professional degrees awarded to Hispanic students from 2000 through 2011. Similar to the percentage of professional degrees awarded to White and Hispanic students, the number of degrees awarded to Black students fluctuated from 2000 through 2011, with the lowest percentage awarded in 2010 (10.18%) and the highest awarded in 2003 (13.64%).

Statement of the Problem

Over the past two decades, the demographics of the population in the United States have been transformed to reflect an increasingly diverse, racial/ethnic population. This transformation is reflected in the student population of postsecondary institutions across the nation, particularly at the undergraduate level. However, at the graduate level, substantial inequities exist in terms of racial/ethnic diversity in relation to educational attainment. Moreover, the majority of research studies on racial/ethnic diversity in postsecondary education has been conducted by researchers who have focused on the undergraduate student population. Only a few empirical research investigations have been conducted by researchers on the experiences of underrepresented students and educational attainment at the graduate level. The lack of research in this area is problematic when considering the increasing importance of a diverse and educated workforce—a workforce with a graduate education. Indeed, researchers have determined that a graduate education is becoming progressively necessary in terms of securing employment, increasing earning potential, promoting a healthy economy, and in remaining competitive in a global marketplace (Koc, 2013; Perna, 2015; Wendler et al., 2010; Wendler et al., 2012). The lack of scholarly research studies on diversity and race/ethnicity in relation

to advanced degree attainment becomes even more problematic when considering the multifaceted ways in which a diverse graduate student population could potentially inform a diverse workforce. As noted by the American Council on Education (2019),

Racial and ethnic diversity comes with a host of benefits at all levels of education and in the workforce—greater productivity, innovation, and cultural competency, to name a few. Moreover, the current and future health of our nation—economic and otherwise—requires that the whole of our population have equitable access to sources of opportunity. (p. 3)

Purpose of the Study

The overall purpose of this study was to determine the degree to which changes might have occurred in the numbers of professional degrees awarded to White, Hispanic, and Black students in Texas public postsecondary institutions over an 8-year period, which includes two education initiatives in the State of Texas, *Closing the Gaps by 2015* and *60x30TX*. Specifically addressed were the numbers of professional degrees awarded to White, Hispanic, and Black students in Texas public postsecondary institutions over a 19-year period. Also ascertained were the percentages of professional degrees awarded to White, Hispanic, and Black students in each of the five academic years. Analyses were conducted between the 2001-2002 academic year and the 2018-2019 academic year to determine whether statistically significant changes have occurred in the numbers and percentages of professional degrees obtained by White, Hispanic, and Black students. The final purposes involved ascertaining the extent to which trends were present in both the numbers and percentages of professional degrees awarded to White, Hispanic, and Black students in Texas for the 2011-2012 through the 2018-2019 academic years.

Significance of the Study

The significance of this study is fourfold. First, although the increase in a diverse, racial/ethnic population in the United States is reflected in postsecondary institutions at the undergraduate level, substantial disparity exists at the graduate level—particularly in terms of racial/ethnic diversity in relation to educational attainment. Second, the preponderance of research on racial/ethnic diversity has been conducted by researchers who investigate these concepts as they relate to an undergraduate education. However, few researchers have explored how race/ethnicity and diversity inform education in advanced degree programs at the national level or at the state level, particularly in the State of Texas. Currently, only one researcher has conducted an investigation of Texas' statewide initiative, *Closing the Gaps by 2015*, which involved an analysis of the number and percentage of professional degrees awarded as a function of race/ethnicity from 2000 through 2011. Thus, thirdly, the significance of this study largely resides in serving as an update to Franklin's (2013)

research by examining underrepresented student completion rates for professional degrees during the 20 academic years of the *Closing the Gap by 2015* initiative as well as for the *60x30TX* plan from 2015-2016 through the 2018-2019 academic years. This information might prove advantageous to those individuals who are tasked with creating and implementing educational and diversity initiatives and to those involved in decision-making processes related to higher education. Finally, this study will contribute to the relatively limited body of research and literature on underrepresented students' attainment of professional degrees.

To provide a context for the findings of this article, according to the World Population Review (n.d.), 73.97% of the Texas population is White, 39.7% is Hispanic, 12.13% are Black, and 5.2% are Asian. Readers should note, however, that the percent of White persons, without also being Hispanic or Latino, is only 41.2%. As such, Texas is regarded as being a majority-minority state where less than 50% of the population is White, non-Hispanic.

Research Questions

The following research questions were addressed in this study: (a) What are the numbers of professional degrees awarded to White students at public postsecondary institutions in Texas from the 1999-2000 academic year through the 2018-2019 academic year?; (b) What are the numbers of professional degrees awarded to Hispanic students at public postsecondary institutions in Texas from the 1999-2000 academic year through the 2018-2019 academic year?; (c) What are the numbers of professional degrees awarded to Black students at public postsecondary institutions in Texas from the 1999-2000 academic year through the 2018-2019 academic year?; (d) What is the difference in the percentage of professional degrees awarded to White students at public postsecondary institutions in Texas from the 1999-2000 academic year through the 2018-2019 academic year?; (e) What is the difference in the percentage of professional degrees awarded to Hispanic students at public postsecondary institutions in Texas from the 1999-2000 academic year through the 2018-2019 academic year?; (f) What is the difference in the percentage of professional degrees awarded to Black students at public postsecondary institutions in Texas from the 1999-2000 academic year through the 2018-2019 academic year?; and (g) What is the trend in the percentages of professional degrees awarded to White, Hispanic, and Black students at public postsecondary institutions in Texas between the 1999-2000 academic year and the 2018-2019 academic year?

Method Research Design

A non-experimental, causal comparative research design was used for this empirical investigation. According to Johnson and Christensen (2017), this type of research design is appropriate when a study involves an examination of

“the relationship between one or more categorical independent variables and one or more quantitative dependent variables” (p. 43). In this study, the independent variables were academic years and race/ethnicity, and the dependent variables were enrollment numbers and percentages. Archival data for these variables were downloaded from the Texas Higher Education Coordinating Board Interactive Accountability website. Specifically, data included the numbers and percentages of professional degrees awarded to White, Hispanic, and Black students in the State of Texas for the 1999-2000 academic year through the 2018-2019 academic year. A decision was made not to include Asian students due to their very low percentage of the Texas population, only 5.2%.

Participants

Participants for this study included only public, 4-year postsecondary institutions in the State of Texas that reported race/ethnicity and professional degree information to the Texas Higher Education Coordinating Board. Data from private postsecondary institutions, community colleges, technical institutions, and health-related institutions were not included in this study. For this study, an archival dataset was retrieved from the Texas Higher Education Coordinating Board Interactive Accountability system—a system designed to monitor the effectiveness of postsecondary institutions in Texas and to generate data that is used to improve educational outcomes.

Results

The dependent variables in this study were the numbers and percentages of professional degrees awarded, and the independent variables were race/ethnicity and individual academic years. Because the Texas Higher Education Coordinating Board combines these variables, the appropriate inferential statistical procedures to use were paired samples *t*-tests. A check of the underlying assumptions of this statistical procedure revealed that the majority of them were met (Slate & Rojas-LeBouef, 2011). Accordingly, paired sample *t*-tests were used to answer the inferential research questions presented earlier. The results for each of the seven research questions will be reported separately.

Results for Research Question One

The first research question in this study was “What are the numbers of professional degrees awarded to White students at public postsecondary institutions in Texas from the 1999-2000 academic year through the 2018-2019 academic year?” To answer this question, descriptive statistics were calculated. As revealed in Table 1, the number of degrees awarded between 1999-2000 and 2018-2019 fluctuated throughout this time period. The fewest number of degrees awarded was 871 in the 2017-2018 academic year, and the highest number of degrees awarded was 1,091 in the 2013-2014 academic year. The average number of professional degrees awarded at Texas universities ranged

from 73 to 203. Regarding the overall percentage of degrees, an increase of 88% was observed in the number of professional degrees awarded to White students from Texas universities.

Table 1

Descriptive Statistics for the Number of Professional Degrees Awarded to White Students Between the 1999-2000 and 2018-2019 Academic Years

Academic Year	n of universities	Sum	M	SD
1999-2000	5	993	198.60	153.07
2000-2001	5	1016	203.20	159.80
2001-2002	5	1002	200.40	164.53
2002-2003	5	985	197.00	149.26
2003-2004	6	1026	171.00	165.34
2004-2005	6	1182	197.00	186.68
2005-2006	7	1031	147.29	150.50
2006-2007	8	951	118.88	132.97
2007-2008	8	1030	128.75	142.57
2008-2009	9	972	108.00	130.67
2009-2010	9	1011	112.33	114.49
2010-2011	11	1001	91.00	112.63
2011-2012	12	977	81.42	100.54
2012-2013	12	947	78.92	96.77
2013-2014	12	1091	90.92	112.25
2014-2015	12	1026	85.50	105.48
2015-2016	12	985	82.08	104.30
2016-2017	12	961	80.08	94.40
2017-2018	12	871	72.58	85.23
2018-2019	12	875	72.92	87.37

Results For Research Question Two

To answer the second research question, “What are the numbers of professional degrees awarded to Hispanic students at public postsecondary institutions in Texas from the 1999-2000 academic year through the 2018-2019 academic year?”; descriptive statistics were calculated. As delineated in Table 2, the number of professional degrees awarded to Hispanic students steadily

increased from the 1999-2000 academic year through the 2018-2019 academic year. A total of 153 professional degrees were awarded to Hispanic students in the 1999-2000 academic year, which progressively increased to 303 in the 2018-2019, representing a 198% increase in the number of professional degrees awarded to Hispanic students. Additionally, as revealed in Table 2, the average number of professional degrees awarded to Hispanic students by Texas universities increased from 64 to 227.

Table 2 Descriptive Statistics for the Number of Professional Degrees Awarded to Hispanic Students Between the 1999-2000 and 2018-2019 Academic Years

Academic Year	<i>n</i> of universities	Sum	M	SD
1999-2000	5	153	30.60	19.01
2000-2001	5	181	36.20	20.84
2001-2002	5	157	31.40	21.96
2002-2003	5	176	35.20	27.54
2003-2004	5	177	35.40	23.80
2004-2005	6	203	33.83	32.11
2005-2006	6	236	39.33	36.23
2006-2007	7	236	33.71	35.74
2007-2008	7	224	32.00	36.43
2008-2009	6	242	40.33	38.81
2009-2010	8	233	29.13	31.17
2010-2011	10	253	25.30	29.29
2011-2012	12	247	20.58	28.22
2012-2013	10	269	26.90	28.65
2013-2014	10	283	28.30	25.82
2014-2015	10	275	27.50	28.59
2015-2016	10	288	28.80	26.94
2016-2017	11	286	26.00	24.62
2017-2018	11	288	26.18	24.50
2018-2019	12	303	25.25	25.43

Results For Research Question Three

The third research question in this study was, “What are the numbers of professional degrees awarded to Black students at public postsecondary institutions in Texas from the 1999-2000 academic year through the 2018-2019 academic year?” To answer this question, descriptive statistics were calculated. As revealed in Table 3, the number of master’s degrees awarded to Black students increased from 139 in 1999-2000 to 213 in 2018-2019. The fewest degrees awarded was 139 in the 1999-2000 academic year and the highest number of degrees awarded was 233 in the 2017-2018 academic year. The average number of professional degrees awarded ranged from 18 to 56. Overall, a 153% increase was documented in the numbers of professional degrees awarded to Black students during the academic years of data that were analyzed.

Table 3 Descriptive Statistics for the Number of Professional Degrees Awarded to Black Students Between the 1999-2000 and 2018-2019 Academic Years

Academic Year	<i>n</i> of universities	Sum	M	SD
1999-2000	4	139	34.75	52.12
2000-2001	4	172	43.00	68.79
2001-2002	4	217	54.25	83.00
2002-2003	4	226	56.50	80.64
2003-2004	4	208	52.00	76.92
2004-2005	5	194	38.80	59.04
2005-2006	4	187	46.75	61.90
2006-2007	7	224	32.00	65.29
2007-2008	5	219	43.80	62.17
2008-2009	5	213	42.60	61.06
2009-2010	5	177	35.40	39.53
2010-2011	6	198	33.00	48.12
2011-2012	10	208	20.80	41.74
2012-2013	8	182	22.75	38.19
2013-2014	9	212	23.56	43.48
2014-2015	7	193	27.57	42.79
2015-2016	8	179	22.38	37.13
2016-2017	10	177	17.70	32.60

2017-2018	10	233	23.30	47.27
2018-2019	8	213	26.62	46.71

Results For Research Question Four

Regarding the fourth research question, “What is the difference in the percentage of professional degrees awarded to White students at public postsecondary institutions in Texas from the 1999-2000 academic year through the 2018-2019 academic year?”, a paired samples *t*-test was performed. This analysis did not yield a statistically significant difference in the percentage of professional degrees awarded to White students between the 1999-2000 academic year and the 2018-2019 academic year, $t(4) = 1.15, p = .31$. The percentage of professional degrees awarded to White students was 69.26% in the 1999-2000 academic year compared to 59.63% in the 2018-2019 academic year. Descriptive statistics for this analysis are presented in Table 4.

As discussed previously, the percent of the Texas population that are White, non-Hispanic is 41.2%. Thus, the percentages delineated above reflect a substantially higher percentage of White students who obtained professional degrees than their percentages in the Texas population.

Table 4 Descriptive Statistics for the Percentages of Professional Degrees Awarded to White, Hispanic, and Black Students Between the 1999-2000 and 2018-2019 Academic Years

Academic Year	White%	Hispanic%	Black%
1999-2000	69.26	13.52	17.22
2000-2001	65.04	14.86	20.11
2001-2002	66.36	12.33	21.32
2002-2003	64.17	13.16	22.67
2003-2004	66.04	12.67	21.28
2004-2005	69.33	13.22	17.46
2005-2006	66.07	16.72	17.22
2006-2007	69.37	14.64	15.98
2007-2008	64.96	15.80	19.24
2008-2009	68.99	15.44	15.57
2009-2010	67.45	16.00	16.55
2010-2011	64.65	15.95	19.40
2011-2012	68.26	20.21	11.53
2012-2013	65.85	22.60	11.56
2013-2014	65.87	22.58	11.56
2014-2015	68.46	18.57	12.97
2015-2016	61.34	25.71	12.95
2016-2017	66.36	23.36	10.28
2017-2018	61.37	25.69	12.94
2018-2019	59.63	27.17	13.20

As presented earlier in this article, 39.7% of the Texas population is Hispanic. Accordingly, given the lower percentages of Hispanic students who obtained professional degrees, as noted in the table above, inequities were clearly established. Differences of 12% to 15% were present in the percentages of Hispanic students who obtained professional degrees in the last four years in the table above and their percentages in the Texas population.

The percentages of professional degree attainment for Black students were much more equitable, with respect to their enrollment, 12.13% of the Texas population are Black.

Results For Research Question Five

To answer the fifth research question, “What is the difference in the percentage of professional degrees awarded to Hispanic students at public postsecondary institutions in Texas from the 1999-2000 academic year through the 2018-2019 academic year?”, a paired samples *t*-test was calculated. A statistically significant difference was present in the percentage of professional degrees awarded to Hispanic students between the 1999-2000 academic year and the 2018-2019 academic year, $t(4) = -4.57, p = .01$, Cohen’s $d = 0.93$. The effect size was large (Cohen, 1988). As delineated in Table 4, the percentage of professional degrees awarded to Hispanic students in the 1999-2000 academic year was slightly over 13.52% compared to 27.17% in the 2018-2019 academic year. Accordingly, the percentage of professional degrees awarded to Hispanic students more than doubled during this time period.

Results For Research Question Six

In reference to the sixth research question, “What is the difference in the percentage of professional degrees awarded to Black students at public postsecondary institutions in Texas from the 1999-2000 academic year through the 2018-2019 academic year?”, a paired samples *t*-test was calculated and did not yield a statistically significant difference in the percentage of professional degrees awarded to Black students between the 1999-2000 academic year and the 2018-2019 academic year, $t(3) = -1.96, p = .14$. The percentage of professional degrees awarded to Black students was slightly over 17.22% in the 1999-2000 academic year and decreased to 13.20% in the 2018-2019 academic year.

Results For Research Question Seven

The seventh research question was “What is the trend in the percentages of professional degrees awarded to White, Hispanic, and Black students at public postsecondary institutions in Texas between the 1999-2000 academic year and the 2018-2019 academic year?”. As shown in Figure 1, 69.26% of professional degrees were awarded to White students in the 1999-2000 academic year. With the exception of an increase to 69.37% in professional degrees awarded in the 2006-2007 academic year, the percentage fluctuated and decreased to 59.63% in the 2018-2019 academic year. Regarding the percentage of professional degrees awarded to Hispanic students, 13.52% of professional degrees were awarded in the 1999-2000 academic year. This percentage decreased to the lowest percentage of 12.67% in the 2001-2002 academic year but then gradually increased to the highest percentage of 27.17% in the 2018-2019 academic year.

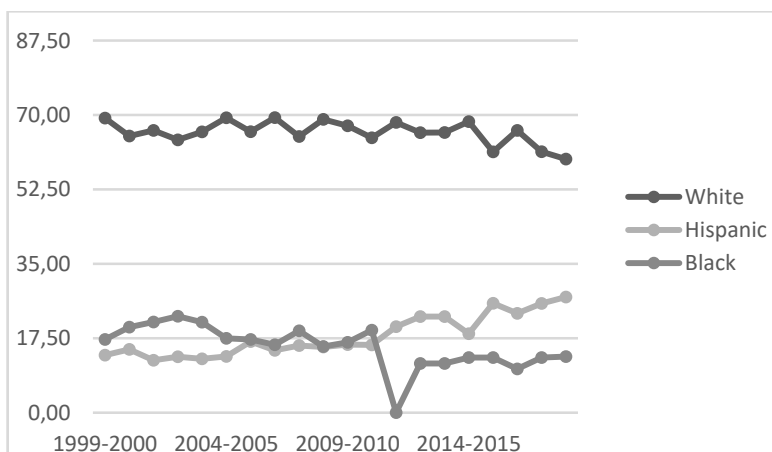


Figure 1. Percentages of professional degrees awarded to White, Hispanic, and Black students between the 1999-2000 and 2018-2019 academic years.

The percentage of professional degrees awarded to Black students was 17.22% in the 1999-2000 academic year, which increased to 22.67% in the 2002-2003 academic year, representing the highest percentage of degrees awarded to Black students between 1999-2000 and 2018-2019. However, the percentage of professional degrees awarded to Black students decreased to 13.20% in the 2018-2019 academic year. Overall, although the percentage of professional degrees awarded to White students decreased by nearly 10% between the 1999-2000 and 2018-2019 academic years, the highest percentage of professional degrees were awarded to White students in comparison to the degrees awarded to Hispanic and to Black students between 1999-2000 and 2018-2019. The percentages of professional degrees awarded to Hispanic and Black students were lower in comparison. Similar to the percentage of professional degrees awarded to White students, the percentage of professional degrees awarded to Black students also decreased by just over 4% between 1999-2000 and 2018-2019. Hispanic students were the only racial/ethnic group that were awarded a higher percentage of professional degrees in the 2018-2019 academic year than in the 1999-2000 academic year; 13.52% of professional degrees were awarded to Hispanic students in 1999-2000, a percentage that increased by 13.65% in 2018-2019.

Discussion

In this multiyear, statewide study, professional degree attainment as a function of race/ethnicity in Texas postsecondary institutions was examined from the 1999-2000 academic year through the 2018-2019 academic year in relation to two education initiatives implemented by the Texas Higher Education Coordinating Board. The first initiative, *Closing the Gaps by 2015*, was in operation from 2000-2015. The second initiative, *60x30TX*, was implemented in 2015 and will extend through 2030. Throughout the 20-year period of inter-

est in the current study, White students were consistently awarded higher numbers of professional degrees than were awarded to Hispanic and Black students. However, fewer professional degrees were awarded to White students in the 2018-2019 academic year than in the 1999-2000 academic year. In contrast, Hispanic and Black students were awarded a higher number of professional degrees in 2018-2019 than in 1999-2000.

Regarding inferential analyses over time, a statistically significant difference was not present in the percentage of professional degrees awarded to White students or in the percentage of professional degrees awarded to Black students between the 1999-2000 and 2018-2019 academic years. However, a statistically significant difference was yielded in the percentage of professional degrees awarded to Hispanic students. The percentage of professional degrees awarded to Hispanic students increased by 11.07% between the 1999-2000 and the 2018-2019 academic years.

Connections With Existing Literature

The findings of the current study were consistent with Franklin's (2013) findings regarding the extent to which progress had been made in the numbers and percentages of professional degrees awarded to White, Hispanic, and Black students. Overall, Franklin (2013) documented a statistically significant increase in the percentage of professional degrees awarded to Hispanic students between the 1999-2000 academic year and the 2010-2011 academic year. Franklin (2013) further established that statistically significant differences were not present in the percentages of professional degrees awarded to White students and to Black students between 1999-2000 and 2010-2011. These findings are consistent with the results of this study.

Implications For Policy and Practice

Based upon the findings of this multiyear, statewide investigation, some implications for policy and for practice are recommended. First, given the ever-increasing diversity of the Texas population and the subsequent increase in the diversity of the student population in Texas colleges and universities, policymakers are urged to be vigilant in acknowledging this diversity when developing policies. Second, policymakers need to examine the degree to which past and current education and diversity initiatives have been successful or unsuccessful and to then create and implement policies, accordingly. More specifically, policymakers need to identify factors that are preventing or hindering the success of education and diversity initiatives and develop policies that mitigate those factors. Third, policymakers are encouraged to create policies that include ambitious but attainable benchmarks or targets for professional degree attainment by underrepresented racial/ethnic students. Fourth, policymakers should develop policies that require communication, partnerships, and collaboration between the K-12 sector and the higher education sector. It is largely through these partnerships that policies may be practiced in a manner that promotes the procurement of a viable, highly educated, diverse workforce pre-

pared to stimulate and sustain both a healthy economy and the ability to remain competitive at the national and global level.

Recommendations for Future Research

Based on the findings of the current study, several recommendations for future research can be made. First, the current study was limited to data for professional degree attainment in the State of Texas. Future researchers are encouraged to investigate professional degree attainment by racial/ethnic groups in other states with similar demographics. Second, because data for the current study was limited to public postsecondary institutions, researchers could expand on the current study by examining professional degree attainment as a function of race/ethnicity for private colleges and universities as well. Third, future researchers could expand on the current study by including additional demographic information such as socioeconomic status, first-generation student status, marital status, employment status, and gender. Research that is aligned with any of the aforementioned recommendations would contribute to a more holistic understanding of the backdrop of a professional degree education as well as to the highly limited body of literature on the completion rates for professional degree programs by underrepresented racial/ethnic students.

Conclusion

The purpose of this study was to determine the extent to which changes had occurred in the numbers and percentages of professional degrees awarded to White, Hispanic, and Black students by public, postsecondary institutions in Texas from the 1999-2000 academic year through the 2018-2019 academic year. A statistically significant difference was not present in the percentage of professional degrees awarded to White students or to Black students between the 1999-2000 and 2018-2019 academic years. A statistically significant difference was revealed in the percentage of professional degrees awarded to Hispanic students between the 1999-2000 and the 2018-2019 academic years. Although some progress has been made in the professional degree completion rate for Hispanic students, the same cannot be said for Black students. The percentage of professional degrees awarded to Black students fluctuated and decreased by 4% between the 1999-2000 and the 2018-2019 academic years. When considering the percentages of professional degrees awarded to White, Hispanic, and Black students, for 20 years, White students were awarded the highest percentage of professional degrees. This observation highlights the continued disparity in professional degree attainment between underrepresented racial/ethnic groups. It is imperative that leaders in K-12, leaders in postsecondary institutions, leaders in the community, stakeholders, and policymakers, commit to intentional and intensified practices specifically designed to decrease and eliminate the continued disparity not only in professional degree programs but in all advanced degree programs.

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THE CHALLENGES OF ALTERNATIVE EDUCATION IN ISRAEL

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The research field of alternative education in Israel is relatively new. It presents us with research of the existing frameworks, showing themselves as alternative or educational spaces to which some or other components that choose to call themselves “alternative” have penetrated or pretend to penetrate. Nevertheless, alongside the “creativity” and “innovation” and now also the “meaningfulness” – “alternative” has become a banal and worn-out buzzword, and a term which demands us to stop and examine it carefully.

I would like to start our journey by asking the question: what is so alternative about alternative education?

Before we move ahead in this complicated endeavor to answer the question, I took upon myself, I would like to try and define – in quite an inclusive manner – the traditional education systems, mostly but also in what we call the western world.

These frameworks, also referred to as humanistic, pretend to set the person in the center and offer the idea that education and its practices will lead to growth, development, and transcendence – towards what is good. Education is, therefore, the elevator that takes a person from a lower rank (of “not knowing” or “unable”) to an upper level (of “knows”, “capable”, “worthy”), if you please. There, in that upper level, for example according to Plato, he knows what he does not know, he also loves wisdom, also gets out of the cave.

There they have has proven capabilities, since he overcame his voluptuous soul, transcended the sovereignty, tough he still does not reach the ideal he is on his way there. And there is a way towards “there”. It is a specific one, can be reviewed and examined. There lies excellence, which is a worthy purpose. This purpose rejects dogmatism as well as the harmonious and proportional development of a full range and variety of human capabilities – physical to artistic. Education, therefore, is the realization of moral virtue. Its realization, according to those who claimed throughout the history of educational philosophy, can be achieved by shaping the character and training it until it becomes second nature. According to Aristotle (1999), education is essential to men

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not because it is useful and not because it is necessary, but because it is one of the beautiful and appropriate things for a free human being.

History will summon upon the classical education of these or other such twists. In summary, it demands from every person to develop and expend his personality by reference to the hierarchy that determines what is the virtuous in action, thought and creation, while promoting rational thinking, moral behavior and the ideal of human essence (Apple, 1999).

These principles lie in the base of Israeli education and are those who unfortunately give the schools – as a bureaucratic institute and as a human space – the legitimacy to label people and rank them.

Today, nonetheless, it seems that the power of the school stems from the fact that it's an institution of economic value – meaning, an institution which retains children at relatively low rates (labeled “free” or “semi-free”) while their parents are required by the country (dare say: the kingdom) to earn a living which will reasonably sustain them (dare say: through reasonable debts in banking institutions within the kingdom or elsewhere). It's no wonder, therefore, that the educational discourse in Israel in the past few years was centered on the cost of summer camps in schools, suggested by the former minister of education, who promised to shorten the summer vacation and to extend more and more (as much as possible) the school year. In the sense of “we will keep your children at a low cost and your work will cost you dearly.”

This discourse does not discuss, for a long while, the quality of education let alone its contents. Education, therefore, comes up to upkeep, an action of human storage – sometimes in a friendlier face of the innkeeper and sometimes in a less friendly face.

Schooling frameworks have been given many justifications: from transferring knowledge, instilling tradition, preserving the hegemony, nurturing warriors, assimilating culture, to more down to earth presences such as institutions of fun and pleasure, a social institution where you learn how to get along with others, and even to essential institutions essential for obtaining a high-school diploma “because what can you do? *C'est La vie*”, according to a student quite in tune with that nationwide reality.

But beyond the criticisms thrust upon state education, it has succeeded and continues to be successful in holding to three powerful vertices through which it shapes the public's consciousness for many years, if not to say, to numb consciousness, mainly the vertex of “I, the school, know what is learning.”

State education therefore, is the landlord of “scholarship” and holds the public franchise both practical and conscientious – to name a subject “learner” and eventually to determine who is and mainly what is “a successful subject”; this triangle of three powerful vertices: “learning is school”, “school deter-

mines who is a student or learner”, and “school determines who is successful” is the grand celebrated success of the education I called here state, traditional or governmental education. In short – school. Hence, teachers in Israel officially are no longer called teachers but “education employees”. The purpose of hiring them has become clear and limited.

From now onwards, I would like to suggest that anyone or anything that does not support this position will be labeled in Israel “alternatives in education”. Meaning that every stream or educational act or even educational philosophy denying these three basic premises: (1) the school has the sole right on the license or franchise on learning and, (2) therefore, determines its shape, (3) and determines who is really a learner and his success – becomes the alternative.

Alternativeness in education is therefore different than the alternative education in Israel. The latter contains the frameworks which want to challenge, sometimes fully and other times in part, the foundations of the regular, traditional, conservative, state education. And this challenge can be quite varied. Thus, Rami (pseudonym) a teacher in a school of alternative nature in the Western Galilee where I visited alongside students from the Division of investigating Alternatives in Education (of my department in our university) said:

"The question of alternativeness is a one of degree and perspective... the group that established this school wanted something different from what children were used to: creativity, choice, small groups. This is the repertoire of the different education, the other education."

Here you have an example of alternative education. Its definition: being different, other. What is that difference? What is that otherness? It is not always clear; in my opinion it is not clear to the alternativists. I would not argue here that they do not define themselves as alternative. They do.

For instance, see how Rami defines “being different”:

"school is a community of human beings in which all the different components are partners in building the life in a community that translates itself to all aspects of school-life starting with the decision-making process to other things."

I would try to follow his definition: different and other can at times be the same thing but is characterized by one alternative element – a process in which all the people in the community are partners. Meaning different and other is in fact community. The need of communities and people in Israel, and not just in Israel, to be the landlord of education, meaning. School can eventually become one which contains regular classes, regular schedule, the Ministry of Education’s curriculum, but is alternative in one aspect – the answer to the question “to whom does this place belong?”

Alternativeness here challenges the question of ownership. The state is not the Owner, say the people at the specific alternative school, but not just there,

we are. This of course is not true, but as Rami says, "the question of alternativeness is a one of degree and perspective."

Therefore, it is a question of classical relativism, if we, at this place, say that we are alternative – we are alternative.

I wish to suggest an additional answer to Rami's perspective. Alternativeness in education today is also people's ability to establish for themselves, something that will enable them self-realization. This is entrepreneurship style 2021, if you please. They want to be pioneers specifically in education. They want to do it by themselves.

If the state of Israel embraces this alternative position – that includes, as aforesaid, just a request for a process – and transform it into an all-state process – it can preserve the state education under a blossoming alternativeness. Not just to maintain but to preserve them.

It seems that many communities of parents want only one thing – belonging. And one more thing – therapeutic belonging. As for the rest they are willing "to buy" it from the state, because in the end, they also believe in the state's educational product and believe that the state knows "what is learning?", "what a learner is?" and "what a successful learner is?".

Hence, it is an alternative education but not alternativeness in education as I tried to define it. In other words, it is the same store, but it is not part of a big cooperation or market net, rather a neighborhood store, a cozy one. People in the alternative school up north in Israel want to feel well. If it feels good to them or is right in their experience – it works. And it's even alternative. This school can also have a slogan, an alternative one (or at least this is what those who suggested it think): to feel good in the other and different school (which in the small print is "actually the same").

Then why Rami and the other people in the alternative school state: "we have great liberty in our system. Each individual will feel – both teachers and students a great deal of freedom"?

In my opinion, the facts do not indicate that. However, the feelings indicate otherwise. Hence, working on feelings or mainly the feeling of belonging – without a fundamental and substantial change in the contents or forms of learning (hence: practices) is the feeling of alternativeness. And for feeling people today are willing to pay good money. Feelings can be branded and, in a flash, they become a brand that has even a symbol, smell and feeling. A better feeling, of fun, of something that cannot be, defined in words and therefore I would try two words that sound alternative to me – different and other.

The freedom of these alternativists is not challenging the system regarding decisions we used to call critical pedagogical decisions (what to learn, when to learn, and mainly whether to learn) however, in Rami's words: "The individual's desire to be heard." And in a moment of candor two other students told us:

"We go to the teachers and tell them we have a problem, and they solve it for us. It is really nice."

The alternatives in the educational process are a feeling of expression Vis a Vis contradictions and a feeling of a therapeutic space in the face of a major authority. These alternativists, but probably not just them, have a pretty regular school and they even don't know it; yet they live feeling it is alternative-ness. They fulfil a dimension of pleasure, happiness, and self-fulfillment.

They even claim to be entrepreneurs; according to them they create a coalition of entrepreneurship. They talk about the feeling of freedom that infects everyone and confronts the alienation; and seek to express voluntary groups as part of the manifestation of concern and caring. But in fact, they are not rebelling, especially not against the three powerful vortices of traditional education.

The principal of that school says that "we have a highly complex meaningfulness. It summons opportunities – an interaction, an intimate and familial sensation." Hence, it is not clear why these elements are the alternative ones, while the rest is completely traditional, not to say highly traditional. Therefore, the conclusion is that part of the alternative education provides an important casing, but a casing, nonetheless.

It was not always like this. The alternative education in Israel along its history did challenge the fundamental points of public, traditional, conservative education: the democratic schools in Israel (Hecht, 2005) placed a harsh mirror in front of the traditional –state education, and determined, following Rousseau (1979) and Dewey (1916), which a person learns all the time even if he is not part of a learning framework structured by adults.

Democratic schools in Israel severely criticized the alienation based on single-age learning, which encloses young people within groups chosen for them (with whom to learn) and suggested multi-age and sometimes multi-layered. It came out against the premises of Piaget's (1972) developmental psychology, and assumed that a person can make bigger strides than the developmental stages enclosed for him using the professional jargon of professionals and professionalism, mostly of educational psychologists and entire theories that turned into entire institutions of formative hierarchy (meaning – educational counselors and the tracking, which Israel has been blessed with, throughout its existence, more overtly at times, and more covertly today). The democratic schools also came out strongly against imposing the orderly curriculum and suggested replacing it giving the learner choices and involving him in the learning process.

The alternative streams that corresponded with the democratic schools, gave it, and took from it, suggesting a partnership not in a therapeutic but an essential manner. It is not a partnership when I find it convenient, but a partnership that summons sharing, a call for responsibility.

The question is not "do you participate?" The answer being, "you must participate because it is yours, because it is a democracy, because you are part of it", and also: "you participate in spaces you feel discomfort or and an inner rebellion." This partnership or participation, wants to stem from a lack of consent and existential discomfort because it wants to create a situation in which this place called "an education community" is a not a place without thorns – you sometimes need to walk through a painful field, one that bothers you, that annoys you, that makes you leave your comfort zone and safe zone; one that makes you look, shout, scream, and if possible, even to identify and change your mind.

This is of course the ideal; and its implementation unfortunately manifested itself in other forms in Israel, such as a selective and elitist education, which separated those with privileges from the unprivileged, thus making the Thorn field into a pleasant bed of roses where we encounter "people like us" who agree with us.

The main alternativeness in these democratic schools' streams lies in the question do we even need to study, therefore, in the consent that sometimes you do not need "to learn" or the child/adolescent can decide not "to learn" (even for long periods of time) and s/he is the one who chooses what to learn (and not the state) and most of all with whom s/he learns.

Radical democratic school's alternativeness in Israel has also been challenged throughout the years by the mere question "who is the successful person?" and it came out against, theoretically at least, against the position that an entity external to the learner – be it the National Authority for Measurement and Evaluation or the parents/teachers or any other arbitrary examination industry – be the one to determine for the learner if he is worth anything and mostly - how much he is worth. Just as the words "insufficient" are unfounded, they have become, nonetheless a labeling and tormenting grade.

The anthroposophical schools in Israel draw their educational structure, historically, from the Waldorf education. In Israel it does not challenge the state education foundations, yet it suggests a series of practices which are too simple a challenge (not to say to convenient one) for the educational, moral, and public industrialization system. It even suggests a process of educational dialogue on issues of human development and in this matter, it creates a space for growth and immediately closes it; providing a place of honor (rather extensive one) for the significant adult/teacher who will walk alongside the child for many years providing him not just with spiritual and physical provisions; but also to instill in him a meaningfulness held by, preferably of course, by the adult/teacher.

Therefore, the same adult does not only groom; s/he also the one who decides. In Waldorf education school, and as a result, the answer to the three

vertexes of power enabling an alternative deviation – who determines what is learning, who determines what is the learner, and who determines which of the learners is successful – is foretold and quite banal, meaning, completely un-alternative.

These are of course only two examples, but the alternative education in Israel had many and diverse faces along the years. Dani Lasri's Meitar, the democratic schools, Waldorf education schools, the bilingual education, Montessori education, Kedma School and of course the diverse forms of home education and home schooling.

Its main characteristics, in different ways and practices of form and content, challenge the state-public education, according to what I would like to call here the scale of 11 Challenges the Alternative Education sets to the state-public education:

Challenge 1: challenge of single-age learning – by creating multi-age alternatives in a highly creative manner.

Challenge 2: challenging the structure of learning in fields of study which sanctifies a rigid structure for example by attaching it to a system of evaluation throughout the years, for example by thematic learning across disciplines, multi-disciplinary learning or interdisciplinary learning.

Challenge 3: challenging the structure of learning in a regular school year divided into semesters, by forming an alternative system that suggests learning in periods using periodic projects or by learning throughout one period.

Challenge 4: the challenge of learning within the boundaries of a school which sanctifies scholastic homeroom classes, gyms, and laboratories, by providing extensive or restricted learning spaces outside of the classroom or even outside the school, some more natural than others.

Challenge 5: challenging group learning which in Israel sanctifies the organic group as part of group formation throughout the years and as part of an Israeli ethos of group/military formation and the project of building a nation by providing individual or virtual learning frameworks.

Challenge 6: challenging the curricula of the Ministry of Education, which justifies the learning of a skeleton-based curricula that underwent only a few fundamental changes throughout the existence of Israel; this by providing alternative contents which contain courses on subjects that are completely unaccounted for in the curricula.

Challenge 7: challenging the structure of the school, which uses justifications based on developmental psychology and social integration – that is usually divided into elementary, junior-high school and high school by creating a growing educational community in one compound which will supply stimuli despite the age differences; stemming from the recognition that multiple ages holds a human, educational and pedagogical strength.

Challenge 8: challenging examinations or assessments, which are external to the learner that sanctify the structure of the Israeli and international examination system, mainly the system of matriculation exams and the preparation for the industrialized academic world; this by creating diverse assessments, dialogical, shared, alternatives (alternative assessments).

Challenge 9: challenging the relationship between the educational staff and the learners in the schools; that in Israel sanctifies the teachers as the authorities who lead the student, who seemingly strengthen the students' self-esteem, who establish clear and necessary boundaries for him; by creating dialogical frameworks (parliament, mentors, joint committees) that wish to prevent the alienating hierarchy between students and teachers, that are not afraid of fluidity in the interpersonal relationship between older-younger people and vice versa.

Challenge 10: challenging the national narrative as leading (or enslaving) the education system to traditions; by embracing a multi-perspective set of values, that has room for national, social, ethnic, gender and other values.

Challenge 11: challenging the perception of "the adult figure desired by the system" which is part of the "requirement model" by creating frameworks where "the person builds himself" and "plans his learning" (alongside Zvi Lamm's principle/logic of individuation) and as part of the "model of support".

Hence, this is a current overview of alternative education also in Israel:

- Against any form of "institutionalized" learning – unschooling.
- Against institutionalized learning in schools – Home Education.
- Against institutionalized learning in schools (but not against it at home) – Home Schooling.
- Against institutionalized learning in schools– Open Education (Meitar, The Dialogue Academy, Dani Lasri).
- Against curricular learning in schools – Democratic education/Progressive Education (to this or other extent) – Democratic schools in Israel.
- Supporting this or other stream – ultra-orthodox education, Anthroposophical Education, Montessori Education etc.
- Against the narrative separating Jewish, Palestinian, and other populations – Bilingual Education.
- Experimental alternative frameworks within the state/classic education –the Ministry of Education's Division of Experiments.

Any alternative framework challenges the state education in a creative and different way. Frameworks and practices moved along the years from a complete, sharp, negative challenge to a partial, moderate, and positive challenge. The motivations behind those challenges are numerous: from ideological initi-

atives to political objections, from national reasons to cultural claims, from social status motives to peripheral rebellion (Gur-Ze'ev, 2010).

However, these do not meet the theoretical framework to which I refer as "alternativeness in education." This in contrast to alternative education, wants to ask the fundamental questions that are not asked, those presented by Ivan Illich (1971) in his book *Deschooling Society* as well as John Holt (2004) in many of his writing. Especially *How Children Fail?* Illich was challenged into discussion on school by Everett Reimer (1971) in his book *School is Dead: Alternatives in Education* which also challenges the fundamental question about school's structure and education.

Illich (1971) who nowadays is defined as a radical; (radical as many of us like to call everyone who is willing to delve into the main and deepest pains of education in a broader sense) claimed that general education lost because it was subjected to school authority. Then he set the first goal – a philosophical one: education will benefit if it is confiscated from the school authority.

And why is that? Because school nurtures the ever-growing dependence of the poor in institutionalized welfare through psychological impotence and inability to save them, so he said. If I may, I would like to add that: school victimizes students (as well as teachers) the victims. It victimizes them because it makes them psychologically impotent – that they cannot do without it – while what they need is a mechanism to emancipate them from education and the self-consciousness it creates in each of the learners and at the same time in their parents and teachers (Kizel, 2016).

Alternativeness in education can raise at this point the question – why does the school create these mechanisms? We can turn to Nietzsche in this context according to him as a person's ability to order decreases, thus his desire for someone to give orders, harsh orders – a desire for a god, a king, for status, for a doctor, for a priest, for a religious principle, for a partisan conscience increases. It is an acute, permanent, illness that attacks the willpower. Hence, school represents person's willpower not to be a unique and one-time wonder. If you will, school attacks the idea of "Be yourself! All your actions, your thoughts and desires up to this point – are not yourself."

Years later, Emanuel Levinas ([1972] 2006) will claim that western metaphysics created wholeness and will launch a fight for the possibility to deviate from it in favor of individuation. This is the same individuation which is eliminated in schools by the idea of formation of a collective, which by definition and by nature does not enable the person to be himself.

The same collective, Levinas ([1972] 2006) will argue, also does not enable the person to be alert for the summon made by the other. This summon, which is not a choice (like choosing where to volunteer as part of the 10th grade personal responsibility program) but one which awakens the ethics in

men, which is immediate, which is not instrumental, which does not need to be learnt and taught, there is no need in merit scores or assessment certificates in the local school's Friday's lineup.

Therefore, alternativeness, challenges the central concern of traditional education – or at least the distortion of the starting condition of traditional education – cataloging, labeling and promoting men under an orthodox education (Ricci & Pritscher, 2015). Under the same categorization and labeling, human beings are a defected creature (sinners since birth, if you will) and therefore he is insufficient, barely sufficient, almost good, and so on. Their human flaws need to be clinically addressed in the traditional education. Just like the clinic took over the entire public discourse, it also took over traditional education in all its aspects and set a cataloging, labeling, caring, supportive, and embracing language, which was meant to face one challenge – to which we referred to as the "entrapment triangle" – to enable the professional (some would say hegemonies) forces to preserve their control over learning, on determining who is a learner and mainly who is a successful learner.

Therefore, Alternativeness in Education – and not Alternative Education – will ask (and yes, asking a question is embarking on a journey, and it is legitimate, even if the system encourages us to look immediately for answers and its better if they are short, one-dimensional and "real") why does the school deprive us from the power to control learning? Why does it create, according to Illich (1971) a greater illusion upon which the system of education is based, meaning, that learning is a result of teaching? Why do most people acquire most of their knowledge outside of school and are still locked inside school doors?

However, a question more significant that an alternative educator will ask is: why is learning shaped by the school and therefore, our students think that learning is school, and the teachers are convinced that teaching is school? Thus, alternativeness in education breaks the paradigm learning equals the school. And as a result, learning does not have to be taught or molded into schools many educators might view this claim as betraying my enlightenment, as Illich claimed, yet enlightenment is fading away in schools now; and who if not we know that is true about our school.

The theoretical framework of researching alternativeness in education (unlike the research of alternative education) needs to be driven by an attempt to challenge the language, turn it into an opposition to the traditional education's triangle of entrapment; to undermine it and its foundations.

This framework would require exposing the roles in the system of education: monitoring, sorting, indoctrination, and learning. Following Illich's footsteps, education needs to defy three assumptions that on which there is an only little dispute about today (especially on behalf of homeschooling and unschooling trends which are very restricted in Israel): children belong to school,

children learn just in school, children can only be taught in school and can only succeed through school.

To that I would like to add that nowadays alternativeness in education needs to challenge parents on those issues and, therefore by its definition it will be anti-state, anti-traditional, anti-national or anti-religious, or at least post-state, post-traditional, post-national and post-religious.

Alternativeness in education would have to challenge "institutionalized wisdom" stating children need school and cannot do without it. Of course, this institutionalized wisdom, according to Illich (1971), is a result of the school which gives birth to the teacher as a guardian, preacher and healer. Today, school added to each of these roles more embracing names, if you like: a significant adult, state, accountability, school support, as well as other names that wish to fixate the school and tighten its grasp on our minds as "something we cannot do without."

Summary

I would like to conclude following Illich (1971) and claim that alternative education, as aforesaid, are frameworks or ideologies; however, alternativeness in education wished to oppose: the myth of institutionalized values that lead to an endless consumption, to the belief that stuck to learners – that learning has no horizon, and has no hope, except for a set of quantitative values which measure the person and at times even his body.

Illich (1971) claimed that personal growth is an unmeasurable quality, and it is a growth in a disciplined agreement that cannot be measured by any criteria nor by any school programs; and also, it cannot be compared with the other's achievements. According to his view, people who have been taught to measure everything allow unmeasured experiences to slip away. For them, what cannot be measured becomes secondary, dangerous. There is no need to rob them from their creativity.

He added that teaching has made them forget how to "take their own" actions or "be" with themselves, they do not appreciate what has been done or what can be done, and that school merges the increase in the humiliating dependence on the teacher with the increase in a false sense of power, so characteristic to the student who decides to go on and teach all the nations how to save themselves.

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EARLY CHILDHOOD SOCIOLOGY OF EDUCATION; A CASE OF CULTURAL DIVERSITY IN AUSTRALIA

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Introduction

The sociology of education is a broad concept that contains social, cultural, historical, pedagogical and philosophical aspects and dimensions of education. In this chapter, highlighting a current challenge, the focus will be on *how early childhood education must serve as a major agent of socialization for young children*. One of the essential socialization factors at the present time, which correlates with children's schooling, is learning and respect for the diversity of races. Most recently during the Covid-19 pandemic the whole world experienced the 'Black Lives Matter' movement. This movement occurred across many nations simultaneously with millions of people attending rallies to demonstrate their outrage and demanding change. This happened during a time when people risked their own and others health to show their disagreement with their government's approach to this problem.

The early childhood education is important both because young children's brains develop more rapidly than at any other time in their life and also any experiences at this stage tend to have a lasting impact for the rest of their life. The growing acceptance of this, plus the recognition by regulatory authorities that education in early childhood is a right for all children, has led to the number of children attending formal schooling increasing significantly around the world.

Early childhood education systems comprise educational policies, teachers and setting up an environment that specifically respects diversity, to play a major role in children's socialization process. Australia as a multicultural society with over 200 languages spoken by its inhabitants (DIMIA, 1997) must place a high priority on informing young children about the diversity of the society in which they live. The national curriculum of the Early Years Learning frameworks (EYLF) of Australia highly recommends teachers to provide learning environments that respect diversity by "honoring the histories, language, tradition, child rearing, practices and life style choices of families" (DEEWR,

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2009, P. 13). Teachers must promote this learning by planning experiences and providing resources that broaden children's perspectives and encourage appreciation of other cultures.

This chapter has been developed based on the argument of the importance of early childhood sociology of education, specifically valuing diversity, and how early childhood education in Australia assists children in socialization by integrating suitable policies into early childhood. The chapter follows diversity in early childhood education in Australia, its implication for teachers, recommendations and concludes by emphasizing that every child must be involved in learning diversity through a socialization process embedded in the education system.

The Importance of Early Childhood For Learning Diversity

Internationally, early childhood is defined as the period from birth to eight years of age during which the brain undergoes remarkable growth. These early years lay the foundation for subsequent learning and development (UNICEF, n.d).

Theorists such as Piaget, Vygotsky, Erikson and Bronfenbrenner have been influential in emphasizing the child's social and cultural environment as an important element that influences learning (McInerney, 2014). Mustard (2008) in a final report for department of the premier and cabinet that has been internationally influential, explained that experience in the early years affects brain development. His research has shown that brain development in this period influences health, learning and behavior throughout the life-cycle. In his work as an *Adelaide Thinker in Residence* he emphasized that experience in the early years, effects gene expression and the function of sensing neurons. It was also found that the development of neural pathways shapes emotion and regulates temperament, whereas social development shapes language and literacy capability. Early experiences also mould our perceptual and cognitive ability, determining our physical and mental health in adult life and how we cope with our daily experiences. He concludes that children need support and a quality education to develop their brain to its full potential.

Early childhood is widely recognized as a 'critical stage of life' during which any learning and development influences the whole of life (Sylva, Melhuish, Sammons, Siraj-Blatchford, & Taggart, 2010; World Health Organization, 2020). These researchers draw to the attention of policy makers, educational providers and parents regard the importance of early childhood education. Australian data shows the number of children attending to early childhood education has increased significantly (Australian Institute of Health and Welfare (AIHW), 2020).

Beside the critical stage of childhood, it's children right to express their views, though and ideas and to actively participate in global, societal and envi-

ronmental challenges (United Nations International Emergency Funds (UNICEF), 2013). The research has proved that allowing agency has implication for health and wellbeing of children (Sorbring & Kuczynski, 2018).

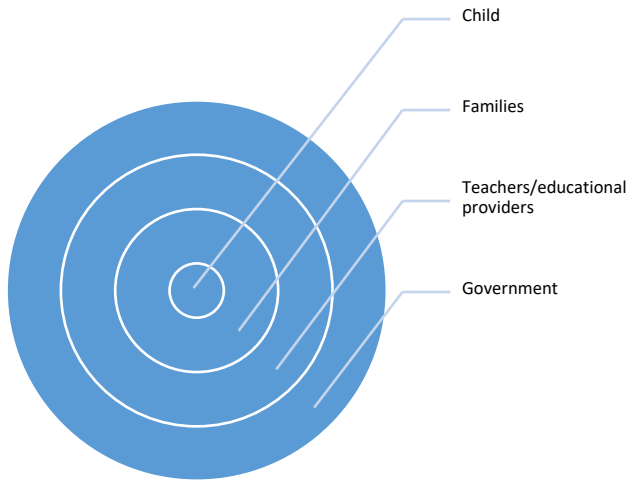
The importance of the early childhood stage in encouraging agency plus the increasing numbers of children who attend a formal educational setting also builds a case for supporting children's social skills through the education system.

Early Childhood Education in Australia

The aim of education and schooling in Australia is to broaden socialization, which is defined as the process of understanding the values, rules and culture of its society (Crawford, 2011). Education and schooling is a powerful form of secondary socialization acting as a bridge between the family and the world outside. The aim of Australian education can be linked to Bronfenbrenner's theory that a complex system of relationship and context influences children's life (Hoffnung et al., 2019). He identified four systems within which children exist that combine to impact them as they develop:

1. the microsystem, the interaction between parents and child, a close relationship;
2. the mesosystem, the interaction between children, families and educational environments such as school;
3. the exosystem, those factors that influence them but lie beyond their immediate environment and
4. the macrosystem, societal factors such as cultural values and overall economic conditions.
5. Figure 1 shows how the interaction between governments, early childhood services, teachers and parents impact on the children's life.

Figure 1. The complex system of relationship



Early childhood education in Australia has undergone immense change in recent years (Garvis & Manning, 2017). For example, what was termed ‘education and care’ was split into its component elements. In many cases the organizations responsible for providing early childhood services delivered education and care separately. For instance, preschool was under education department management with a focus on education and learning, whilst children in a younger age group would be provided with care by social services organizations with no educational content. In the late 1980s privatization of these systems took place under the Childcare Act and by 1996, the Howard Government elicited strong support for the privatization of all early childhood sectors.

Hence, today most services in Australia are provided by private organizations (Garvis & Manning, 2017), yet even though the Australian Government continues to strongly support privatization, the Government itself develops the policies that govern early childhood education and continues to manage the quality of the education offered. Similar government management resulted in the rapid growth in early childhood education around the world (OECD, 2012) largely because providing quality education was considered a worthwhile investment for many countries (Ioanescu, Ionescu, & Jaba, 2013; Mustard, 2008).

Early childhood educational policies in Australia

The first National Quality Frameworks (NQF) resulted from an agreement between Australian State and Federal governments to work together to provide better educational and developmental outcomes for children using education and care services (ACECQA., 2020). The NQF includes: National Law and National Regulations, National Quality Standard assessment (NQS), a quality rating process and national learning frameworks. The National Quality Stand-

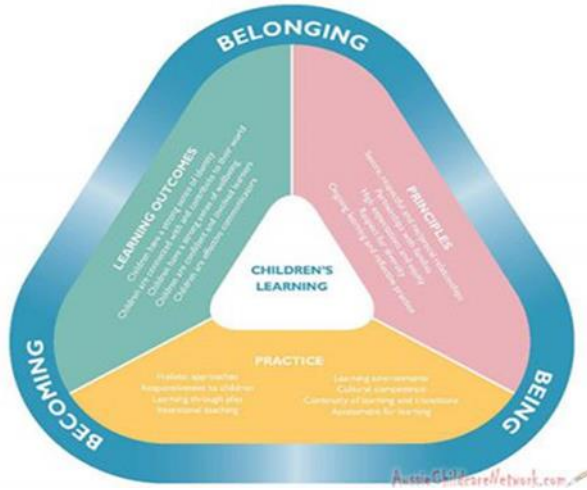
ards includes seven quality areas that are important outcomes against which services are assessed and rated accordingly.

Early childhood education programs in Australia are delivered in a range of settings including child care (long-day care, occasional, family day-care, in-home day care) that operates for eight hours or more per day for 48 weeks per year and stand-alone preschools and school-based preschools that operate during school hours and school terms. Early Childhood services are provided by government, local communities, churches, not-for-profit agencies and for-profit owners with the majority being private (ACECQA, 2013; Australian Institute of Health and Welfare (AIHW), 2020).

These services also need to base their educational program on an approved Early Years Learning Frameworks (EYLF). The Australian EYLF outlines the principles, practices, and outcomes that educators should strive to achieve in order to support and promote young children's learning (ACECQA, 2014). The NQF ensures programs for young children are delivered by qualified educators and that services must engage or have access to an early childhood teacher(s) (ECT) based on the number of children in attendance. The continuing assessment by government bodies of the services, child ratio and teachers' qualifications is likely to explain the increase in quality education as children get older (Burchinal, Cryer, Clifford, & Howes, 2002).

The EYLF is one of two nationally approved learning frameworks that outline practices to support and promote children's learning. This framework assists educators by articulating principles, practices and outcomes essential to support and enhance children's learning from birth to five years of age, as well as their transition to school (DEEWR, 2009). The elements of the Australian EYLF are represented in Figure 2 below.

Figure 2. The Elements of EYLF (DEEWR, 2009, P. 11)



Belonging is the first of three elements that define children's lives and "experiencing belonging- knowing where and with whom you belong is integral to human existence" (DEEWR, 2009, P.7).

Being "is about present and them knowing themselves, building and maintaining relationship with others, engaging with life's joys and complexities, and meeting challenges in everyday life" (DEEWR, 2009, P.7).

Becoming reflects the process of changing during childhood as they learn and grow.

The EYLF is underpinned by the three elements of learning; outcomes, principles and practices that clearly guide the educators to value and celebrate diversity. For example, "Principle 4: Respect for diversity which describes the way in which educators 'honor the histories, cultures, languages, traditions, child rearing practices and lifestyle choices of families'" (DEEWR 2009, p. 13). It also in the practice element invites the educators to 'value the cultural and social context of children and their families '(DEEWR, 2009, P.14). Five learning outcomes which support children's diversity both explicitly and implicitly are:

1. children have a strong sense of identity,
2. children are connected with and contribute to their world,
3. children have a strong sense of wellbeing,
4. children are confident and involved learners, and
5. children are effective communicators (DEEWR, 2009, P.8).

Outcome 2 specifically identifies that 'children respond to diversity with respect 'as a key element (DEEWR 2009, p. 26).

EYLF as a national policy directs educators to implement these elements into their early childhood curriculum. Therefore, diversity is one of the social

skills that must be considered by early childhood educators. The next section will draw the attention of the reader to diversity in Australian early childhood education.

Diversity In Early Childhood Education in Australia

Diversity in early childhood education encompasses many aspects such as race, ethnicity, gender, ability and social backgrounds, learning variations and behavioural concerns (Ashman & Elkins, 2005; Talen, 2012). Since there are so many areas to discuss in teaching diversity, the focus of this chapter will be on diversity of race, as brought to the public's consciousness by the 'Black Lives Matter' movement. This began in 2013 in United States after George Zimmerman, a black teenager, was shot dead by a policeman. It was reignited in the USA when George Floyd, another African American was killed by a member of the police force on the 25th of May 2020 and spread worldwide, including widespread protests in Australia during the Covid-19 pandemic. A main driving force was an Australian human rights lawyer and activist Hannah McGlade, a Noongar woman, who called for an independent investigation of the 432 Indigenous deaths in custody recorded in Australia in the past 30 years. A report in the media stated:

'The Prime Minister is calling for an end to Australia's black lives matter protests with more expected this weekend. He says more huge gatherings could derail the country's path back from coronavirus after one of the protesters in Melbourne last weekend tested positive for COVID-19. Regarding the Melbourne protester who's tested positive for coronavirus, what do we know about how the person contracted it and how many others they may have infected?'

Despite this type of pressure from the government Australian's showed their empathy for indigenous people by protesting at risk to their own health and that of others.

Bronfenbrenner theory, outlined previously, explained and also visually clarified (see Figure 1) a complex system of interaction between a child and the layers of relationships that influence the child. In the 'Black Lives Matter' movement, a lot of interaction took place between the Australian government (the macrosystem), institutions like schools (the mesosystem) and families (the microsystem). Children as the center of those interactions have the right to know and learn about diversity. They are active citizens, and as research explained (Mustard, 2008; Sylva et al., 2010) they are at a critical stage when learning to value diversity can influence their whole life. This requires a intensive investigation on how early childhood teachers and educators value and bring to the fore diversity in their everyday interaction with children.



Figure 3. During 'Black Lives matter 'protest NSW police formed a protective perimeter around a statue of Captain Cook, who initiated colonization of Australia (David Shoebrifge/Twitter).

An example of the macrosystem.

Australian Teachers Practices on Diversity

Studies have reported that early childhood educators, mostly socialize young children into their own cultural contexts (Fleet, 2002; Souto-Manning & Mitchell, 2009). Because of this those children may consider their culture to be unimportant or inferior, sending the wrong message to their families (Buchori & Dobinson, 2015). The obvious example is teachers regarding children's bi-lingualism negatively (Diaz Jones, 2000).

Similarly studies by Mansouri and Kamp (2007) and Robinson and Jones Diaz (2005) revealed discrimination and inequity towards children from immigrant, indigenous Australian and low socioeconomic groups. Specifically, indigenous Australians and refugees from Asia and the Middle East often fail to achieve at the same educational level as the rest of the Australian population (Cahill, 2001; Mansouri & Trembath, 2005).

There is further evidence on cultural diversity practices among early childhood services in Australia that causes concern. For instance a larger study of nearly 100 South Australian early childhood services found that 38 percent of services, in spite of having endorse cultural inclusivity policy, they lacked culturally appropriate practices. From this study reported 33 percent saw no benefit in training around issues of cultural diversity (Prasad & Ebbeck, 2000). It was also reported that 35 female students in an early childhood degree course at a university in Melbourne, said that the practicum component of their course do not prepared them to be competent culturally since no experience gained from culturally responsive and respectful curricula (MacNaughton & Hughes, 2007). In particularly in early childhood education staff low confidence has a major influence on whether teachers promote inclusion programs (Mohay & Reid, 2006).

From the above studies it is easy to understand how low levels of teachers knowledge and or confidence can lead them to devalue children's diversity, or in other words discriminate. Early childhood policies promote valuing diversi-

ty, however when it gets to teachers 'practices, they are unsuccessful in delivering it. A study conducted by Buchori and Dobinson in 2015 explored '*Diversity in teaching and learning*' in Australia. This qualitative study reported the perceptions that early childhood educators had of their culturally diverse classrooms and the pedagogic practices they implemented to address the needs of children from different cultural backgrounds in their care. The results showed that teachers recognised the need to acknowledge and honour cultural differences in their practices, however they tended to use a 'one-size-fit-all' approach. Using this approach teachers were helping children to develop their skills, values and attitudes for survival in the dominant culture, in order to help them integrate into Australian society, rather than considering their individual differences. One of the example given in the study on this aspect was a teacher comments during lunch break. One Singaporean child had noodles for lunch and a teacher asked the child to bring a sandwich, like his or her peers. "*You can eat your yummy noodles at home because I know how yummy they are. I love my noodles but when you come to school maybe bring a healthy sandwich*" (Buchori & Dobinson, 2015, p. 76).

The devaluing of diversity by Australian teachers is clearly evident from this research. What is important now, is persuading teachers not to follow the wrong approach of 'one-size-fits all'. The promotion of diversity will in the long run reduce or eliminate the discrimination that led to the 'Black Lives Matter' movement.

Recommendation

This section provides practical recommendation for teachers on how to encourage valuing diversity in an early childhood environment. Teachers have an important role in implementing social education that promotes valuing diversity and inclusive education. Horne and Timmons in 2009 identified the key to a successful inclusion program is teachers professional preparation, family and school support and the time available for consultation with the children and their families.

Research by MacNaughton and Hughes in 2007 suggested that professional learning about cultural diversity has most impact on teachers attitudes and practices when they are exposed to diverse cultural groups and experiences, They also proposed increased understanding by teachers about the impact of discrimination, extended time for teachers to explore cultural diverse principles and pedagogical practices, plan deliberate strategies and allow time for identifying and exploring the dominant group resistance to diversity. Teachers should also be allowed time to reflect critically on problems caused by lack of diversity, such as cultural marginalization. Australian early childhood professional development and training lacks one or more of these suggested features and provides little or no time for exploration and reflection.

Teachers can assist children in learning and respecting the diversity of other races by carefully preparing the classroom environment. For example selecting books or poster and images that not only engage the children but also their families. photographs that represent people of all skin colours, without any labelling that classifies them as different. For example, this doll’s colour of skin is toasted almond-gingerbread-peach rather than saying it is black.

Encouraging families to share drawings, pictures, stories, foods and so on can show how many different lived experiences there are between children in only one classroom. Teachers can add more spaces for dramatic play, create self-portrait exploration areas, like drawing/painting, craft making, and designate space for family photos, stories and racial and cultural artifacts.

Young children from their toddler years on, take notice of whether what they encounter is the same or is different. This is largely because of early categorisation processes (Follari, 2015) within their microsystem. Teachers can encourage children’s interests on similarity and differences by discussing and providing activities such as categorising and matching.

Different studies that identified the importance of education in promoting the teaching of diversity of races, proposed three main recommendations complete with suggested principles and practices. These are summarised in Table 1.

Table 1. Summary of recommendation for teachers

Recommendation	Principles	Practices
Building confidence	Positive attitude	Professional preparation; being exposed to diverse cultures
Curricular connection	Ongoing learning and reflective practices	Specify time; learning environment: engaging and plan experiences; focus on children’s lives
Family partnership	Supporting and welcoming families	Include families in day to day program; share ideas; promote their culture and language

Conclusion

Children as future active citizens of their society, who are in their ‘critical stage ’of development should be considered as ready for social education. At this stage, there are a lot of different social learning possibilities to deal with, however the priority is the current challenges posed by the worldwide ‘Black Lives Matter ’movement.

As discussed throughout this chapter, young children are in the critical stage of their life when any learning has massive impacts on their future.

Teaching them to value diversity, will reduce the prevalence of these types of problems in the future and make the world a more peaceful place by allowing different races to coexist harmoniously.

A multicultural society such as Australia has an enhanced responsibility to teach young children to respect and value diversity. Learning about valuing diversity of races can be supported by our education system through the policies and teacher preparations that are recommended in this chapter.

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DISABILITY AND MEDIA LITERACY EDUCATION AND EMPOWERMENT OF DISABLED PEOPLE

Theodoto W. RESSA *

Introduction

Societies around the world have misconceived disabled people¹ as lesser beings, and the media have contributed to their invisibility and hypervisibility by perpetuating the culture of deficit and ingraining prejudices in the minds of the masses leading to ableism (i.e., preference for nondisabled people over disabled people), making disabled people members of the fringe. These blatant biases have triggered disability activism (Charlton, 2000; Davis, 2014; Mitchell & Snyder, 2003; Siebers, 2008) and influenced enactment of disability legislations and treaties to protect the human rights of disabled people (e.g., Americans with Disabilities Act 1990, Kenya People with Disabilities Act 2003, Turkish Disability Act 2005, and UN Convention on the Rights of Persons with Disabilities 2006). Due to increased disability awareness around the world, disabled people have focused on dismantling ableist structures in all realms of life including the media industry and education. Even though much has been achieved in the past four decades in terms of creating accessible environments mostly in Global North countries, many structural barriers remain that make inclusion and belonging of disabled people difficult, often perpetuated by the media. The media play a huge role in shaping societal norms about disability, but disabled people experience difficulties in accessing, analyzing, evaluating, creating, and acting on media and their messages. Low involvement of disabled people in the media schools and media industry is due to factors such as inaccessible facilities, inaccessible media programs, biases, and myths (Schmidt, 2012). Dismantling sedimented ableist culture is the key to empowerment of disabled people. Their visibility and involvement in the media production, analysis, and usage of media can enlighten society about disability matters.

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¹ Disability identities are contested, although the two major schools of thought have common guidelines for terminology when referring to disability: avoiding patronizing praises and pejorative terms. Even though person-first language (i.e., persons with disabilities) is widely used in the literature by nondisabled scholars, identity-first language (i.e., disabled people) is popular with the disability rights activists (Brown, 2011; Siebers, 2008; Sinclair, 2005). In this chapter I embrace both terms in context as a way of problematizing the discourse of oppression and to elevate disabled people's voices.

This chapter presents how media literacy education can correct biased practices in the media realm to promote the welfare of disabled people (Friesem, 2017). It dwells on the role and impact of media and media literacy education on the lives of disabled people. Specifically, it examines the locus of disabled people in the media to identify factors that hinder and enable involvement of disabled people in the media. Understanding how the portrayals of disability in the media affect the disability community, especially learners with disabilities, is critical in understanding ways that media literacy education can contribute to the dismantling of institutionalized ableism and to the empowerment of disabled people. This can be realized when disability studies are infused in media literacy education to promote individual transformation and media industry and society reformation (National Association for Media Literacy Education [NAMLE], 2007).

Definitions of Media Literacy Education

Media refers to electronic and nondigital means of transmitting audio and visual messages to the masses (Green & Green, 2018). They are the instrumentality for storing or communicating information to the public. Different forms of media, such as mass media (e.g., television programs), print media (e.g., blogs, magazines, books, posters), visual media (e.g., films, graffiti, iPosters, statues), audio media (e.g., radio programs), and social media (YouTube, Facebook, Twitter, TikTok) share the universal purpose of enabling communication (Green & Green, 2018). Information, however, is always interpreted based on consumers' worldview (Haller, 2010), which makes media literacy education important.

Literacy is the ability to encode and decode symbols and to synthesize and analyze messages, while media literacy is the ability to synthesize, analyze and produce mediated messages and the ability to use all forms of communication in an interdisciplinary manner (Green & Green, 2018). Different forms of media-related literacy include digital literacy, which is the set of skills required to use digital media. It involves knowing how to access the internet, how to send an email, what a meme is, and the ability to protect self from online harm, for example. News literacy is the set of skills to navigate news media specifically, and it involves knowing how news is gathered and disseminated and its impact on the audience (Green & Green, 2018; Sprafkin et al., 1990). Media education is the study of media production and consumption while media literacy education is the ability to access, analyze, evaluate, create, and act on all forms of communication; it is the educational field dedicated to teaching the skills associated with media literacy (NAMLE, 2007).

Media literacy provides new ways of using media in an empowering manner because it turns individuals into active citizens who think critically, make sound judgments, and effectively communicate their ideas. Media literacy edu-

cation represents a necessary, inevitable, and realistic response to the complex, ever-changing electronic environment and communication cornucopia that surround us (NAMLE, 2007). Different worldviews about media literacy often reflect people's experiences, approaches and goals, and targeted audiences. As such, media literacy has both proponents and opponents who always question the impact of media and technology on society. Nonetheless, to become a successful student, responsible citizen, productive worker, or competent and conscientious consumer, individuals need to develop skills to interpret efficiently and productively perceive and consume media information since it affects the way people think, feel, behave, and relate.

The Media Industry and Disabled People

The naturalness of disability means that disabled people have been part of the society, and today about 15% of the global population has a disability (World Health Organization [WHO], n.d.). Whereas disability is a natural human condition, most disabled people live on the margin of society because of invalidation on the grounds of their disability. Biased practices have been normalized over time via media, allowing the public to denigrate disabled people (Bogdan et al., 2012; Haller, 2010).

In the history of the media industry, disabled people have been fundamental in the production and consumption of (true and fake) information; they have been a source of news, data, and ideas that have contributed to conversations (Bogdan et al., 2012; Gartner & Joe, 1987; Haller, 2010). Mostly, disabled people have been objects and subjects and points of reference for many things happening in the society. Habitually, they have been constructed badly to the benefit of nondisabled people (Davis, 2014; Siebers, 2008). While disabled people have been made the center of information by the media industry (e.g., freak shows), disabled people have remained on the periphery of media production and consumption for centuries and therefore on the outskirts of their communities (Friesem, 2017; Haller, 2010; Mitchell & Snyder, 2003; Siebers, 2008; Sinclair, 2005). Unfortunately, their hypervisibility and invisibility in the media have entrenched a culture of deficit-fueled disability prejudices and contributed to their oppression (Screen Actors Guild - American Federation of Television and Radio Artists, 2012).

For centuries, the disabled community has been subjected to opprobrium, pogroms, expulsions, institutionalization, and extermination (Davis, 2014; Dolmage, 2011; Siebers, 2008; Sinclair, 2005). In the 19th and 20th centuries, the media intentionally portrayed disabled people as evildoers, monsters, or aliens, for example, in the freak shows that were popular in the theaters across North America and Europe (Bogdan et al., 2012; Gartner & Joe, 1987). Caricaturing disabled people as a way of entertaining and educating the public emphasized the differences between disabled and nondisabled people, but the

scaring misrepresentations and negative portrayals created fear in nondisabled audiences and forced disabled people to acquiesce to the dominant norms that framed them as inferior and invalid. Thus, misrepresentation of disability not only entertained the masses but also led to misconceptions that inculcated a culture of violence against disabled people (Davis, 2014).

Contemporary media are involved in addressing historical damage caused to the disability community through misrepresentation of disability as a human deficit and the social construction of disabled people as differently bad and subhuman (Haller, 2010). The changes contemporary media are adopting are influenced by the disability rights movement effort to promote disability culture, identity, and rights and resultant disability laws and treaties that prohibit discrimination of the disability community in all spheres of life (e.g., ADA, PWDK, 2003; CRPD 2006). Caught between a culture of deficit to appease the traditional audience and disability culture and identity and laws that prohibit discrimination of disabled people, contemporary media remain ambivalent to their commitment to the disability community. Media attempts to correct and erase the brutal disability history has led to omission of disability experiences, distortions of disability realities, exclusion of disability knowledges in the formal curriculum, whitewashing of history, and falsifications of facts and truths. Thus, nondisabled people are allowed to lay blame on the disabled people for the societal wrongs against them (Davis, 2014; Dolmage, 2011; Powers & Haller, 2017). As such, disabled people are still colonized by privileged nondisabled people's norms perpetuated by the media (Haller, 2010). Consequently, the media continue to harm the disability community by perpetuating ableism via fallacies.

Media-Mediated Fallacies About Disability

The disability community is increasingly demanding fair portrayal in the media, and the media industry is rapidly adapting to the forces of change instituted by the disability rights movement (Haller, 2010). The changing landscape about the representation of disability and disabled people in the media, however, still faces Herculean opposition from established norms that for centuries demeaned the disability community (Davis, 2014). Implicit and explicit biased information still construct disabled people as the other (Bogdan et al., 2012; Gartner & Joe, 1987). Subtle prejudiced media information veiled by fallacies (i.e., misconception resulting from incorrect reasoning) not only cheats the disability community of their rights but also poisons nondisabled people's minds when disabled people's experiences and images are falsified to sustain disability mythologies (e.g., disabled people are patients).

Fallacies used by contemporary media include false balance, false identity, exaggeration, omission, lies, blue wall of silence, cover-up, half-truth, disinformation, and exaggeration (Lechte, 2011; Ressa, in press; Tindale, 2007).

False balance is a media bias in which reporters present an issue as being more balanced between opposing viewpoints than the evidence supports. Often broadcasters provide information out of proportion to the actual evidence for each side, or they omit information that dismisses or devalues the claims of the other side. The problem is that false balance contributes to the spread of misinformation since consumers of information have only partial information. False identity happens when media use characters without disabilities in the real world to represent disabled characters in films.

Also, media lies are used to deceive the deceiver and consumers. Types of lies include a lie-to-children, blue lie, honest lie, white lie, and lying by omission (Breithaupt, 2020; Byrd & John, 2021; Guzel Vilsurovna, 2020). A lie-to-children happens when the media broadcasters use a simplified explanation of technical or complex subjects in the fields of education, bioinformatics, or science (e.g., scientific discoveries, exploration of space, or manufacture of vaccines) as a teaching method for children and laypeople. Often, simplification of technical matter omits nitty-gritty information needed by consumers to comprehend (e.g., the side effects of drugs) and contribute to its development (e.g., responsible use of drugs). A blue lie happens when involved people decide not to tell the truth on the grounds of the collective good. For example, when teachers claim they value inclusion on camera when in reality or practice they do not support or endeavor to include learners with disabilities in their classrooms. Such a blue lie that aims to paint the reporter as caring and compassionate harms the disability community especially when the public buy into false statements that in reality are mere public relations statements or made on camera to protect professionals from legal consequences. An honest lie is an inaccurate verbal statement or action about a history, phenomena, or circumstance. Even though the claimer or broadcaster is often unaware they are providing false information, the outcome is usually misinformation that renders the audience capable of future misjudgment. A white lie is considered harmless or trivial, especially when told to avoid hurting a disabled person's feelings. Nonetheless, this lie may be trivial when a nondisabled person tells another nondisabled person about liking or supporting a disabled person who may not be in the vicinity. Such a white lie, however, hurts a disabled person who may not be aware that a nondisabled individual claims to care for the disabled person (e.g., as happens with many nondisabled-led organizations with the mission of helping disabled people).

Lying by omission happens when the media tell most of the truth about disability or disabled people but leave out facts needed for consumers to holistically understand the happenings with disabled people. As such, lying by omission involves misrepresentation of realities and truths and so leads to a misconception of the shared information about disabled people. Lying by

omission is the failure to right preexisting mistakes. For example, this happens when media claim that disabled people are now included in every realm of society or that stigma is all gone since the enactment of disability laws but fail to mention the violence they experience in society in order to paint a family, institution, or nation as caring, compassionate, understanding, or civilized. Powers and Haller's (2017) analysis of textbooks used in journalism and mass communication classes found that only 7 out of 41 books mentioned speech disability as condition that affects students. This omission of a such a disability in an era when disabled people are interested in joining the media industry sends a wrong message to all students in the field of journalism and mass communication that disability is a nonentity. Such an omission also means that students in these classes do not have time to learn about disability and familiarize themselves with disability culture and disability identity, critical components of disability rights movement (Siebers, 2008).

Blue wall of silence refers to an informal code of silence among professionals who decide not to report on a colleague's error, crime, or misconduct even when they obviously demean disabled people, for example. A cover-up may be used to deny, defend, or obfuscate a lie, errors, embarrassing actions, or lifestyle, and/or lie(s) made previously. Often the media deny lies previously made about disabled people or claim that their lies were not as egregious as disabled people claim. For example, in the nineteenth and twentieth centuries, the media lied that disabled people are lesser beings and that institutionalization was for their good when in reality it was a political gimmick to protect the nondisabled community from the perceived alien monsters (Davis, 2014). A half-truth is information that has some truth and some deceptive content. Partly true and partly wrong information lead to doublespeak and double meanings that not only deceive consumers but also make them less accountable for their behaviors. For example, when the media teach nondisabled people that disabled people are dependent (and not interdependent), they nurture the perception that disabled people are needy, unworthy, and therefore qualify their infantilization and discriminations. Also, the media engage in disinformation when they intentionally make false claims that people with autism are savants when two-thirds of the autism community have average abilities (Nordahl-Hansen et al., 2017). However, when consumed by the public, this misleading information may lead to high expectations from teachers for all learners with autism to the disadvantage of the low-functioning students with autism, for example.

Besides, the media is fond of exaggerating about disability experiences. Exaggeration happens when the media presents information as more important or impressive than reality (Danforth & Naraian, 2015). For instance, it is true that some disabled people need constant medication to address various

health conditions such as chronic pain, but it is "stretching the truth" to generalize that to the whole disability community and to treat everyone as patients, since disabled people are as heterogeneous as the causal disability factors and just as the general population. Exaggerations made in the name of education and entertainment (edutainment) are equally hurtful to the course of the disability rights movement since they allow the public to qualify biases. For instance, contemporary media have invested in correcting the sedimented cultural tropes by focusing on disability aesthetics such as savantism—the production and presentation of disabled characters with superhuman qualities in TV and film productions (e.g., autistic characters with savantism as in *The Good Doctor* TV series on American Broadcasting Company). Though such effort creates disability awareness in the neurotypical populace, overemphasis on supercrip (Schalk, 2016) has negative repercussions on the neurotypical psyche and contributes to unrealistic positive attitudes and expectations that harm people with autism who do not exhibit savant qualities (Haller, 2010). While there is increased “positive” representation of autism in the contemporary media (Baron-Cohen, 2015; Nordahl-Hansen, 2017; Nordahl-Hansen et al., 2017), the shifts on the scale of judgment from positive, neutral, to negative have depended on how autism is portrayed as either a tragic human occurrence or a human identity (Sinclair, 2005).

Overall, fallacies have serious consequences on the disability community because they create confusion in the public, entrench myths and stereotypes, and promote biases against the disabled community (Davis, 2014; Haller, 2010). They sustain popular discourses that disabled people are different and burdensome and so socially imprison nondisabled people into believing that the remedy is exclusion of disabled people. Unfortunately, having the media individualize disability experiences as a bad human trait makes the public less reflective of how their feelings and behaviors contribute to the oppression of disabled people and therefore normalize ableism. Then, challenging marginalizing norms is necessary.

Challenging Normalcy

Local and global disability awareness, disability laws, and enactment of disability rights continue to force the media to reevaluate their portrayal of disabled people. However, the relationship between the disability community and the media remains unstable because modern-day media still employ fallacies that oppress disabled people (Byrd & John, 2021; Lechte, 2011). This makes challenging normalcy through disability-studies-infused media literacy education.

Media, in all its forms, mainstream, digital, commercial, social, and political, are the greatest influencers of opinions, feelings, thoughts, and behaviors and therefore inform and shape our culture—customs and beliefs (Haller,

2010). While media have a plethora of information that informs, educates, and persuades, they also corrupt people's minds, which makes media literacy education necessary (NAMLE, 2007). Being media literate demands knowing disabling norms and having critical thinking skills to make appropriate and timely decisions in different settings with diverse audiences. Higher-order critical thinking skills involve "knowing how to identify key concepts, how to make connections between multiple ideas, how to ask pertinent questions, formulate a response, identify fallacies—that form the very foundation of both intellectual freedom and full citizenship in a democratic society" (Thoman & Jolls, 2005, p. 181). Unfortunately, media literacy education has not fully focused on dismantling media structures that have demeaned and excluded disabled people from the larger society (Friesem, 2017).

In the twentieth century, disabled people were intentionally misrepresented in the media to edutain the public. The media used disability as an endgame of making profit by turning impairments and disabled people into subjects and objects for edutaining nondisabled consumers. Since then, disabled people have been victims and victimized; they have been prisoners and imprisoned; and they have been slaves and enslaved by nondisabled norms and practices that have othered and invalidated them. Disability information (text, audio, and visual) taken from the nondisabled perspectives removes context from a situation and perpetuates biased ideologies (Davis, 2014; Siebers, 2008). As in the case of freak shows that distorted disabled people's experiences (Bogdan, 2012; Gartner & Joe, 1987), current media fallacies distort realities, truths, facts, and disabled people's experiences (Haller, 2010). Such distortions predispose disabled people to misjudgment, perpetuate myths and stereotypes, instill fear in the public, and normalize discrimination (Davis, 2014).

Challenging normalcy (Davis, 2014), especially the media-perpetuated oppressive culture, requires disability-studies-infused media literacy education. Injustices experienced by the disability community, however, can be corrected when media literacy education recognizes and engages with disability matters constructively (NAMLE, 2007). Also, challenging media-perpetuated biased norms then requires the introduction of media literacy education in all professional and technical training programs. Knowing the nature and impact of media fallacies on society is key to dismantling oppressive structures in the media industry and disability studies infused with media literacy education provides a means of creating disability awareness and disabusing the public to empower the disability community.

As an area of inquiry, disability studies allow media literacy educators to interrogate ideologies and perspectives, engage in dialogue that brings to the fore disabled people's lived experiences, and to use their perspectives as counter discourse and their agency in challenging devaluing stereotypes and my-

thologies (Siebers, 2008; Mitchell & Snyder, 2003). This is true in education where disability studies “goes beyond mere pedagogical practices and arrangements to challenge educators at the level of personal and communal ethics asking troubling yet hopeful questions about who we are and who we are together” (Danforth & Gabel, 2016, p. 2). On the other hand, media literacy education involves analysis, production, or both (Friesem, 2017). Media literacy analysis involves scrutiny of media information, while media production involves the creation of information about a phenomenon that is distributed via the media to the public. In the classroom context, media production (e.g., video production) and media analysis (e.g., critiquing of films) enable learners with disabilities ownership of the information, and their critical analysis of the content therefore improves understanding of the meaning of the message. Infusion of disability studies into media literacy education can help with the deconstruction of norms and cultivation of empathy and tolerance needed for the inclusion and belonging of disabled people in schools and society (Danforth & Naraian, 2015).

Media literacy education informed by disability studies benefits society when used to dismantle oppressive systems (Haller, 2010). Studies show that media literacy education benefits both disabled students and teachers (Friesem, 2017; Probst, 2017). It creates disability awareness and innovative practices that increase constructive involvement of disabled students and non-disabled people in schools and communities. It improves school outcomes such as increased participation, attention, and motivation, improved communication, critical thinking, self-efficacy, social interactions, social and emotional well-being, academics, and learners’ ownership of their education (Dezuanni & Gattenhof, 2015). It helps build the abilities of students by providing opportunities in which students competently, constructively, and productively use media technology and information (Hobbs, 2010). Media production and consumption provide high quality and complex concepts in a limited time and space and setting; stimulate both the cognitive and affective experiences; tailor learning to learners’ experiences, and therefore use interesting, familiar information to capture their interest and attention; and present multiple worldviews that provoke and encourage critical thinking (Raehsler, 2013). Media-literate individuals gauge the values, beliefs, philosophies, and ideas that influence media production and consumption and therefore do not succumb to broadcast information (Cubbage, 2017; NAMLE, 2007).

Despite the benefits of media literacy education, disabled people are less targeted positively, and so they are left out of opportunities that otherwise would positively revolutionize their lives (NAMLE, 2007). Friesem (2017) mentions not much effort by the NAMLE has focused on developing core principles (2007) that address the disability subject despite the pervasive existence

of disability in the media (Bogdan et al., 2012; Gartner & Joe, 1987), and the potential of media literacy contributing to the empowerment of disabled people such as students. Considering that engagements of disabled students with media projects would lead to better academic, social, physical, and emotional outcomes, eliminating barriers to media production and consumption is necessary in turning disability-studies-infused media literacy education into a critical pedagogy of liberation (Freire, 2000[1970]) that empowers disabled people to address biased societal norms (Haller, 2010; Siebers, 2008). Importantly, media literacy educators should be involved in the transformation of individuals and reformation of institutions. Media literacy educators are obligated to dismantle media prejudices and shape and promote relationships between people with and without disabilities in this period of digital pluralism (Haller, 2010). It is important that they address and eliminate the digital divide barriers and create media opportunities that allow them to access, analyze, evaluate, create, and act on media devices and messages to empower disabled people into becoming key agents responsible for reformation of institutionalized marginalizing practices and norms (Friesem, 2017; Haller, 2010). For “NAMLE Core Principles to advance inclusion as a liberating practice” (Friesem, 2017, p. 6), media literacy educators should use critical media literacy practices (Kellner & Share, 2007) as an inclusive practice (Friesem, 2017) in addressing disability matters. The NAMLE (2007) Core Principles should guide media literacy educators’ teaching and learning about disability culture and identity to promote individual skills, beliefs, and experiences in constructing their own meanings from media messages, and to allow individuals to examine their own biases toward disabilities while understanding and appreciating other perspectives on disability to promote a better understanding of diversity and appreciation of own values. Creating environments that promote equality and equity participation, representation, and consumption of media information is important in challenging ableist practices in the society and media industry specifically. Changing biased norms requires the media industry to embrace disability culture and disability identity and disability rights. Disabled people experience increased inclusion and belonging of in schools and community when biased norms are changed (Danforth & Naraian, 2015). Already, a few media literacy educators are responsible for direct involvement of disabled people in the media programs and industry; they promote involvement of disabled people in media production and analysis and therefore fair representation in the society (Accardo & Finnegan, 2019; Cubbage, 2017; Friesem, 2017; Probst, 2017). Still, active participation of disabled people in the media literacy education is vital for dismantling oppressive cultures in all realms of life.

Disabled people engagement (Charlton, 2000) in all aspects of media production and analysis (Cubbage, 2017; Haller, 2010; NAMLE, 2007) provides

opportunities to correct biases in the media industry and society. It matters that disabled students acquire experiences needed to use and consume media information without poisoning their minds. Opportunities should be created to promote disabled people constant access to media technology and interactions with stakeholders in the media field in order to challenge normalcy (Davis, 2014), especially now when the emergence of digital media is providing them with opportunities to access, analyze, evaluate, create, and act on media (Cucinelli, 2017; Friesem, 2017; Haller, 2010). Unlike five decades ago, disabled people can actively contribute to dismantling of ableist systems, especially now that availability and accessibility of new, efficient technology create opportunities for them to be included in the media field (Haller, 2010). Technology such as podcasts and mobile apps enable disability media in and out of school (Cucinelli, 2017). The emergence of digital media and explosion of disability media have created opportunities for disabled people to foster a society that values everyone irrespective of ability differences (Haller, 2010; Schwarz, 2007). In schools, educational technology and assistive technology are creating opportunities for disabled learners' engagement with media. Educational technology includes tools or instruments used to enhance teaching and learning (Spector, 2016) such as artifacts (e.g., videos, photos, blogs) (Friesem, 2017). Assistive technology (AT) devices are used to enhance physical, mental, and socio-emotional conditions to improve participation of learners with disabilities in education (e.g., wheelchairs, computers, and smartpens) (Dell et al., 2017). Both educational technology and ATs have transformed teaching and learning of disabled people, and many are now using media to foster safe environments and to network, build partnerships, develop reciprocal relationships, and exchange ideas that advance disability experiences and rights (Haller, 2010; NAMLE, 2007).

Moreover, the arrival of social media has disability media. Many disabled people are now connected to the World Wide Web than a decade ago, allowing the flow of information and human interactions in ways that have turned disabled people into both media producers and consumers. Social media—*Facebook, WhatsApp, Twitter, Messenger, Instagram, WeChat, Tik Tok, YouTube*—offer subscribers spaces for messaging, calling, chatting, shopping, making payments offline, transferring money, reserving places, and booking taxis and rideshares. Disabled people now broadcast their experiences based on their own understanding of disability (Haller, 2010) to henceforth challenge mainstream ideologies that have framed them as unworthy beings (Siebers, 2008). Disabled people also connect with families and friends, and they engage in like-minded activities and events to edutain themselves about society but also to engage in political awareness that counters disability myths. By sharing their lived experiences that often are dismissed by nondisabled people, disa-

bled people take control of the flow of the disability information and shape the discourse of disability in the public domain, which helps discount the dominant narratives of disability.

Conclusion

The media industry has long excluded disabled people and perpetuated a culture of deficit, leading to oppression of the disability community. However, emerging technologies have also created broadcasting opportunities for disabled people to challenge normality and their invisibility and hypervisibility. It is critical that barriers in the schools and media industry are addressed to promote inclusion of disabled people. A collective approach is necessary in dismantling ableist practices. This can be achieved when disability-studies-infused media literacy education is embraced by both media literacy educators and disabled people and used to center disability matters as a way of challenging normalized practices that have pushed disabled people to the periphery of society. It is critical for stakeholders in education and the media industry to use disability media as counter discourse to the dominant discourses in the mainstream media that habitually demean disabled people.

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VISIONS OF THE FUTURE IN GRAPHICA: THE POTENTIAL FOR A MULTIMODAL PEDAGOGY AND RECONSTRUCTION OF READER REALITY

Jason D. DEHART*

Introduction – From Moment to Future Vision

This chapter focuses on the affordances of graphic novels and digital texts in working with students to frame visions of the future. I draw particular attention to visions captured in dystopian graphic novels, with specific examples forming textual connections for readers. The chapter includes teaching notes and reflections drawn from interviews on building conversations with students surrounding these works, as well as a theoretical exploration of how these books convey meaning in multimodal format (Kress, 2005; van Leeuwen, 2015) to explore the world as it is, as it is yet to be, and it may never be. Particular implications for embracing all modes of text and meaning-making in the digital classroom are included as part of this chapter's conclusion.

In my experience in the classroom, few genres captured attention quite as resonantly as did the dystopian genre. Dystopian literature is, more accurately, a sub-genre of the science fiction strand of literature. As a teacher responded in the course of my work on this topic, these books draw particular appeal for some individuals. The teacher I interviewed as part of this work discussed the nature of the books as “appealing to me, on the surface,” but the next steps in classroom application for literacy involved more consideration as not all students immediately and eventually engaged with these texts as strongly as more realistically-based stories (personal communication, January 2021). In the words and experiences of this teacher, using dystopian literature speaks to those who enjoy reading science fiction, but the conversation expands beyond a simple fantasy tale or visionary trope; dystopian fiction works differently in that these stories conceptualize a world of similarities and differences, one that is refracted and appreciated as a representation at the same time.

This response lines up with my engagement with dystopian literature as a teacher, as well.

Most prominently, students in my middle grades classes studied *The Hunger Games* series by Suzanne Collins, *Fahrenheit 451* by Ray Bradbury, and *The*

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Giver by Lois Lowry. Additional texts that were available for my students to engage with as choice reads included the *Divergent* series by Veronica Roth, *Enclave* by Anne Aguirre, and *The Maze Runner* series by James Dashner. This list of texts is in no way to imply that all students were immediately entranced by the genre; rather, these books existed as what Harvey and Ward (2017) might call one of a series of constellations of entry-points into further reading. The book choices also have particular limitations in terms of cultural diversity and representation, and Baker and Schak (2019) have noted additional limitations for *The Hunger Games*, in particular, in terms of critical response across media adaptations. So then, while these books are capable of doing some identity and social work, they do not stand alone as a culture-shifting entity, nor would I intimate that they hold this narrative power.

However, dystopian stories do contain the stems for further conversation and allow students to see the world around them in different ways. According to the teacher interview, “Students will read a part of the book, and go, ‘Oh, that’s just like down the street. ’But it’s not, it’s a new world that is being shown to them” (personal communication, January 2021).

While all of this is true of prose novels, graphic novels contain a rich set of affordances that travel beyond the traditional printed page. McCloud (1994) has noted this range of affordances, and even constructed a graphic novel about graphic novels. In this metacognitive work, McCloud examines the artistic roots and grammatical possibilities of the comic book or graphic novel. The result is a look at a kind of literature that presents information not simply in a singular mode, but through a range of meaning-making practices that allow students to see a set of stories at work.

There is the visual story, the rendering of the world that is like and unlike, which can be achieved in a walk through the pictures. Then, there is the story that is told in the word bubbles and dialogue between and among characters. This is where the story takes its next level, as text is often implemented to track what is occurring in images. There are times when text is missing, and the reader must make inferences about the scenes they are encountering. These too are powerful moments in reading. Duffy (2003) pointed to moments of imaging in stories in which readers “create pictures in their minds” (p. 95). These images require a schema, or system of prior knowledge, according to Duffy.

In the comic book or graphic novel, the artist/author provides the images, but these images are not simply present on the page. They are part of the multimodal construct from which meaning is made, and from which a narrative world is constructed. An attendance to the graphic novel as merely an easier form of reading is a passive treatment of the ways that the pages work, and a

failure to recognize the balance of quantitative and qualitative complexity contained in the pages.

This chapter particularly focuses on the affordances of visions of the future, dystopian tales, that are rendered in visual and textual format. I use the term *graphica* to subsume a wide range of materials, but in this case focus my attention on three examples of what might be termed graphic novels. I borrow from the tradition of the juxtaposed sequential visual story first offered by Will Eisner, while noting that terms like comic book, graphic novel, and *graphica* are potentially more of a distraction of delineated textual definition than a useful term for discussing the implications of multimodal formulations of narrative content for an audience of readers.

At the same time, I linger on the term multimodality as explicated by Kress (2005) and Jovanovic and van Leeuwen (2018) as a way of thinking about text that, in this case, subsumes notions of printed matter, digital presentation, conveyance of meaning in articulated letter forms that we tend to refer to as words, and visual presentations of author intention and storytelling that can take on pictorial format. In keeping with the work of Jovanovic and van Leeuwen (2018), these steps in meaning-making may exist in prefigured formats, but extend into emotive categories of compositional function. Moreover, these pictorial formats include a sense of the spatial, as well as notions of coloration and design that take the reader beyond simplistic and binary definitions of picture or text. In my discussion of this term, I consider the positioning of literacy as a range of literacies, and explore these terms. Part of this work of determining a future trajectory for educational practice is rooted in an exploration the ways in which conceptualizing of new practices for reading and encountering the world have been described in research literature.

To embrace a pedagogy of the future, we must also acknowledge that we are living in some fragments of the future we once imagined. Dystopian literature can help break this cognitive ice.

Literature Review – The Wide Range

In this review, I focus my attention on the ways that dystopian literature, particularly within graphic novel format, has been explored. I then turn my attention to a consideration of the multitude of ways that researchers think through a literacy pedagogy of the future before examining individual graphic novel works.

Both dystopian literature in both general terms, and in more precise consideration of graphic novel treatments of the genre, have been examined in a number of ways in research literature. Research focused on dystopian graphic novels have been slightly scant and disparate in their formulations, with focus on ecological pedagogy (Jones, 2020), as well as focus on specific textual examples. In an analytic stance on a particular title, Sabeti (2013) centered dis-

cussion on Alan Moore's *V for Vendetta* (1988). Initial presentation of the work shared character descriptions and relationships, as well as student responses. In Sabeti's (2013) work, students aligned their reading with prior literary experiences with reading authors like Orwell and suggested an overall appreciation for the graphic novel.

In their discussion of notions of citizenship, politics, and dystopia, this researcher noted, "The discussion itself is non-linear and haphazard in its structure, dotting from one reference to another at the whim of individual pupils" (Sabeti, 2013, p. 844). Beyond this close attention to a graphic novel example, Hescher (2016) noted that graphic novels present both textual and pictorial affordances for exploring narratology across a range of genres. Wheeldon (2012) extended the notions of dystopian comic book worlds to include the theological and eschatological notions of apocalypse, a term which has a history of a coming reality or sense of the future, as well as a simultaneous uncovering of the present.

Preferences in some cases line up with this multimodal system of meaning-making. It is both the ontological formulation of the graphic novel to convey meaning in a variety of ways, and the educational function to attend to storytelling that occurs beyond a single method of what Hescher (2016) might term as transmission. It is with intention that I use the word beyond to suggest that visual storytelling is far removed from the reductive stances often taken in educational settings regarding literature that exists outside of the canon. Loh and Sun (2019) traced reader preferences among adolescents and found that young audiences are moving away from the traditional and canonical texts positioned in formalist and perennialist traditions to embrace a wider range of contemporary and multicultural voices.

This finding aligns with Christensen's (2006) notion that graphic novels have been popular with young adult audiences for some time. Basu, Broad, and Hintz (2013) pointed out that dystopian fiction is presented in popular form across a variety of media, as well, and Hurley-Powell (2020) traced the example of Margaret Atwood's *A Handmaid's Tale* across transmedial permutations. Baker and Schak (2019) have noted the transmedial potential of texts like *The Hunger Games*, while also noting the limitations of the books in terms of social commentary, although filmic interpretations of the story are constrained in their capacity for critical reflection.

Following from this discussion of what has been presented in professional literature revolving around dystopian graphic novels, with a brief examination of the genre in more general terms, I move to discuss three examples of dystopian visual stories that have not been part of prior cited examinations. The central argument of this chapter is that graphic novels contain affordances for both a textual and multimodal consideration of the ways that reality is con-

structured in terms of future possibilities but also present reality. There is a dynamic of “yet” that is contained in dystopian narrative as authors and artists share visions of what could be, while a reified sense of “already” is contained in these narratives. In this way, authors and artists point to those elements which are focused on and, in some cases, expanded in dystopian work.

In this way, the genre demonstrates a sense of pathos about a future reality, while establishing an ethos that suggests elements of these future terrors are already felt and actualized in some regions of society and the world.

What Is a Text?

Of critical concern in situating multimodal texts is the notion of what constitutes a text. A number of theorists have explored this question, and a number of terms exist. In order to build an understanding of the growing number of terms and movements that address the current shape of literacy, particularly in digital and multimodal texts, I now look at the ways researchers have used the terms New Literacies, multiliteracies, and media literacy, and then trace these terms to their practical utility in shaping educational practice. I will note that each of these terms exists as a broad framework all its own, with voices from the professional literature applied respectively. What follows is an exploration of each of these frameworks, consisting of a brief definition, as well as an exploration of major theorists from each framework. In some cases, theorists speak across frameworks.

In some ways, it seems that these frameworks overlap; yet, each one carries a distinct set of voices and particular assumptions, as well as specific foci. What is challenging and freeing at the same time is the notion that literacy researchers should “take advantage of multiple perspectives, and new ones that will ultimately emerge, to capture the full range of the complexities defining literacy during a period in which literacy continually changes” (Leu et al., 2013, p. 1156).

This range of complexities can help teachers and teacher educators consider the ways language occurs and works in a variety of cultural and digital spaces, and perhaps avenues for visions of the future in graphic novels and other visual works. Each of these frameworks offers an individual perspective relative to literacy as reading and writing habits have occurred across a variety of platforms, including digital tools and image-based texts.

New Worlds, New Literacies

Here, I will consider the term New Literacies. Lankshear and Knobel (2011) traced the path of the term literacy in its growing prominence in education, beginning in the 1970s and culminating in more impact on policy in the 1980s. The reasons offered for this shift included the work of Paulo Freire, as well as a post-industrial literacy crisis, an increased focus on accountability in education, and a focus on post-industrial economic growth. The increasing

demands of reading and writing practices within social and economic institutions played a role in this dynamic of cultural change, as well as Freire's attention to the power of literacy to enable groups of people. Our focus on reading and writing is not an end in itself, but has profound implications for the mobility of individuals in society, and for the ways that individuals and groups take up concepts of identity through their written and spoken language practices.

New Literacies has been defined both paradigmatically and ontologically, or in terms of both ethos and practice. Lankshear and Knobel (2011) described this paradigmatic shift as "a new approach to thinking about literacy as a social phenomenon" (p. 27). The ontological definition refers to the very nature of New Literacies, rather than a larger research or social paradigm, suggesting that New Literacies are composed of "a different kind of 'stuff' from conventional literacies we have known in the past" (Lankshear & Knobel, 2011, p. 28). Because of the changing nature of the ways that text is delivered, and even defined, daily literacy practices change. Following this, educators seek to change their work spaces and teaching practices to establish relevancy. The result is a kind of trickling down, as the ways we communicate are shaped in action, then migrate slowly to our traditions and prescribed practices. Some literacy work, then, is deemed appropriate by the institution of education, while others exist on the outskirts of this brand of acceptance.

These New Literacies have been described as "post-typographic," conveying meaning electronically "via digital code as sound, text, images, video, animations, and any combination of these" (Lankshear & Knobel, 2011, p. 28). Street (2003) called New Literacies practices a "broader cultural conception" (p. 79). Thus, New Literacies capture a recognition that the cultural context matter for a reading or writing practice and, given the composition of these materials, New Literacies often focus on those practices that are digital, electronic, or otherwise post-typographic. In this way, the framework of New Literacies can be a starting point for considering the ways reading and writing practices are shaped by and reshape cultures, including the new tools we take up to make meaning in society, and the ways school either succeed or fail in addressing these changes in literacy practices.

Leu et al. (2013) commented on the way the rise of Internet has transformed daily practices, including those in economic spaces, requiring "competence with the New Literacies required by the Internet" as a "crucial determinant of an engaged life in an online age of information and communication" (p. 1154). Mills (2010) served as another voice marking this shift in literacy thinking, noting that advocates of New Literacies "regard literacy as a repertoire of challenging practices for communicating purposefully in multiple social and cultural contexts" (p. 247). New Literacies studies entail a model of reading that, like Street's (2003) definition of ideological practices, moves be-

yond a prescriptive, school-based approach. However, New Literacies studies also focus on individual tools and modes of conveying meaning, and how readers use these tools.

Coiro, Knobel, Lankshear, and Leu (2008) noted that New Literacies are always changing, and that these “New Literacies will continuously be new, multiple, and rapidly disseminated” (p. 5). Under the New Literacies framework, being literate means taking being adaptive as new demands are placed on readers by flourishing technologies (Coiro et al., 2008). This concept of New Literacies represents an ongoing set of skills, regardless of what changes occur in technology; in other words, the expiration date on a particular technological mode or site does not correspond to an expiration of the literacy practice, as these practices are in a constant cycle of adaptation. This understanding of literacy as always changing, requiring a new skillset, can be applied across the frameworks of multiliteracies, and media literacy.

According to Jewitt (2008), New Literacies focus both events and on-going practices, and the reception of these skills is not passive, but participatory. New Literacies give attention to the distinctions between literacy practices in some localized places, and more globalized contexts. It is this focus on the ontological nature of the practices themselves that helps me separate New Literacies from multiliteracies. Leu et al. (2013) wrote, “Some people use the term *New Literacies* to capture the new social practices of literacy,” while others “tend to see new technologies emerging from new social practices” (p. 1156). New Literacies, in either case, involves an interrelation of social practices and new technologies. While the languages and media we use may be different, we encounter similar tools for meaning-making and encounter one another in new ways through digital means.

New Literacies entail changes in reading and writing practices, and these changes have made their way into educational practice. Kist (2000) reflected on his experiences of viewing film as a medium for communication, and advocated for the implementation of New Literacies in the classroom. Kist (2000) referred to these classrooms as places for “cognitive pluralism,” where students could explore reading and writing across a variety of media (p. 712). Kist (2000) went on to describe New Literacies with five characteristics, which included “multiple forms of representation,” emphasis on the use of symbolism, analytic dialogue “in an atmosphere of cognitive pluralism,” both individual and collaborative of ways of working, and “evidence of active, engaged students” (p. 712). New Literacies were said to “demand new forms of critical literacy and greater dependency on critical thinking and analysis” (Leu et al., 2013, p. 1161).

Becoming a teacher of New Literacies, according to Lapp, Moss, and Rowsell (2012) means embracing a personal sense of critical literacy, interro-

gating “texts and technology” when assessing readings in “online or in traditional formats,” and modeling the navigation of a variety of texts (p. 369). Discussions about reading, in the New Literacies paradigm, would occur at a variety of times and in a variety of ways, and work would be completed by students in a project-based manner that would transcend individualized academic disciplines. Furthermore, reading and writing practices in New Literacies cannot be passive; they require engagement, analysis, and critique from students.

Forzani and Leu (2012) suggested that New Literacies serve as an important aspect of curricular content for young children, and particularly those children who come from socio-economically disadvantaged backgrounds due to lack of access to technologies at home. This finding has been brought to alarming light in the Covid-19 pandemic. Furthermore, teachers of New Literacies see themselves as learning alongside students who may have more experiences with certain types of texts, and utilize aspects of design in providing feedback to students. Using new tools in new ways, then, opens up new opportunities for negotiating the dynamic of the student-teacher relationship. Notions of New Literacies lead to changes not only in the practice of classroom teachers, but in the roles teachers assume in their classrooms. New Literacies are also seen as increasingly important as societies change and the world becomes more globalized. New ways of communicating and engaging are fostered across and within cultures, and these new ways of connecting with one another sometimes take place in new digital spaces. Kalantzis and Cope (2009) wrote of New Literacies in the context of multiliteracies, and described these New Literacies as outcroppings of new “new communication practices” and “embodied in new social practices,” stemming from new practices in employment, citizenship, and formation of identity (p. 167).

Following from this mingling of New Literacies with multiliteracies, I explore the latter framework in more depth in the next section.

A Multiverse of Reading and Writing

Moving from a consideration of New Literacies, I now turn attention to the term multiliteracies. Serafini (2014) defined multiliteracies as, “The reconceptualization of literacy as a multidimensional set of competencies and social practices in response to the increasing complexity and multimodal nature of texts” (p. 171). Serafini (2014) went on to say, “This concept suggests literacy is not a single, cognitive set of skills, rather an array of social practices that extend beyond reading and writing printed text” (p. 171). This definition corresponds with Leu et al.’s (2013) description of the changing nature of literacy, and the emphasis on competencies speaks to our need to conceptualize literacy as a set of skills that can be translated into pedagogical structures. Multiliteracies encompasses both traditional and newly emerging ways of encountering

reading and writing practices, and speaks to the varied nature of communication that has been sparked by both the globalization of society and the inception of new materials.

Jewitt (2008) discussed multiliteracies as a reaction to global changes in the job market, suggesting that multiliteracies and New Literacies share many tenets, but that “multiliteracies has at its center the idea of a social and culturally responsive curriculum,” speaking to the need for reconsideration of educational approaches in a world with a new set of reading and writing demands (p. 245). This political stance can also be traced in the ways New Literacies has been drawn upon to act as an equalizing force, calling attention to the complex and interactive autonomous practices of members of communities who are sometimes excluded from access to education.

The multiliteracies framework, like New Literacies studies, consists of a focus on critical engagement and social change. This is the moral center of the work, beyond its descriptive role in defining and comparing materials. The framework of multiliteracies seems to draw not only on notions of literacy in terms of reading and writing, but casts a wide net in defining literacy practice through a larger consideration of cultural and economic factors. These practices issue into changes in pedagogy, curriculum, and even in the reader themselves as the role of “reader” is reconfigured. A consideration New Literacies or multiliteracies carefully naturally leads to questions about which materials and modes of discourse are prioritized and valued in society and

While New Literacies maintains a critical stance in terms of materials, multiliteracies extends this critical stance to the economic position and political space of the reader. Luke and Elkins (1998), when considering the multiliteracies framework, noted that “new technologies do not simply replace or erase older systems of communication,” instead “they have a transformative, hybrid effect” (p. 5). In this view, television, technology, and cinema would not erase traditional printed text, but would transform literacy practices in changing job markets.

The New London Group (1996) suggested a changing pedagogy to address the literacy practices of “the burgeoning variety of text forms associated with information and multimedia technologies” (p. 61), and this pedagogy included experiential learning, intentional descriptions of “modes of meaning,” critical reflection, and application of learning in new spaces (p. 88). It seems that both New Literacies and multiliteracies include implications for pedagogical change in the context of the movements that occur in globalized and interwoven social structures. The New London Group’s (1996) conversation for this sense of change was situated in the context of cultural diversities, and included notions of reshaping communication in light of “the visual, the audio, the spatial, the behavioral,” among other modes of meaning (p. 64). This transformational

nature of language was discussed in light of “diversity and global connectedness” (p. 64). What researchers envisioned in multiliteracies, in terms of the barriers that new ways of reading and writing have broken down, has in some ways been achieved – while inequities persist, even more than twenty years after this seminal work was published.

The New London Group (1996) described the reader as one who both inherits “patterns and conventions of meaning” and one who simultaneously acts as a designer of meaning in an active capacity (p. 65). As suggested by Jewitt (2008), literacy practices were seen as an economy-driven set of skills that challenged “readers” to move beyond industrial conceptions of routinized, mindless worker drones, and adapt and apply work-based practices that could analyze and synthesize information. One can hardly ignore the ways in which readers are now required to sift information and factcheck as we have a seemingly endless flow of both reliable and disreputable sources to consider.

In its original conception, multiliteracies stemmed from the ways work place demands restructured and reshaped public school curriculum design. As Anyon (1980) has noted, educators have tended to reinforce social stratifications with the kinds of tasks and texts that they include in curriculum. These texts and tools have a reifying effect on already-existing social class barriers. Multiliteracies and New Literacies entail a sense of design and decision-making that allows readers to acquire new skills, make choices, and interact in new spaces, and it is difficult to parse out the ways that biases and preconceived notions shape what material is taught and the manner in which material is taught in public schools.

Meanwhile, in private spaces, a mass media narrative unfolds that includes a variety of brands, including a variety of products, advertised through a diverse set of “media and channels” (New London Group, 1996, p. 70). In this way, adolescence is reflected in similar cultural spaces. Readers, in this model, can find a voice in a variety of lifeworlds. Lifeworlds were defined as “spaces for community life where local and specific meanings can be made,” and virtual online communities served as one example of a lifeworld (New London Group, 1996, p. 70). In practical terms, this sense of media and channels makes its way into popular culture connections and provides new opportunities for identity formation and meaning-making and calls for interaction with a variety of texts in the classroom beyond the printed page. Popular characters draw attention to new textual interactions and texts that, at one time, were spurned by educators (e.g., graphic novels, fan fiction) are more likely to be embraced for the motivation they provide. In discussing how these social and cultural transformations affect curriculum and pedagogy, the word *design* was applied. This sense of *design* draws on an order of discourses, a concept defined as “a socially produced array of discourses, intermeshing and dynamically

interacting” (New London Group, 1996, p. 74). Schools were seen as spaces where a variety of discourses interrelate and students are involved in a process of meaning-making as they draw on what the New London Group (1996) called *Available Designs*.

Leander and Boldt (2012) expressed concern over the application of the New London Group’s (1996) pedagogy. More specifically, Leander and Boldt (2012) were concerned with the lack of “indeterminacy” among adolescents expressed in “A Pedagogy of Multiliteracies” (p. 24). The second concern voiced by Leander and Boldt (2012) was the use of “A Pedagogy of Multiliteracies” as a redefinition of literacy, rather than as a pedagogical framework; for these researchers, literacy practice was not necessarily focused on a text as an end result or focus, but was conceived of as an improvised, living reality. In this consideration of literacy practices, the construction of a text is emergent and developmental, with pauses and redirections. For example, a reader might stop their singular reading experience, engage in another activity, and then return to the reading experience, or may even enact the reading experience in a lived expression. Similarly, reading in a multiliteracies or New Literacies space is not dictated in the same way that a traditional reading experience might be, as a reader from line one on page one to the next line, and so forth.

Of final consideration in multiliteracies is the work of Gee (2013), drawing on understandings of context in considering reading and language. Gee (2013) wrote that context “means not just the words, deeds, and things that surround our words and deeds, but also our purposes, values, and intended courses of action and interaction” (p. 138). A variety of terms help to define this context; the first is Discourse, which “always” involves “language,” but then “always involve more than language as well” (Gee, 2013, p. 143). Discourses are expressed through identity kits, defined as something like “a toolkit full of specific devices (i.e., ways with words, deeds, thoughts, values, actions, interactions, objects, tools, and technologies) in terms of which you can enact a specific identity and engage in specific activities associated with that identity” (Gee, 2013, p. 143). Discourses can be composed of other Discourses in a kind of blending. In this view, literacy becomes not just reading and writing, but a variety of meanings conveyed in a variety of ways, and is cultural and situational in nature.

Both New Literacies and multiliteracies seem to be broad in their reach and encompassing in their descriptions, subsuming a variety of texts and materials that have been, are, and will be. Whether “new” or “old,” multiliteracies suggests that there are many ways to engage in reading practices. What follows is a discussion of media literacy as final avenue of exploration with particular relevance to the ways that multiliteracies and New Literacies have made their way into cultural practice.

The Power of Media

From New Literacies and multiliteracies, I move to a specific use of the term of literacy with regard to media. Bawden (2001) defined media literacy as a framework that is “used to imply critical thinking in assessing information gained from the mass media: television, radio, newspapers and magazines, and (increasingly) the Internet” (p. 223). Media literacy, then, may be defined in terms of what is actually intended by the word *media*. Hobbs (2011) stated that the term media has been using in conjunction with communication practices since the 1920s, and went on to write that the media preferences of children and teenagers very often conflict with the choices and preferences of adults. For Hobbs (2011), media meant “an intervening agency, means, or instrument” historically, but has since been applied to a series of formats, including “print, visual, sound, and digital media” (p. 9). An increasing attention has been given to media literacy as concepts of bias and power are explored by politicians and popular figures. It is within the political context of elections and the negotiation that occurs around what is acceptable communication in social media tools that I position media literacy with the greatest potential relevance.

Serafini (2014) defined media as “particular technologies used for the reading and dissemination of texts, in particular multimodal ensembles,” and included examples such as television, Internet, and DVDs (p. 171). Media literacy has elsewhere been defined as the “need to learn to ‘read ’media or information sources in specialized ways in order to ‘get what is really there ’ and/or to avoid being ‘taken in’” (Lankshear and Knobel, 2011, p. 22). Serafini (2014) suggested that media literacy is aimed at, “The ability to critically understand, question, and evaluate how media work to produce meanings, and how they organize, mediate, and construct reality” (p. 171). It should be noted that critical stance was included in each of these four frameworks; New Literacies, multiliteracies, media literacy, and digital literacy each include critical evaluation as part of the reading and writing process. It is not enough to simply read – in each of these frameworks, reading is an active and thoughtful process that causes the reader to consider the world around them.

In theoretical terms, Kress (2005) defined “medium” as “the term for the culturally produced means” of distributing messages (p. 6). Kress (2001) drew on semiotics to serve as the foundation for his discussion of the ways in which meaning is conveyed across multiple modes, suggesting that signs are made in “all semiotic modes” (p. 404). According to Kress (2005), modes, or “culturally and socially produced means for representation” (p. 6) carry their own affordances, and media work in their own, distinct facilities. The ways people and ideas are represented, or misconstrued, in media have powerful implications.

As an example of these distinct facilities, Kress (2005) contrasted the concept of author in terms of a traditional book and the concept of author in terms of a screen representation. Representation, then, is the goal of utilizing these modes and media, and the representation points back to aspects of living. Affordances were defined as “distinct potentials and limitations for representation of the various modes” (Kress, 2005, p. 12). Jewitt (2008) went on to define affordances as that which “is possible to express and represent easily,” which is shaped by the ways “a mode has been used, what it has been repeatedly used to mean and do, and the social conventions that inform its use in context” (p. 247). These considerations of affordances delineate what particular media are used for and can accomplish.

Thoman and Jolls (2004) suggested that media literacy includes a strong emphasis on analysis, as well as opportunities for real-world learning. Indeed, we live in an age where open channels in social media feature a wide range of messages. This sense of viewing beyond the surface and interrogating agenda and bias is inherent to critical media discourse, so that educators who wish to address media literacy have a new level of scrutiny to attend to when asking their students to interpret messages. Implementing media as an educational tool, according to Thoman and Jolls (2004) has potential for increased engagement for adolescents, and moves beyond passive viewing. The focus in media literacy is one of process, rather than content as “one engages critically with a mediated message” (Thoman & Jolls, 2004, p. 23). Thoman and Jolls (2004) noted that, in media literacy, there is more than one definition of text, which can include “any message form” (p. 23). Asking questions is also an essential element of media literacy. This notion of a broad definition of text, as well as a critical stance for the reader, aligned with both New Literacies studies and multiliteracies. Engagement, however, took on a unique focus in media literacy.

Hobbs (2011) identified five elements of the literacy practices within media literacy, beginning with access. Access, in this case, referred to both locating and implementing information that was considered “appropriate” and “relevant,” as well as using technological tools effectively (Hobbs, 2011, p. 12). Buckingham (2007) echoed this concept of access as an essential in media literacy. Concepts of student success or struggle, as well as messages of which media are acceptable and which are not, are bound up in this concept of access. Following access, digital and media literacy then included analysis as a critical process, much like Thoman and Jolls (2004), with attention on purpose, audience, and other dimensions of messages, as well as possible effects of messages conveyed by media, and overall quality of media.

Students follow access and analysis into a process of creation, in which they draw on what they have learned about media to begin to produce their

own content. This is a literacy practice that requires confidence, as well as creativity, and draws on understandings of audience and purpose, formerly considered in the analytic processes of media literacy, for the purposes of synthesis. Reflection acts as a fourth element of digital and media literacy, and considers daily effects on daily life practices, as well as larger concepts of “social responsibility and ethical principles” applied to “our own identity, communication behavior, and conduct” (Hobbs, 2011, p. 12). The final component of digital and media literacy is action, the active application of literacy practices to solve problems in the wider world, as well as in a variety of social situations, including family and the workplace. While social and political considerations serve as a backbone for New Literacies and multiliteracies, it is in these concepts of access and action that media literacy approaches socio-economic questions.

Expanding on engagement, Alvermann and Hagood (2000) suggested that “fandom” can increase student response in classrooms, writing, “Bringing together fandom, music, and critical media literacy in classrooms may open up new opportunities for the classroom context to be a site of active meaning making by both teachers and students using a variety of popular culture texts,” (p. 445). Jenkins (2014) drew a distinction between researchers who study fans as individuals and researchers who study fandom as a larger construct. In working with readers, this concept of fandom translates into drawing on popular characters and engaging with media outside of traditionally accepted texts. Teachers can trace connections between traditional print literacy, as well as the multimodal experiences of graphic novels and film. Within the space that fan fiction communities allow, students can then become makers and even change elements of narratives they enjoy to meet their own desires and expectations for what works best in stories. This use of text opens new possibilities as students are not limited to the work of other authors but, in essence, become authors themselves and reshape narratives to fit their own demands and expectations.

Jenkins (2010) commented on the role of media, and the ways that brands are marketed so that one medium can be drawn and utilized across a variety of media, a concept he called transmedia. This use of media can stem from adaptation, which is defined as reproduction of “the original narrative with minimum changes into a new medium and is essentially redundant to the original work” and extension, which is defined as an expansion of “our understanding of the original by introducing new elements into the fiction” (Jenkins, 2010, p. 945). Jenkins’s (2010) pedagogy of transmedia includes maintaining a critical stance for examination of the media, as well as examining the way storytelling works across media.

Both Jenkins (2010) and Turner (2009) consider media as a cultural phenomenon, while Fairclough (1995) suggested that language in any text, including media texts, “is always simultaneously constitutive of (1) social identities, (2) social relations, and (3) systems of knowledge and belief” (p. 55). Awareness of this aspect of language use in media connected media literacy in my mind with the work of Gee (2013). This discourse of media can also convey a sense of hegemony, given the attention or importance paid to certain types of media, which Fairclough (1995) called “orders of discourse” (p. 67). These political considerations align with aspects of the sociopolitical focus of multiliteracies. Machin and van Leeuwen (2016) explored the relationship between media literacy and power, specifically in terms of the interpretations that can be gathered from multimodal discourse.

Situating the use of media in the classroom, Sholl and Denski (1995) wrote that critical pedagogy is an essential in media literacy, as has been noted in New Literacies and multiliteracies, and saw media literacy as a place where marginalized students could be reached. The work that students do that is sometimes ignored or misunderstood by traditional school structures may be reevaluated under a new framework. Sholl and Denski (1995) went on to say that media literacy from a critical stance should be “conceived as political, social and cultural practice” (p. 17). It seems that in all these frameworks, there is not simply a descriptive sense of materials, but an attentiveness to the larger social and cultural set of practices in which these platforms and products exist.

Adding to this conversation about media literacy in pedagogy, Bazalgette and Buckingham (2013) reinforced the importance of including a wide variety of texts in classrooms, and explored current applications of theories of multimodality, drawing a distinction between the use of multimodality to qualify analysis *of texts* and the use of multimodality to define *texts themselves*. Bazalgette and Buckingham (2013) called this a “significant conceptual leap,” stating “multimodality seems to be reduced to a mere aggregation of ‘methods of communication – ’which is very different from the aim of multimodal analysis” (p. 96). The researchers aimed for a closer analysis of media containing moving images, considered distinctly from more traditional text forms (i.e., print). Moving-image media’s cultural importance and impacts on early cultural development were cited as rationale for this investigation. Next, I will consider the final framework, digital literacy, before offering a brief summary of why these frameworks are important for education.

From this large family of literacy theories, I now turn to consideration of three dystopian graphic novels.

Text Example and Analysis: The Hard Tomorrow

Author and artist Eleanor Davis paints a stark future in the graphic novel, *The Hard Tomorrow*. In some ways, this work draws to mind Sophie Goldstein's 2015 graphic novel, *The Oven*, as a female-articulated figure negotiates the dangers of a foreseeable reality. In Davis's work, the world is repainted as one in which social media control is out of bounds, and the main characters, Hannah and Johnny, must negotiate this pared-down space. The future is not one of growing technology, as seen in other dystopian stories, but one in which life looks very much like it does now.

Hannah has a desire for pregnancy, a plot point that contains much to consider in emblematic terms for future hope, while also encountering life with a partner who is described by publisher Drawn & Quarterly as a pothead. Also recalling the publisher's description, the book's sense of a future is near. The emotive function of the design of the text is one of contemporaneous encounter, as well as bleak dread as worlds and characters are depicted in unadorned fashion.

Moments of violence occur in unexpected moments and stem from human frailty. There is little known of the authoritarian leadership in this state as much of the narrative focuses on making it through daily demands, negotiating human sexuality and social formations. Davis's use of black and white lends a sense of timelessness to the pages, acting in contrast to Goldstein's deserted setting and tones of reds and yellows.

The story is not yet occurring, given the actualized social media empire, while it is already happening as citizens exist in a pandemic context. The background of war and conflict found in the text is not only an already sense of the text, but an always-present aspect of reality. Indeed, it is difficult to think of a time when there has not been some kind of war going on.

The less visible war of information exchange and identity that occurs in social media spaces is a thread that runs beneath the surface of the narrative, and brings to mind both the expansion and dilation of social media that has occurred in the past few years. There is an increasing specialization of platforms to adhere to the viewpoints of participating members, no matter how extreme, and an increasingly important understanding of the limitations of political voice when such sense-making leads to violence.

While essentially a quiet narrative, *The Hard Tomorrow* is also focused squarely on the difficulties of today, and the violence is felt, unseen in many cases, even when not explicated in panels. The ecological considerations of Jones (2020) resonate strongly here. A pedagogy of the future might take note of this sense of violence, while also comparing what is expressed by the palette, arrangement, and use of image in the story.

This is a pedagogy that is focused on saving both the physical and emotional nature of the world. I am reminded of Hobbs's (2020) conceptualization of the world as subsuming propaganda, platform, entertainment, and persuasion. The notion of the platform with its range of affordances for connections that are sometimes misappropriated to share false information or to spread division is a thread to the narrative in Davis's work that pulses below the surface.

There is a sense that this world has come to be as a result of some unstated facts, but the inferences are ripe not just in a traditional imagistic sense with meaning-making that occurs alongside the images, but within the narrative itself. Kukkonen (2013) positioned graphic novels as literary works of merit, and Davis shows that notion to be true in this work.

Text Example and Analysis: The Wrenchies

In a tale told through vivid colors and acting in stark contrast to *The Hard Tomorrow*, Farel Dalrymple's graphic novel, *The Wrenchies*, acts in a Mad Max-like fashion, while also drawing on parallels with William Golding's *Lord of the Flies*. Violence is not only felt but vividly expressed in this story in graphic terms.

Youth, in this story, is told through the prism of a cave experience, but the cave is hardly Platonic. What the characters experience is not an idealized vision of the future, but one of shadows where violence occurs and survival is essential. Endemic to the story is the notion of a younger generation conflicting with the horrors of another. The effect is not unlike the push and pull of progress in contemporary society, and the ways in which systematic structures of oppression continue to be revisited and revitalized after periods of surface-level transition, where a holistic transformation may otherwise occur.

In *The Wrenchies*, it is only through the banding together of youth that the world has the possibility for positive change. The story is generational, and speaks to the need for change while noting the reality that gatekeepers from other corners of society seek to set change back. Emotively speaking, these pages assemble a sense of war and are a visual punch to the stomach. They are visceral in their sensibility, as well as in the occasional presentation of figures of viscera. Dalrymple includes additional intertextual affordances, which comment on the nature of the book, as characters read a comic book page, detailed in Panel A on page 112.

One character responds that the text is "looks sort of gay," a comment which includes problematic language, but also reflects the confrontational worldview of the speaker. This intertextual reality-distortion between the medium and commentary on the medium itself continues throughout the pages as the reader encounters an issue of *The Wrenchies* depicted in the book, and a

character represented on the page signals the terminus of the story by saying the words, “The End” (Dalrymple, 2014, p. 303).

The message from *The Wrenchies* is one of conflict, confrontation, and necessary battle. There is world-building and play, though conceived in a gripping visual style, and the further effect is that book is almost aware of itself as a book. The cave metaphor again returns as one generation encounters the still-open wounds of previous generations and speaks to the potential of a pedagogy of the future not as an isolated and free-standing entity, but as a natural step (perhaps a healthy and metacognitive and meta-fictive stance) taken in succession.

The conversation continues.

Text Example and Analysis: Heavy Liquid

In Kafka-like fashion, author/artist Paul Pope fashions an alternative future in which a character with a singular letter name (S) encounters both reality and distortion. Pope is no stranger to the world of dystopian fiction in visual format, having written *Batman: Year 100* and the *Battle Boy* series, both of which occur in alternative universes presented with unique vision. Pope’s style might be described as a sleek and urban punk rock approach that could just as easily appear on a poster announcing an upcoming concert, as it decorates at the pages and panels of a comic book work. The setting for all of these stories is decidedly more metropolitan and urban than the titles previously explored in this chapter. The violence in the narrative takes the frame of espionage-level escape in many cases.

It is, by the end of the story, a balance of reality and distortion that is so central to dystopian fiction as S encounters a shadow-self, reminiscent of the shadows encountered throughout the narrative. Detective fiction works as a fitting sub-genre for this dystopian story. I return once more to my experience teaching *The Hunger Games* series with middle school students as I ruminate on the questions presented in this *Heavy Liquid*:

To what degree would a society so delude itself into thinking that sacrificing youth to stave off rebellion would be an essential and acceptable way of life? Other questions arise. To what degree do members of society so segment themselves or assign value to themselves that the world becomes a capitalistic set of interchanges? Are roles in society so stifling that the notions of freedom and selfhood are thereby inhibited? Pope’s future is a dark one, but all of these questions present a sense of shadow and darkness.

At the end, all of these stories, whether told in visual or text-only format, revolve around questions of identity and personhood to the degree that these values are lost in a series of manipulations. Such is the critical role of considering voice in society, and of interrogating systems of power and oppression. A critical dynamic occurs in social structures that ostensibly provide inclusion

and opportunity through written slogan or propaganda, and yet do the opposite in their actualized work. It is this dynamic is emotively present in *Heavy Liquid* as the reader encounters moments of familiarity and concrete narratology, as well as moments of uncertainty.

These are realities and questions not so divorced from our own as we contend with systems of inequity in the world. For centuries, personhood in full form has only been relegated to a select few, based on propositions of gender, wealth, and ethnicity.

Further Analysis: Why These Books?

As one of my undergraduate students recently remarked in a poetic response to an assignment about reading habits, *Fahrenheit 451* “scorched my brain” (personal communication, 2/13/21). Reflecting on this student’s interaction with the text, it is certainly not the case that all readers engage with dystopian materials in the same way or at the same time. Rather, the confluence of visual storytelling and futurism that is present in these texts reflects a more precise potential for capturing the attention of some students, while other options for reading might be offered to those less attuned to these materials.

Bradbury’s work has been adapted into graphic novel form, which might issue into another line of response and engagement; nevertheless, stories of dark futures are not every reader’s wheelhouse. At the same time, I see the importance of having assumptions burned down, and a new world construction in the absence of a prior worldview. While it is certainly not the goal of my instruction to topple thinking, I know that I have gone through a similar and difficult process in my life as I have come to terms with the world around me, first noting that inequities persist, while also noting that these inequities are so often ignored or erased.

In the context of this writing, the 2020-2021 academic year has been one of struggles and, in other moments, creative insights. It has been one of political revolution and world events that have recast this author’s life into a somewhat dystopian experience. Voices murmuring pandemic possibilities and lists of symptoms now provide the background music in restaurants, and people move about in masks and small groups. On the day that I write this sentence, a half-million citizens in the United States have died as a result of the pandemic; meanwhile, some members of society continue to downplay or resist the information that is being provided to them. Reasonable measures of mitigation are, in some spaces, considered political moves or laughable choices.

Such is the life that is around this author at the moment, and it is with appreciation of the medium on which this chapter has treated that I note the irony of a genre, or sub-genre, that has proven to be so popular leading to moments of sorrowful recognition. These are words that have not yet passed

into the world, ideas that have not yet shaped the practices and identities of members of society.

Dystopian stories afford a particular sensibility for exploring the woes of present reality through the lens of a fictive one; it is this sense of writing out the woundedness of this age (Dutro, 2011 has previously utilized the phrase “writing wounded”) that leads me to consider the ways in which stories of the future are also stories of lived moment, and how these stories unpack and unfold the trauma and pressing questions of justice that readers find resonant.

Those who do not adhere to these limitations are shamed in some spaces, and embraced and celebrated in others. Political leaders have utilized social media platforms to share ideas of dissent and agitate residents in some parts of the United States who were ordered by sitting governors to lock down. In perhaps the most salient example in my nation’s recent history, the response of former President Donald Trump was to “liberate” regardless of the consequences felt by other human beings. It is difficult, even from a global and non-partisan standpoint, to remove this level of rhetoric from a dystopian context, and to rewrite this historical moment as one of anything but Malthusian politics.

While dystopian stories glimpse the future, they clearly speak to current times and it is only from a place of privilege that this author notes and remarks on this finding. In many ways, members of marginalized communities have experienced dystopian states from the beginning as those who are othered find themselves at odds with dominant groups and rhetoric. A pedagogy of the future is, in effect, one which considers all means of communication in the context of a historical reality and a wounded present, and considers all identities and experiences as aspects of the living world. This pedagogy seeks to heal not by means of erasure or memory loss, but by means of confrontation, naming of issues, exploration of solutions, and commitment to future progressive work.

What is more, this is a pedagogy that can lend itself to a war of the minds that puts weapons at the side, embrace a brighter vision of authentic humanity, and acknowledge the problems that are so often reflected in visions of dystopian worlds. They are the trappings and chains of fictional realities that exist, to some measure, in our lived experiences now. Conversation about what might be necessarily and naturally leads to a conversation about what is currently true; my classroom experience was one of awe and revelation as I learned new aspects of my students’ lives, including the ways that prejudice and bias shaped their lives.

Conclusions and Recommendations

It is difficult at the time of this writing to fully imagine the implications of the COVID-19 pandemic and the on-going destructive debate about the rights

of Black Indigenous People of Color (BIPOC). There is a dynamic of forward movement punctuated by a sense of three steps back in these aspects of lived experience. This writer can point to the moment that they realized that racism was still a component of daily human life in the United States, a marked sign of privilege that continues to shape my pedagogy.

A pedagogy of the future and present must be concerned with social justice, and with the decent treatment of all people. These notions might seem utopian, but they are also essential. It is within the space of the dystopian story that we so often find an injustice or a sense of hatred brought to full world form. I am thinking of *The Wrenchies* here, but also of *Lord of the Flies*. The hatred that groups sustain and convey is, in so many ways, arbitrary. Both of these works demonstrate this notion through the lens of youth.

Perhaps in the shadows of invented realities we contend with these questions, but it is also paramount that such questions be addressed beyond the pages of literature and become enacted in spaces of law and daily social practice. Returning to Hobbs (2020), the move to silence educators concerning the ethical treatment of others, both in the present and throughout history, is particularly problematic. So too is the notion that curriculum might erase rather than reveal layers of truth.

Textually speaking, a pedagogy of the future might necessarily subsume the fusion of all manner of texts and modes of delivery for such texts. A prioritization of the printed page is as anachronous, at this juncture in the world of literacy education, as would be a lesson stemming from the Horn Book. Throughout this piece, I have attempted to intimate that the inclusion of graphic novels or dystopian literature, or indeed their literary nexus, is at once truly literary in nature, and yet does not qualify as a motivating material for all readers at all times.

Returning to the comments of the teacher I interviewed during this project, the phrase they shared, “Reading is reading” comes to mind, as does the Freirean notion of reading the world around us. There is a globalized sensibility to our modes of communication that is daunting, yet delightful in its capacity to allow a variety of perspectives to be represented and shared.

The inclusion of multiple modes of meaning construction necessarily entails a vision of the future that is rendered not simply in words, but in images and other less obvious modes of communication. That is to say, a pedagogy of the future must simultaneously confront experiences of inequity so often demonstrated in dystopian narratives. Without an analytic and authentic sense of current problems and issues, and without both the freedom and the authority to name and describe these issues in educational spaces, the result is a removal or intentional ignorance of reality. There is little to say about the possi-

bilities of the world ahead if educators are not supported in their work of anti-racist and community celebrating education now.

What a reader sees about themselves and their world is presented in a disjointed nature that simultaneously aligns with and extends an understanding of momentary lived reality. We now live in a digital age more than ever, and this move to digital and virtual has been necessitated by a global pandemic. The result may be the embracing of digital pedagogies and multimodal storytelling that is afforded by digital texts, while a subtle or not-so-subtle resistance to the importance of the screen may also be an implication in some pedagogical spaces.

As is the case with so many conceptualizations of the future, time will tell.

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APPLYING PERMACULTURE PRINCIPLES TO MODERN EDUCATION

Gary PADGETT*

Introduction

This chapter analyzes the method and approach to teaching STEM/STEAM based lessons. As standalone courses, science, technology, engineering, math (STEM), and now art (STEAM), have been a mainstay of most public school curriculums in the United States since the 1950s (Jolly, 2009; Bybee, 2013; White, 2014). Seventy years later, schools are attempting to develop these courses into a holistic, integrated program. This chapter adopts the permaculture principles as defined by Mollison (1978) to create a platform in which the problem is the solution. Rather than view a multidisciplinary curriculum as a challenge to overcome, it can be viewed as an opportunity to provide students with real life learning experiences. By applying permaculture principles to a school's curricular approach, it is possible to create opportunities for students to learn STEAM subjects areas in a manner that allows them to connect to the natural world and to their communities.

As defined by Mollison (1978) permaculture is comprised of three ethics. They are Earth Care, People Care, and Fair Share. These principles are depicted here in Figure 1:



Figure 1: Permaculture Ethics

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When applied to the field of education, these three permaculture principles have the ability to shape the way pedagogy is applied. This chapter will explore each principle separately, demonstrate its applicability to the field of education, and conclude with how the combination of all three principles is greater than the sum of its parts.

Earth Care

Within the field of permaculture, there are three distinct, yet overlapping, ethics (Fox, 2013). The first ethic is Earth Care. Earth Care is defined as maintaining, and possibly regenerating, the soil, water systems, forests, air quality, and agricultural production areas (Akhtar, F. et al, 2016; Vitarik, C & David, C, 2017). This is the ethic that best aligns with modern school’s science education systems. The ethic of Earth Care is depicted here in Figure 2:



Figure 2: Earth Care

Stem/Steam

In the United States, there has been a focus on science and math since the 1950s. This focus was caused by launch of the Soviet satellite Sputnik (Wisehr, C, Concannon, J, & Barrow, L.H., 2011). When the Soviet Union launched a satellite before the United States did, it highlighted that the United States was not keeping up with other countries in these subject areas.

Over the last seventy years, the focus on math and science has moved from teaching them as stand-alone subjects to teaching them as part of a holistic curriculum. This holistic curriculum began as a STEM program, defined by teaching science, technology, engineering and math. This type of curriculum consists of only the hard sciences and is not as holistic as it first appears. To become more inclusive, and to infuse STEM into all subject areas, the arts were added to this curriculum (Connor, A, Karmokar, S., & Whittington, C., 2015). This changes the acronym from STEM to STEAM.

From an Earth Care perspective, STEM programs can, and have, provide opportunities for students to learn about environmental issues and sustainability programs. With the addition of the arts, STEAM programs have the ability

to reach a broader population of students and utilize their interests in teaching about how to care for the Earth.

Ecoliteracy

Ecoliteracy is a concept derived from two words, ecology and literacy. William Graham (2018) writes, “Ecoliteracy is the ability to understand the natural systems that make life on earth possible.” Most school systems have a science curriculum that includes standards concerning the natural systems occurring on Earth, but it is the word literate that changes this course of study slightly from just the memorization of ecology facts.

Ecopedagogy

Ecopedagogy, as the word implies, is an outgrowth of ecoliteracy. It is “a discourse, a movement, and an approach to education that has emerged from leftist educators in central and South America including Paulo Freire, Moacir Gaddotti and Leonardo Boff that seeks to re-educate ‘planetary citizens’ to care for, respect and take action for all life.” (OMIYEFA, AJAYI, ADEYANJU, 2015) Utilizing this definition, ecopedagogy is calling for a whole child, or rather a whole world, approach to education. Rather than separating people from the rest of the natural world, ecopedagogy is placing people directly back into the ecological systems that ecoliteracy is teaching. Ecopedagogy also examines how oppression and societal problems are causes of – and caused by – environmental issues, but this aspect of ecopedagogy will be covered in more detail in the section on People Care.

Conclusion

When examining aspects current education standards within the United States, Earth Care can easily align with the science standards. However, students are enrolled in, and should care about, more than just science courses. A STEM or STEAM approach allows for a more comprehensive approach to caring for the planet and engaging students’ varied interests. This approach, as mentioned in the section above on ecopedagogy, still does not address the whole student or includes human interaction and society as part of the ecological environment. Permaculture is a three-legged stool, and all three ethics are needed for it to be effective. The next two sections will examine the People Care and Fair Share ethics of permaculture.

People Care

Permaculture is based on three ethics, of which People Care is the second (Egan, C., Benyon, D., & Thompson, R., 2017; Genus, A., Iskandarova, M., & Warburton Brown, C., 2021). Unlike Earth Care, not much has been written to explore this ethic of permaculture. Pandora Thomas states that, “There hasn’t been enough work done around permaculture principles translating them for the people care ethic, so now there’s this misconception that permaculture is about farming and gardening, which it isn’t—it’s mostly about rela-

tionships.” (Olson-Ramanujan, 2014, para. 24) People Care is based on the ideals that people, like any resource, are not expendable. This ethic emphasizes the importance of the community and working together to confront local and global issues. It is about taking care of one’s self and others. This ethic can translate to modern education, but will require a pedagogical shift away from focusing on standards to focusing on the whole student. The ethic of People Care is depicted here in Figure 3:



Figure 3: People Care

Ecopedagogy

Ecopedagogy, as discussed in the last section, “seeks to re-educate ‘planetary citizens ’to care for, respect and take action for all life.” (OMIYEFA, AJAYI, ADEYANJU, 2015) As a pedagogy, ecopedagogy aligns with the ethic of People Care. Rather than exclude humans from the natural world, ecopedagogy places humans firmly within the global ecology. This includes the interaction and examination of colonization, systemic racism, cyclical poverty, and sexism. Permaculture is not a linear process, but is circular. Topics such as ecology and racism or sexism are not mutually exclusive, but are overlapping and directly influence each other. (Kovel, J. 2003; Van Sant, L., Milligan, R., & Mollett, S., 2020) Applying this concept to modern education will have a direct impact.

Mindfulness

Up until this point, this chapter has examined science or STEAM based curriculums when applying permaculture ethics to the modern education system. If this chapter only looks at standards based curricula, then it will only touch on one part of the issue and miss the point of permaculture. Rather than operate in a linear fashion from, it is important to work within concentric circles that address issues from multiple angles.

Addressing modern education from a People Care angle, one way that schools can care for the students, teachers, and staff is by applying a degree of

mindfulness (Shapiro, S.L., Brown, K.W., & Biegel, G.M., 2007; Roeser, R.W., et. al., 2013). In a pandemic, or post pandemic world, levels of anxiety and stress are increasing (Marshall, A.L., & Wolanskyj-Spinner, A., 2020; Muldong, V.M, Garcia Jr, A.E., & Gozum, I.E., 2021). Implementing a mindfulness based stress reduction (MSBR) program, available to the entire school community, is one way that modern education systems can practice People Care.

Community Engagement

Mindfulness based stress reduction programs (MSBR) or restructuring schools facilities can take time and money to implement. Time and money are often resources that schools do not have, and it is impractical to ask students to wait five or ten years to access resources for their mental health and wellbeing. It should be remembered that permaculture operates in a circle, and not a straight line. Rather than think of implementing a MSBR program or not, it would be better to think of implementing an MSBR program and other strategies, with the emphasis on the “and”. One way to address the lack of funding and resources at the school site is to look toward the community and other stakeholders.

From a permaculture perspective, the community can be engaged in a number of ways. Community members can be imagined as exiting within concentric circles, or zones, around the school. These zones can be designated literally based on community members 'geographic nearness to the school or metaphorically, based on community members 'personal and/or professional relationship to the school.

When imagining the zone based on geography, this would resemble a standard permaculture zone analysis. (Mars, 2005) Those areas closest to the school would be Zone 1, then Zone 2, Zone 3, and so on until all relevant geographic areas are identified. The zones closest to the school are those that should be engaged first. The community members in this zone may be able to supply funding or donate their unique talents to the school. This can be mutually beneficial to the business in the closer zones as supporting a local school is a great way to advertise.

The previously mentioned zones can also be drawn metaphorically. This can be done by identifying the strength of the personal and/or professional ties a community member has to the school. This may or may not correspond to geographic zones, but may yield better results for the school. Parents, grandparent, and extended family members can be included in the first zone. They are the ones personally connected to the school and have a reason to invest their time, talents, and money. The second zone can include alumni businesses that employ graduates. The third, fourth, fifth, etc. zones can all identify various community members and stakeholders that are related to the school in

one fashion or another. Incorporating and engaging these community members provide a mutually beneficial relationship in which the students, the school, and the community benefit.

Conclusion

In the first section, this chapter examined how the Earth Care ethic of permaculture can be applied to modern schools. This curricular approach is very important, as is evidenced by test scores and the growing job market in STEM/STEAM fields. However, the modern education system must move past a standalone curricular approach. Instead, as this section points out, the modern education system needs to adopt a whole student approach that includes engaging the community and addressing mental health issues. This is why the People Care ethic, as examined in the section, is important the future of the modern education system. The third ethic of permaculture, Fair Share, will be discussed in the next section.

Fair Share

Fair Share is the third and last of the permaculture ethics. Earth Care, the first of the permaculture ethics, is the easiest of the three ethics to implement in the modern education system. Science and other STEAM topics are clearly defined and have state and/or national standards to support them. People Care, while less clearly defined, is usually supported by the modern education system through its focus on the whole student. School systems may debate best practices for providing mental health resources and engaging community stakeholders, but they are usually in agreement that both actions need to be taken. Fair Share, however, has become a heavily politicized concept that is debated based on its definition, its applicability, and even its inherent morality (Akhtar, F., Lodhi, S.A., Khan, S.S., & Sarwar, F., 2006).

Fair Share, as a permaculture ethic, is defined as using what one needs and sharing what one can. This can be in direct opposition to systems based on competition, growth mindsets, and driven by profit. (Akhtar, F., Lodhi, S.A., & Khan, S.S., 2014) Within the United States this has the potential to become misconstrued as an argument between economic systems such as capitalism and socialism. Fair share, however, has the potential to not only enhance educational systems, but also make them accessible to a larger audience. Fair Share is depicted here in Figure 4:



Figure 4: Fair Share

Community Engagement

Donating Food

In a STEAM based classroom, such as those discussed earlier, there are many opportunities to share resources with others. STEAM based classrooms tend to be developed with project or problem based curricula in mind. One example of a project of problem based STEAM curriculum is the concept of a school or classroom garden.

School gardens are used in STEAM projects to teach students agricultural science and character traits such as responsibility and hard work. (Alexander, J., North, M.W., & Hendren, D.K., 1995; Blair, D., 2009) These are admirable outcomes, but they ignore what gardens are naturally intended for – food production. (Ratcliffe, M.M., Merrigan, K.A., Rogers, B.L., & Goldberg, J.P., 2011) School gardens have the potential to grow a variety of fresh produce that, while perfectly designed for consumption, goes to waste. Rather than plan a school garden with only science standards or character development in mind, a more holistic view would take into consideration the vegetables and herbs that are grown in the garden. This produce can be provided to the local community to feed those that are in need.

Donating food does not align with science, math, or any other curricular standard. The impact donating food has on students is not easy to quantify on a standardized test. However, from a permaculture viewpoint, something as simple as donating the byproduct of a STEAM lesson – in this case fresh produce – brings the lesson into alignment with Fair Share ethic. (Rayner, L., 2013; Raimbekova, L., & Amuzu, S., 2019)

Community Stakeholders

This section began with the idea of donating food to help support the local community. This reflects a deficit mindset in which one examines what the community lacks rather than what the community contains. Schools are not isolated entities separate from the communities in which they exist. Shifting from a deficit mindset to an asset based mindset, schools can view communities as resources that can benefit the overall education systems. Communities are a source of funding, subject area expertise, and support. (Sporth, R.,

Greenberg, M., Bierman, K., & Redmond, C., 2004; Janmaat, G., McCowan, T., & Rao, N., 2016;) As described earlier, permaculture principles can allow communities to be assessed based their locality and utility. Within the ethic of Fair Share, incorporating the community into the school allows community stakeholders to have a voice in what is taught, and perhaps more importantly, how it is taught. Excluding the community from participating in schools denies students access to the resources that a school cannot feasibly provide.

Guest Speakers

Incorporating community stakeholders into the school system can seem like a daunting task. Each school and each community will approach this concept in different ways. However, all schools can utilize community stakeholders as guest speakers. (Zorek, J.A, Katz, N.L., & Popovich, N.G., 2011; Craig, C.M., Bergstrom, A.M, & Buschhorn, J., 2020) Schools with fewer resources for instructional materials, laboratory supplies, and electronic devices can supplement their teaching by using guest speakers who have professional or lived experiences that other students would access through textbooks. The ethic of Fair Share tends to be applied only to physical resources, such as food, water, or funding. However, this ethic can be equally applied to information. When Fair Share is applied to information sources, it can change a school's ability to provide an adequate education.

Technology Use

Recorded Teaching

The fair share of information is a hotly debated topic, but it is well within scope of the Fair Share ethic. Permaculture ethics calls for people to share what they can with others and educators can set the example for others to follow. Guest speakers are a valuable resource, but they are limited to specific geographic and temporal scope. Not everyone can attend a speech due to the speaker's location, the time at which the speaker presents, and the physical limitations of the presentation space. Educators can address this issue by recording their lessons and providing them as an open access resource (Chen, J., & Lin, T.F., 2012; Trenholdm, S., et al, 2019). As a pre-recorded, open access resource the barriers due to geography and time are removed. The portion of the population without access to reliable internet will not be able to access these resources, but they are still a step in the right direction.

Conclusion

As stated earlier, the permaculture ethics of Earth Care and People Care are the ones that are usually applied to STEAM classrooms. However, the ethic of Fair Share can, and should, be equally applied. This ethic has the potential to change a STEAM program from one that is classroom or school based to one that not only includes the community, but helps to improve it.

Conclusions, Limitations, And Future Research

Introduction

Science classrooms have enjoyed a place of prominence within the United States since the 1950s. However, science as a stand-alone subject is limited in its applicability. Since the 1990s, cross curricular approaches such as STEM and STEAM have gained in popularity. Thirty years later, this chapter is calling for teaching STEM and STEAM classes utilizing a permaculture approach in order to create a community, rather than a classroom, impact.

Earth Care

Earth Care is the permaculture ethic with the clearest application to the STEM and STEAM classroom. STEM and STEAM classes will cover standards related to ecological systems and environmental issues. Creating a standards based approach to Earth Care is straightforward and relatively noncontroversial.

People Care

The three permaculture ethics address a holistic approach to creating a sustainable system. While this true, even STEM and STEAM based classrooms tend to exclude humans from nature. The permaculture principle of People Care emphasizes that humans are part of the environment and the humans have a responsibility to learn and care about each other.

Fair Share

Fair Share is the most controversial of all the permaculture ethics. It is not uncommon for science classrooms to explore controversial topics, but those topics do not tend to be economic issues. Discussing who should have access to resources and what is considered fair access can be unfairly deemed too political and unsuitable for the classroom. The permaculture ethic of Fair Share, however, places this discussion at the heart of any discussion about the environment or scientific progress.

Limitations

This chapter discusses the application of permaculture principles to modern science classrooms, particularly those that are STEM and STEAM based. These discussions are, however, limited in their geographic scope. The arguments presented in this chapter are grounded in the modern public education system of the United States. This presents a geographically limited discussion, but one that the chapter acknowledges as necessary in order to present a coherent argument.

As mentioned earlier, this chapter focuses on the public education system. Private schools, magnet schools, and schools of choice are not taken into consideration within the scope of this chapter. Schools with an overall emphasis on science or community service may implement permaculture ethics in a way that public schools do not. Only public schools were discussed in this chapter as they are the largest format of education within the United States.

Future Work

This chapter acknowledges the limitations of its scope, but views them as opportunities for future research rather than as a deficit. Research on how permaculture ethics can apply to non-STEAM classes is needed. Permaculture is a holistic philosophy and can be applied to all subject areas. This also true for private schools, magnet schools, and schools of choice. Research discussing different types of school systems will present a larger picture of this applies across the United States.

Research is also needed on school systems outside of the United States. Questions such as “are permaculture ethics applied to education systems” or even “is it feasible to apply permaculture ethics to the education system” need to be explored in other countries, especially in developing countries. Modern education systems, like permaculture ethics, exist globally and need to be applied, and discussed, in varying locations.

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ACTIVATING THE NEXT GENERATION OF LEADERS: ACTION LEADERSHIP FOR ADOLESCENTS APPROACH

Leslie HAMDORF*

Introduction

Action Leadership for Adolescents Approach (ALAA) is a systematic transition from rote pedagogical practices to a holistic approach that employs youth to guide their development, fostering innate and authentic contributions to our world. Rote in the sense that many teacher education programs and K-12 curriculums provide scripts, worksheets, and workbooks for courses. In contrast, holistic approaches focus on developing the intellect while also cultivating character development and community stewardship.

ALAA is an approach that incorporates elements of Participatory Action Research and the Positive Youth Development model to empower and engage adolescents in their everchanging landscape by incorporating five principles into a holistic approach. The five principles include brain balanced, skill development, interdisciplinary curriculum, innate and indigenous truths, and cultural responsibility.

The scope of this chapter includes an explanation of ALAA, followed by portraits of adolescents who have participated in programming and events that used the ALAA approach. After reading about how ALAA has come to life in the portraits, there is an easy access application guide to a few exercises practitioners can use to implement the beginnings of ALAA. Finally, the paper ends with a snapshot of ALAA applied to a relatively young literacy and leadership program the author co-founded, Fueling Youth Reading is Leaders in Training (FYR is LIT), and a snapshot of applying ALAA in a high school course. Data shared throughout this chapter is formulated based on program evaluations collected for interim and final reports for funders who supported FYR is LIT or materials curated for the high school course. Additionally, the names of those mentioned throughout the portraits were changed to protect minors.

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Background

As a professional educator and a parent of two children, I see various sides of the education system. I have had the privilege of serving children who represent diverse backgrounds, neighborhoods, socioeconomic levels, and learning styles. Each time I find myself in front of a child, I know that they will teach me as much as I will teach them. It is through this lens that I created the Action Leadership for Adolescents Approach (ALAA). When we empower and entrust people, namely youth, with the capacity to teach us, we gain the greatest asset possible: their trust and their knowledge of themselves to share with the world.

I have taught in rural, urban, and suburban areas. I have taught wealthy and impoverished children—sometimes even in the same classroom. I have taught people who barely speak the language in which I am charged to teach and learned new languages and cultural idioms alongside those same children. I have done this in private, public, and charter schools and juvenile detention settings. Most importantly, I have taught people—“little people,” as I lovingly refer to them, and they have taught me. Because they are human beings, being themselves, developing themselves, and discovering how they can effectively and authentically interact in our collective society, the lessons are reciprocal. Through these experiences and my tenure as an educator, administrator, community activist, and program developer, I developed ALAA.

It is a critical time for this, as we see youth turning out in more significant numbers for civic participation in the United States. Civic engagement takes shape in many different ways, but one of the most important in the United States is voting. Circle Institute at Tufts University reported that the number of youth voting doubled between 2018 and 2020 (2018 Youth Voter Turnout). Thirteen percent of eligible youth voters cast a ballot in the 2018 midterm election, and 28.2% of eligible youth voters voted in 2020 (Election Night, 2018). However, voting is only one measurement. In another report by the Circle Institute, youth activism is also on the rise. We see youth standing alongside their parents and other adults in protests and marches, we see hands going up asking questions about how the system has perpetrated inequities for so long, and we also see children retreat in their desks or behind a screen because they aren’t being called to share who they are. CIRCLE Institute (2018) also reported that 27% of youth attended a march or demonstration in 2020, compared to only 16% in 2018. In addition, 18% volunteered for a political campaign in 2020, while in 2016, only 6% volunteered for a political campaign. Finally, 25% of youth registered other eligible voters in 2020, compared to 11% in 2018. School districts need to make space to allow for their biggest customers, the students, to engage and transcend programs, processes, and

data collection that public education has become. ALAA provides the tools to do such a thing at a humanistic level.

ALAA was born next to my esteemed mentor, Dr. Robert Patterson, as he reminded me to glean the important and nutritional findings from plants in the field and from the students. We discussed that this was the charge of the educator. Youth's minds needed to be gleaned, their physical bodies take care of the pruning all on their own, but their neurological muscles required to be gleaned and exercised. While teaching World Populations and Food Prospects under his tutelage and serving my final AmeriCorps term at the Durham Literacy Center, I interfaced with a wide variety of adolescents. Students enrolled in the First Year Inquiry course at North Carolina State University (NCSU), upperclassmen enrolled in the survey course: MDS 323, and adolescents who had dropped out of mainstream school altogether and were seeking another route to success through the Durham Literacy Center (DLC). Through seminar discussions, service learning opportunities, individual reflections, group projects, Hunger Banquets, field trips to NCSU agricultural fields and food banks, small group assignments based on experiential learning opportunities, and cross-cultural communication, exemplified by bringing DLC students to NCSU to engage in conversations. ALAA took shape, and it is important to note here that it took the shape of a human almost 15 years ago.

It grew through my tenure as a public and private high school educator and administrator in a United States territory. Then, it blossomed while I conducted my doctoral studies with Fielding Graduate University and explored the impact service-learning has on adolescents while developing their civic engagement. While conducting research under the tutelage of Dr. Jenny Edwards, I began employing more Invitational Education practices, as she is an expert in this area. Invitational Education practices were quickly incorporated, and ALAA continued to incubate again when a small group of students from the Denver School of Science and Technology Montview (at the time, Stapleton) asked how they could help residents on Saint Croix and take a trip after hearing my stories from the island. From those conversations, FYR is LIT was born, which helped to articulate and actualize ALAA. ALAA is my pedagogical approach to children.

The methods used over the course of ALAA's development include Grounded Theory and Action Research. Grounded Theory was popularized by the well-known researcher, Brené Brown, while Action Research is a methodology commonly used for social justice work. Grounded Theory allows the experiences and narratives that impact the ways in which we think and interact with the world, including song lyrics, quotes, proverbs, guiding principles from professors, interviews, and experiences with the participants in the research, to be used to exemplify the theory itself.

ALAA is my attempt to interrupt public education, which is steeped in quantitative data from attendance records, test scores, tracking of intervention attempts, all of which bog educators down and distract them from the real work of building an authentic relationship with the child so the educator and the child can grow, learn, and develop meaningful curriculum together. The current path that education has been on for the past few decades is not showing significant gains in any areas, yet boards and administrators continue to mandate more and more data (Wexler, YEAR). It has reduced professionals and children to practice complicit integrity. Professional educators know that the leverage is in the human connection. It is why we spend out-of-pocket money on our students. They know that if they do not have a snack, they cannot learn. We know that if they are getting abused or bullied by anyone, they won't feel safe enough to ask questions that help them learn. We know that learning calculus won't make a difference if their mom or dad is worried about being taken by immigration services. We know that if the anxiety turning knots in their stomach paralyzes them, they can't hear anyone say their name.

But this knowledge is harder to measure, so we are told to give tests and provide sentence starters or peer notes, often providing a crutch rather than polishing the gem that is the child.

That is why ALAA is unique and POWERFUL, and it is both quantitative and qualitative. ALAA values the narratives, as exemplified in this report through the portraits of ALAA. I also ground claims and growths in quantitative data of how our youth participants engage in programming.

It is not magic, and it is not reserved for just myself. It is an approach for people to try on, play with, share, discuss, and transform. Join me as we provide a catalyst for transforming our educational practices and approach so we can hand our global society to the next generation of human beings and be confident in their receipt of it. We've got work to do!

As Cheryl Sandberg said... "Lean in."

As Indigenous people have cried... "We need a seat at the table."

As Africans have chanted... "I am because you are."

And as people in the Caribbean sing... "It's all ah we."

Whatever movement brought you here, we are glad you joined us in this evolution of adolescent development. Pull up a chair, and help us continue to set the table so all ah we can take our seat and join the conversation. After all, "I am because you are."

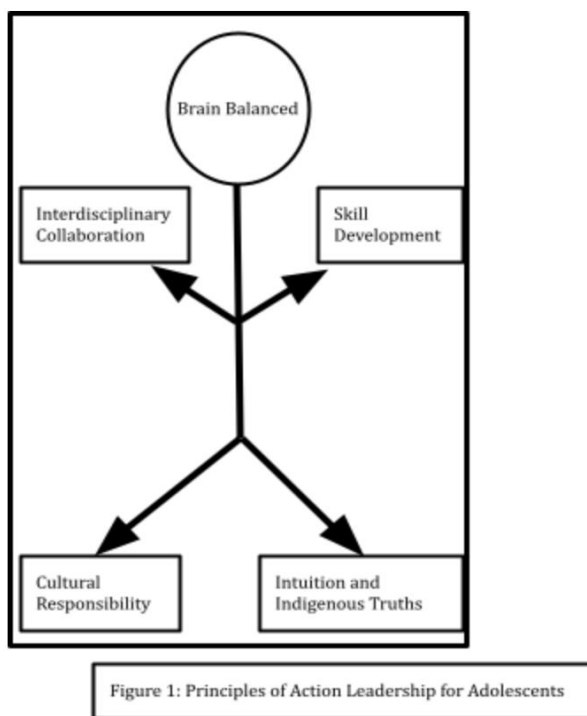
The Approach

Action Leadership for Adolescents is a multi-faceted approach that utilizes an interdisciplinary collaborative web of brain-balanced research and skill development through praxis. Action Leadership for Adolescents Approach (ALAA) incorporates elements of Participatory Action Research and Positive

Youth Development Theories to empower and engage adolescents in their everchanging landscape by using five principles from which any organization can launch, depending on given circumstances. When the approach is understood and used effectively, starting from any of the five principles, an organization will inherently include the additional four principles and ensure transformation for adolescents. ALAA can be adapted for school curriculum, youth leadership programs, service-learning lessons, service-oriented community-based organizations, and most importantly, initiatives that are looking to empower adolescents as the leaders they are rather than as tokens to have.

Definition: Action Leadership for Adolescents Approach (ALAA) incorporates elements of Participatory Action Research and the Positive Youth Development model to empower and engage adolescents in their everchanging landscape by incorporating five principles into a holistic approach. The five principles include brain balanced, skill development, interdisciplinary curriculum, innate and indigenous truths, and cultural responsibility, as displayed in Figure 1.

While reading this report, I want to challenge those that work with adolescents, have adolescents in their lives, or provide funding to programs that support adolescent development to think deeply about the vehicle your system uses to authentically hear from and include adolescents. How often do you engage and empower youth to examine, deliberate, innovate, implement, and then reflect for changes while positively supporting their experiences and not overhauling their power? In short, how do you utilize the power of an adolescent's mind?



System Components of Action Leadership For Adolescents

Action Leadership for Adolescents is a five-limbed approach that a person, group, organization, or network can initiate at any one of the five principles. From there, the said group excavates ideas based on that limb and begins to incorporate other aspects of ALAA to deliver the full experience. It is the goal of this paper to help the reader see the potential of ALAA in their work and then also experience ALAA in practice through applications and portraits of adolescents. The technical aspects of ALAA evolve because the everchanging gaps and needs of adolescents are exposed and changed. Throughout the development of ALAA, the model has proven to be nimble, strong, and responsive to adolescents because it is not a tool or a prescribed program. Rather, it is the concept of the five principles and embedding the ALAA approach into existing curriculum and programs.

Brain Balanced

Adolescent brains need quick feedback to begin making judgment calls, hopefully, safe ones, that can provide for a prosperous future. The brain's malleability results in greater plasticity, which has helped humans evolve. Malleability is created by providing novel yet challenging and cognitively stimulating activities (Steinberg, 2014). As the teen brain (15-19) is still developing, it needs to test the boundaries of mortality and belonging. The plasticity of a

teen brain optimizes learning from novel experiences while also inviting greater risk. Because the malleability of a teen brain, which is similar to an infant's brain, is heightened during developmental plasticity, rewiring occurs. This allows for new connections and pathways to be created while pruning and eliminating inefficient connections in the brain. ALAA attributes much success to acknowledging the value of creating opportunities like this in a teen's life (school, clubs, extra-curricular, etc.) as this inherently develops their sense of connection and voice. An ALAA practitioner will deliberately seek out ways for teens to have novel experiences in brave yet vulnerable spaces, which allows for teen brains to fail forward with support, and further develop resilience, perseverance, creativity, and individuality. This confidence then leads adolescents to have a sense of belonging and being needed in an extremely transitional and inconsistent time in their life.

Adolescent brains are much more equipped to demonstrate and process experiences through their emotional center, the amygdala, rather than use words first or even reflection, as many adults seem to do. Providing adolescents with novel experiences and having facilitated discussions about them is vital to support the development of resilience and competency (Stanford Children's Health, 2020). Adolescent brains work in uniquely different ways, and current research demonstrates that their solutions are innovative and impactful. Greta Thurnburg, Gitanjali Rao, Malala Yusuf, Alfonso Calderon, Sarah Chadwick, Jaclyn Corin, Ryan Deitsch, Emma González, David Hogg, Cameron Kasky, and Alex Wind are current leaders for issues directly impacting their peers. Right now, it is vital we continue to affirm and recognize the value and ingenuity they bring to the table. They will help societies evolve beyond the problems that the digital age has brought to us. Teen brains need affirmation, as we all do, and when provided with a space to show up authentically and offer themselves to a group of peers and, ideally adults, this validates their existence and experience. It affirms who they are and who they will become. Positive affirmations for humans work just as they do for plants and other living species. They provide humans, including teens, with the capacity to keep going and keep giving. This feedback loop, as identified in the Positive Youth Development Model, helps teens recover quickly from setbacks and use those setbacks as opportunities for growth; however, they need to know that they are authentically participating and not there as a token for funding or reporting purposes.

Portrait Of Brain Balance In ALAA

Micah, a refugee from Sudan (the name has been changed) and a participant in FYR is LIT, a program that helped bring ALAA to fruition was a part of the program for two consecutive years. She attended her first retreat with some hesitation but eagerly signed up for a second year. Her contributions to

the literacy enrichment camp and in developing relationships with the early elementary students were a model for others. What was most challenging for Micah was when the LIT leaders and the early elementary students went snorkeling off the shores of Saint Croix. The water was clear as glass, so the students could see their toes three feet below them; however, Micah, not an avid swimmer, was cautious. She was eager to get into the water and see the life below but was also nervous. It was through the support of the early elementary students (for whom she was the guide during the literacy piece of the program) and Micah's peers that gave her the courage to experiment with floating on the water to see the animals they were writing monologues to protect. Micah overcame fears of the water that day and, despite being stung by jellyfish, she continues to talk about that day as a transformational moment when she realized the power of positive support from not just her peers but from her community. Micah was provided with a novel experience, one that pushed her typical boundaries and helped to empower others around her, who she fearlessly and easily led previously, to provide encouraging words of support and strategy. By the end of the trip, Micah was jumping off a pier into the sea, which lay at least 10 feet below. Her brain welcomed the new experience. She leaned into it and used her own wisdom and trust that she had built with her FYR is LIT team to take a leap into the water.

Interdisciplinary Collaboration

The next limb of ALAA is Interdisciplinary Collaboration, which falls at a hand in the diagram in Figure 1 to exemplify that this is something that can be given and received. The past six months have been a tumultuous time for people of all ages to explore new hobbies while also reflecting on who they are and how they show up in a world with 7.8 billion people. As technology continues to connect us at monumental speed and requires us to shift our communication skills to interpret emotions and reactions behind screens or masks, interdisciplinary approaches, including cross-generational and cultural collaboration, are imperative. It is through Interdisciplinary Collaboration that innovation is born and helps humankind progress. Taking a generalist approach, so students can learn the value of a variety of different specialties and understand how those specialties connect is imperative to the success and flexibility of ALAA (Teodoridis, 2018). It also helps all of the participants have a greater sense of belonging because there is a celebration of everyone and all of the gifts they bring to the table: language, talents, curiosities, knowledge, experiences, etc.

The Interdisciplinary Collaboration principle allows the ALAA approach to respond to the community needs at the given time through curiosity, conversation, and appreciative inquiry and makes the process invitational for adolescents because there are various entry points. This collaboration provides space

for the validation of often marginalized groups by celebrating and utilizing the innate questions of adolescents and using those points of curiosity to fuel the conversation. In Jel Mehta's *Deeper Learning Has a Race Problem* (2014), Mehta points out that deeper learning can occur when discussions happen through project-based learning experiences or portfolio work. These types of learning help students develop non-cognitive skills and promote inquiry-based learning. Thus, resulting in students having deeper content knowledge, increasing their intellectual ability, and an expansion of non-cognitive skills. Camille Farrington calls this academic perseverance; Angela Duckworth calls it grit and character development- the ALAA approach is committed to emphasizing the importance of interdisciplinary collaboration so that adolescents can be reached and pulled higher.

This principle of ALAA ensures that those attending turn around schools or schools in low-income neighborhoods have access to learning environments that create problem solvers, critical thinkers, and collaborators because these skills help young adults practice and polish the skills needed for supervisory and managerial roles rather than non-salaried employee positions that can remain stagnant both professionally and financially. The difference is that schools often use a program, scripted lessons, pre-written curriculum that lack inquiry, small group work, and discussions, thus preparing learners to have working-class jobs (Mehta, 2014). In comparison, learning environments that require students to have greater autonomy and still complete academic lessons prepare students for managerial positions and cultivate entrepreneurial behaviors. The Interdisciplinary Collaboration limb of ALAA interrupts the baselining and tracking of students and allows for these teaching methodologies to be accessed by all.

A vital piece to the Interdisciplinary Collaboration principle is cross-generational and cultural collaboration. This piece breaks down preconceptions about roles people play in society by providing space for community partners (artists, professionals, elders, policymakers, etc.) to share their tools, talents, and stories, and then opens the gateway for adolescents to share their stories and build a plan together.

Furthermore, it allows adolescents to follow their innate curiosities and take on a generalist view of life without having to answer the question: what do you want to be when you grow up and instead explore that when you go to college. Those pointed questions about one's future can be overwhelming and sometimes paralyzing. Therefore, exposing adolescents to a wide variety of avenues and providing them with a path to cultivate their interests is supported with a generalist approach infused into the Interdisciplinary Collaboration limb. This also requires ALAA practitioners to do some excavating to deter-

mine the interests of the participants and the needs of the community that the adolescents come from, then build from those content areas.

Portrait Of Interdisciplinary Collaboration In ALAA

FYR is LIT partnered with Saint Croix Environmental Association (SEA) during its 3rd year to bring to life that year's annual theme: Environmental Awareness. While the collaboration was not new since FYR is LIT LIT leaders provided service work to SEA during previous retreats, the explicit partnership to collaborate was new. Many minds and interests were explored because of interdisciplinary collaboration. Out of this deliberate commitment for interdisciplinary collaboration, many opportunities were born: Environmental Super-hero monologues, hands-on planting of native species at a wetland preserve, leatherback turtle lessons, and viewing of hatchlings and their nests took shape as workshops and experiences. The intentional Interdisciplinary planning that was executed enraptured all 40 participants (high school teens and second-grade students, in the FYR is LIT retreat, also sparking ideas about future jobs and environmental stewards in the community.

Skill Development

On the opposite side of Interdisciplinary Collaboration is Skill Development. Identifying, naming, and polishing specific skills effective leaders need is a lifelong process, and there are benefits from practicing these early. Much like any practice, explicit instruction and exploration of a strategy or skill help identify areas of growth. The skills listed below are some of the consistent rock steady pillars of an ALAA-trained leader; however, it is important to acknowledge that skill development both matches the interests of the adolescents and the call of the times. For instance, due to the needs of 2020, when many (if not all) things went online, it was imperative that adolescents needed skill development on technological meeting platforms and email communication. During an in-person class or experience, it might be more important to have skill development on verbal and non-verbal communication. The main idea here is that ALAA practitioners reserve time to deliberately present a skill, have students reflect on their level of aptitude with said skill, practice and polish said skill while examining how others (don't) use said skill. Again, an upward spiral pattern to support the development of an adolescent leader. The World Economic Forum recently released the Top 10 Skills of 2025 and categorized those ten skills within the following categories: problem-solving, self-management, working with people, and technology use and development (2020).

ALAA endorses these suggested skills and embeds some, if not all, into the development of adolescents. In looking at the list below, consider which skills the adolescents in your life excel at right now and where they could benefit from the explicit practice.

Problem Solving

- Analytical thinking and innovation
- Complex problem-solving
- Critical thinking and analysis
- Creativity, originality, and initiative
- Reasoning, problem-solving, and ideation

Self Management

- Active learning and learning strategies
- Resilience, stress tolerance, and flexibility

Working with people

- Leadership and social influence

Technology use and development

- Technology use, monitoring, and control

Instead of providing a portrait for this principle, I would like to invite the reader to explore these skills, perhaps even evaluate one's own level of mastery with each of the skills or consider how one might enrich their experience.

Cultural Responsibility

ALAA views Cultural Responsibility as "an attitude that should guide human relationships and economic behaviour, in an anthropological sense" (Salvan, 2013). When ALAA practitioners provide space for an adolescent's culture to be celebrated, learned from, and used even as a model for progress, everyone, and everything benefits. This principle of ALAA requires everyone who is participating to show up as you are with 'icebreaker introductions' (casual name games and activities that require little vulnerability) and working to that brave space to share experiences and wisdom with each other. Through compassionate conversations that help develop empathy, which requires all adolescents have the opportunity to do a self-reflection about who they are and how they came to be, while also engaging through meaningful exercises to expose who and what makes up their community. Through this self-reflection, introspection, and sharing, adolescents can learn to value their cultural practices when it comes to the environment, community relationships, economics, and education, to name a few. As adolescents develop verbiage to explain how their culture manages these aspects of their life, they share it with others, including community leaders- ensuring that their culture's best and progressive practices move forward in the community and perhaps can even be spread and moved to another community.

The Cultural Responsibility principle of ALAA encourages participants to consider these questions as they engage in life: Who are you in this world, and how do you show up? ALAA beats the odds by including youth in society while they are likely to engage. CIRCLE Institute, associated with Tufts University, recommends that communities get the youth involved early, so they

know they have a place in the community, more importantly, that they are needed within a community. This is vital in local communities and in the international arena as civilizations are constantly passing down community practices from one generation to the next. FYR is LIT facilitates conversations about social justice and how that shows up in the different communities that the LIT leaders arrive from. These connections and the LIT leaders direct impact on how social justice is cultivated helps teens realize how they can play a part in the community by serving as a volunteer, an employee, thoughtful citizen, lobbyist, etc. It is providing them a sense of purpose and inclusion and tapping into their generation's creativity and innovation- before the many traditional education systems break it down, mute the creative outlet, and cause societies to repeat the systemic injustices and inequalities. They are ingrained in public education.

There is a variety of different theoretical as well as experiential ways to help activate Cultural Responsibility that we have employed in the development of ALAA.

1. Service Learning, as defined by the National Youth Leadership Council, is a “teaching and learning strategy that integrates meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility, and strengthen communities.”
2. Action Research reveals what the call to action is and what the innovative action would be through community conversations because it is tied to the community; it inherently involves the culture of the action will impact. And tied to AR is, of course, Youth Participatory Action Research.
3. Personalized and Invitational Learning Opportunities (Rickenbaugh and Edwards)
4. Asset-Based Community Development Models

Portrait of Cultural Responsibility In ALAA

Ana's voice and sophisticated intellectual capacity rose over and over again as she contributed to the FYR is LIT: LIFEHACKS discussions throughout the summer of 2020. However, it was when she shared the lesson she learned through LIFEHACKS workshops began to glow. Ana shared that her biggest lesson learned was how she, an African from Nigeria, began to understand what her role as an African in America during another rise in race wars of 2020 became clear. She shared that she felt a pull to share the heritage of Africa and celebrate the gifts that Nigerians bring to the world so that others of that descent could grow from that foundation- rather than a shattered one descendants of slaves would try and find footing on. Ana articulated that she has grown up in a family where differences are valued and shared in a conversa-

tional way so that people can learn from each other. She also shared that there is a great sense of togetherness and community that is a backbone of Nigerian (and probably other African countries' cultures). Ana recognized the disparities and systemic racism as it stands in America but was overcome by a feeling of responsibility, and she wanted to share with others that people can interact in other ways. People can be supportive and recognize that there are more than enough resources, and the idea of scarcity is an economic strategy. She has taken this cultural responsibility a step further and began orchestrating the logistics for a free food pantry at her current school so that students can access nutritional snack foods during the day and even take things home after school hours.

Intuition & Indigenous Truths

This principle of ALAA requires that experiences (novel experiences as mentioned in the Brain Balanced and Skill Development principles) allow for the adolescent to see where the information and experiences land with themselves so that they can learn to trust themselves with decision making. As they balance the information being received with what information is innately within them, they gain skills in deciphering ideas that align with their own truths and gut instincts and ones that push back. Coincidentally, because of the interdisciplinary collaborative piece- adolescents have the opportunity to hear from other people who may have ideas different from their own- allowing for truths and values to shift and adapt because one's innate truths and indigenous beliefs are organic and should be in a position to evolve as a result of experiences, resulting in self-realization.

Importance of self-realization and actualization in a white world with upper to middle-class systems of oppression so that all adolescents can be elevated to a level of receptivity in school. Especially when the data shows that X% of minority students get penalized, attend lower-performing schools, and are often tracked in general ed, English Language Learner classes, disciplinary measures, etc. Systemic inequities due to colonialism that marginalize and often reduce access to progressive opportunities because of the need of minority at-risk families to constantly focus on the basic needs of Maslow's hierarchy of needs.

Effective use of this principle is imperative for growth and, coupled with an asset-based mindset, empowers adolescents to explore their own moral compass in a moment of simulations and real-life scenarios. The concept is to cultivate space to develop and learn about their innate truth and overcome the noise (people, social media, technology, parents, teachers, etc.), which can result in fear, doubt, paralysis, and then mute one's intuition or gut instincts. The principle of Intuition and Indigenous Truths balances out the beliefs one is charged with respecting and living up to in the external physical reality of

school, work, extra-curricular, and family while cross-referencing against one's own innate wisdom.

Portrait of Intuition and Indigenous Truths In ALAA

Amadeus was preparing for his first tutoring session with an early elementary student, and the question about how we can tie a child's experience back to the session came up. Amadeus quickly responded by saying, "Couldn't they come up with keywords that start with the key letter you are working on. And then maybe they could share what that keyword means and draw a picture to represent it." The experience not only allowed Amadeus to practice his innate truth by sharing this idea with the collective group, demonstrating his own belief in it, it also demonstrated how he wanted the early elementary students to practice their own truth and voice by sharing words from their everyday life. Although the exercise may not work seamlessly, this instance taught Amadeus and his peers about their own power to act and correct course when necessary – facilitating failing forward.

Strategies To Utilize These Principles

Brain Balanced

- 1) Foster novel experiences then verify and validate growth and changes
- 2) Acknowledge changing roles and talents because of changing brain development

Skill Development

- 1) Be explicit in the skill introduction, practice, and reflection.
- 2) Diversify and revisit a skill to ensure that they are connected to meaningful venues for the time and place.

Interdisciplinary Curriculum

- 1) Employ service-learning opportunities, allowing adolescents to explore content through real-time inquiry and execution.
- 2) Access a wide pool of resources (speakers, symposiums, presentations) to diversify entry points for exploration and conversation

Intuition and Indigenous Truths

- 1) Provide space for authentic and courageous conversations through appreciative inquiry with the adolescents and other community members as to have the participants share the truths they experience.
- 2) Celebrate contributions of individuals, speak about and explore the contributions deeper, as artifacts of one's culture.

Cultural Responsibility

- 1) Create a bridge of communication between adolescents and their community to promote the transparent exchange of information
- 2) Provide verbiage to adolescents that acknowledge the diverse cultures represented in their community and how the various cultures can live together.

Alaa In Praxis Through FYR Is LIT

As discussed previously, ALAA can support the development of leadership in adolescents from any principle as an entry point for a program, curriculum, organization or club, and still reap the benefits from all of the principles of the ALAA model. Because ALAA acknowledges and is steeped in the knowledge that all human growth is organic, alive, and constantly changing- there is no end in the development and the praxis. Additionally, growth in adolescents can be measured, both qualitatively and quantitatively. Below are two examples of how the author has used the principles of ALAA in curriculum and in programming to achieve results.

Fueling Youth Reading is Leaders in Training (FYR is LIT) has been cultivating ALAA, a cutting-edge approach to leadership and character development for adolescents, since its inception in 2016. FYR is LIT provides a space for this work and leverages the community's most valuable resource, people. Using ALAA as the framework, FYR is LIT founders rely on the adolescents, LIT leaders, to engage and give feedback- simply because we have to. Adult partners do not have the capacity to be everywhere and see everything through empowering and engaging our LIT leaders as partners- they offer a new perspective, creative voice, and cutting-edge innovation. Moving away from seeing the youth as simply tokens and as the stakeholders that they are (Hart, 1992). FYR is LIT provides a pathway for adolescents to rise to an action in their local community and in our global community- providing a unique opportunity to help adolescents realize their invaluable part in societies 'web while also connecting with the next generation through our FYR partnerships.

Quantitatively, FYR is LIT has trained just over 100 adolescents (LIT leaders) and supported the development of about 100 early elementary school students (FYR participants) since 2017. 100% of the LIT leaders reported feeling more connected with people from around the world after participating in FYR is LIT,

Yes, I most definitely believe that I was able to develop relationships with other teens from the VI. I got to get really close and talk about issues that we face as teens and how we are similar in more ways than one. In the few days that we were here, we never once felt like a stranger. Since we talked to them beforehand, we knew each other and build a great understanding of one another. I know for a fact we built some forever friends. (FYR is LIT Teen Feedback Survey, 2019).

When the LIT leaders were asked about what problems they faced during FYR is LIT, 38% of responses realized that they wanted more time to prepare for the sessions with the FYR participants. Through the FYR is LIT Teen Feedback Survey LIT (2019), leaders voiced that they "where all the teens are able to get to know each other better... so we can support each other during

the literacy stations when the kids are acting wild.” Another LIT leader suggested, “More organization in the group transitions. More effective stations that tie and relate to one another will ultimately increase their reading and writing skills but also will help them dive deeper into who they are in order to produce a great poem.”

These quotes are shared to demonstrate the skill of critical thinking (Skill Development Principles) that took place while LIT leaders had a novel experience (Brain Balancing Principle) serving a community in literacy support (Service Learning Principle). While ALAA took shape during the pandemic, LIT leaders exercised all principles of the ALAA approach, beginning with service in 2017. FYR is LIT was born because a group of high school students in Denver, Colorado, wanted to travel and serve the community of Saint Croix. Dr. Hamdorf, author of this paper, founder of ALAA, and Co-Founder of FYR is LIT connected with the leader of the Saint Croix Foundation Youth Advisory Council to explore the possibility of having two teen groups partner in a service project.

As the service aspect of providing a literacy enrichment camp to second-grade students began to take shape, the other principles of ALAA were realized as well:

1. Brain Balanced- novel experiences of meeting people from another region in the world, for some travel to another region, a new role to play in a community
2. Skill Development- LIT leaders, inevitably came across problems with the literacy enrichment camp, so they were discovering and solving problems, learning how to communicate across cultures and generations, and presenting their ideas and thoughts to others. They were developing their zoom skills long before COVID-19 required everyone to go online.
3. Interdisciplinary Collaboration- Although the literacy enrichment camp was a large part of the program and provided the opportunity for service learning, LIT leaders expanded their service-learning to the Saint Croix Environmental Association and Ridge to Reef Sustainable Farm. Both of these organizations provided hands-on learning and service opportunities for all of the LIT leaders.
4. Intuition and Indigenous Truths- Through a World Cafe setting for empowered community conversations, LIT leaders comfortably spoke their truths about what was plaguing their own community while also looking for similarities and solutions in other communities.
5. Cultural Responsibility- LIT leaders engaged with people outside of their own culture and comfort zone, inevitably exchanging stories and

wisdom that breaks down stereotypes and instead promotes compassion and empathy.

Alaa In Praxis Through a Civics Curriculum

As previously discussed, I am a tenured educator in the K-12 sphere. I have had the pleasure of teaching elementary, middle, and high school students and found my niche with high school seniors. It is here where I got to practice ALAA and help it come to life within a civics course for high school seniors. Throughout the two-trimester course, the students are charged with: learning and understanding the organization of the United States Government, exploring a specific landmark case, and working with a small group of colleagues to draft a policy that addresses a social injustice their group cares about. While there are a variety of access points for ALAA within the aforementioned objectives, it is critical to note that students are also asked to complete a Self-Reflection Evaluation and compile an E-Portfolio. While the skill development of problem-solving, communication, working collaboratively, and project management are critical to measuring for student's success in this course, it is vital to recognize that the collection of E-Portfolio assignments give way to helping an adolescent at the end of their K-12 schooling, reflect on their:

- 1) Cultural responsibility is practiced with an interview of an elder.
- 2) Intuition and Indigenous Truths are exemplified by guidance in Courageous Conversations to facilitate brave space in a classroom. This supports students to share and exchange ideas and adjust their own perspectives as necessary.
- 3) Brain Balanced- Ensuring time for experiential education through field trips, guest speakers, and simulation activities.
- 4) Skill Development- Through public speaking, correspondence with elected officials, digital literacy, and research projects, students were introduced to explicit skills and developed proficiency and mastery of skills.
- 5) Interdisciplinary Collaboration- The nature of civics lends itself to a variety of topics to explore- innately welcoming cross-curricular integration such as studying the impact of education systems, healthcare, judicial practices, environmental justice opportunities, and more.

Quantitatively, students in this course took the Student Reflection Empowerment Evaluation (Hamdorf, 2019) in 2019. The data demonstrated that the students felt like their skills in the categories on the SREE improved. Yellow indicates that there was a drop in students rating themselves at that point on the scale. Pink indicates that there was growth in the number of students rating themselves at that point on the scale. When students completed the evaluation, the rate of students who assigned themselves a 5 went up in all categories. At the end of the course, fewer students assessed themselves at a 2 or 3.

Recommendations

Action Leadership for Adolescents is prime for 2021 and beyond. The adolescents in our classrooms are ready for action! Their world, for better and worse, some might argue, is pretty immediate and tangible in a way that previous generations are beginning to grasp. The job, as elders, policymakers, educators, and leaders, is to help them realize that small everyday actions can lead to the change they want and working a plan, such as having a conversation or discussion and adjusting course- fosters a manageable journey and the change they seek. The world experience from one generation does not mirror another, but it's imperative that space is cultivated for exchange and dialogue across cultures and generations; the ALAA approach provides outlets for growth, connection, and adaptation. If this happens, society will adapt and progress.

Action Leadership for Adolescents, an unconventional approach to providing space for adolescents to bravely practice skills educators, employers, and community leaders want them to have, is necessary yet often overlooked in the traditional curriculum for adolescents. ALAA is a brain-balanced, interdisciplinary approach that incorporates skill development for adolescents while they uncover their innate place in our global society. Action Leadership for Adolescents Approach is in full swing with FYR is LIT. Visit the website at fyrislit.com or email the author at lesliehamdorf@gmail.com to see how you can bring the ALAA approach or FYR is LIT programming to your community.

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EMERGING TRENDS IN EDUCATION FOR STUDENTS WITH DISABILITIES, CULTURAL-LINGUISTIC DIFFERENCES AND OTHER DIVERSE POPULATIONS

Srimani CHAKRAVARTHI*

Introduction

Globally, as one reflects on the history of education, we notice that there has been denial of education for diverse groups of students based on some difference – either based on disability, ethnicity, language, socio-economic status and/or other diverse needs. Now, we find that several countries are moving to include these marginalized groups more and more into the mainstream educational environments. Teacher training has also been impacted substantially with this expanding diversity and has been changing to reflect the newer research and advances. There are varied streams of specialization of teacher preparation to cater to needs of the diverse groups of students. Also, a better insight into learner needs and diversity is creating the need for us to shift from teaching to the mythical average¹ learner. Our narrow view of diverse needs must be replaced with a deeper insight into efficiently meet individual needs, drawing from our knowledge of diverse needs in varied areas. Divergent streams of specialized training needs to confluence to efficiently address all individual needs. This chapter explores possible ways to do this, using a U. S. based perspective and yet, applicable to the global teacher education scenarios.

History Of Education of Diverse Groups Around The World

Throughout the world, the treatment of students with disability or any other difference, reflected a distal to proximal trend in history - showing isolation or neglect early through middle ages, followed by moving them to segregated placements such as asylums for those with disabilities, in later years, and slowly towards mainstreaming and inclusion into typical or general education

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¹ The premise that there is none in the classroom who is 'average' in all characteristics, however, teaching methods typically target the 'middle' or the average learner. Refer to Todd Rose's book, *The End of Average – How we succeed in a World that Values Sameness*, for details.

placements in the last century (Yell, 2019). The attention to treatment and education of individuals with disabilities and other differences was significantly enhanced after the World Wars and other key events in history such as the civil rights movements. Technological and medical advancements have led to a better understanding of the brain, contributing to broadening knowledge about teaching, learning and how the brain processes and retains information. Most countries began to pass compulsory education legislation through the second half of the 20th century, followed by legislation to educate and include minority groups, that included disability and other diversities such as linguistic, cultural diversity, religion, race-ethnicity, etc. *Figure 1* shows the historic trends in teacher education with respect to meeting needs of diverse groups.

Most of these movements towards equal education rights were promoted by civil rights movements around the world and social justice advocates, prominently parents themselves, who were pivotal in educational reform and contributing to shifting paradigms, to not only *include* students but also hold them to *high standards*. As a result, laws for compulsory education led to changing demographic of the student population in the classroom to reflect more learner variability, although it was limited to visibly noticeable characteristics such as race, language and cultural differences.

From late 20th century, research in education and neuroscience progressed, as did our understanding on how effective practices work based on evidence from neural activation and connectivity. In the past decade alone, there has been more data and research on how traumatic experiences in childhood could have a lasting adverse effect on the brain, requiring specialized methods of teaching (Trauma & Learning Policy Initiative, 2020). Likewise, research in second language teaching has progressed to better reveal methods for assessing and teaching learners who are learning English as a second language (Ford, 2005). Research in the disability world is providing more empirical evidence to the actual potential of learners with disabilities too, giving an insight into methods of how to better teach them reading, math and other academic skills, and help them retain and use it. The recent Covid19 pandemic also has heightened the emphasis that was already being drawn into the social-emotional well-being of the students, since the effect of social-emotional health in learning and teaching is undeniable. Teacher education all around the world needs to draw from historic progressive perspective and move towards embracing the newer brain research and what we know about diverse learners.

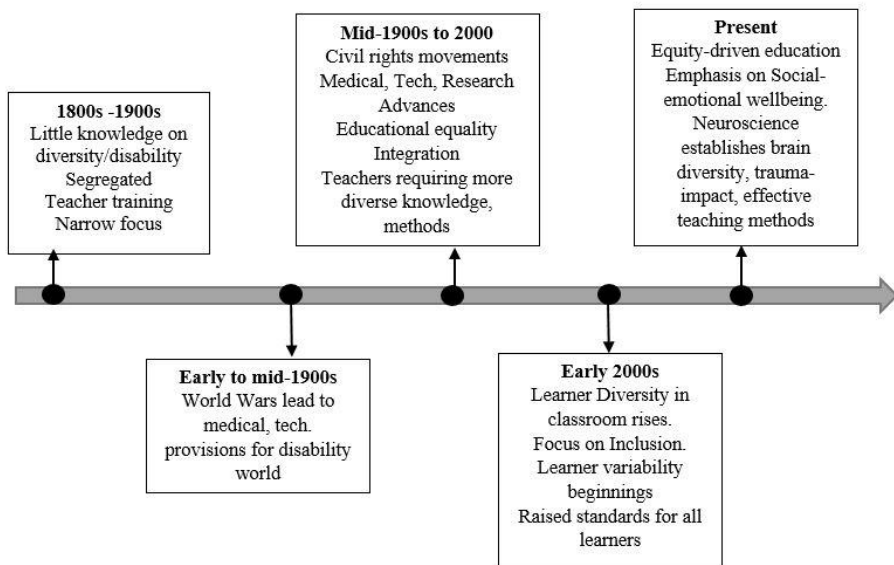


Figure 1: Key Periods of Historic Progression in Teacher Education with Disability and Diversity

Neuroscience and Learner Variability

Over the long period of history of teaching and learning, education has largely drawn from the field of psychology and sociology to inform pedagogical practices. More recently however, an emerging new field in neuroscience, *Neuroeducation*, which combines research in developmental and cognitive neuroscience with educational strategies (Sigman et al., 2014) is now guiding us with better evidence on how learning can be impactful when we know *what* works and *how*. The impact of this is seen in many realms such as learning theories, teaching methods and strategies. For instance, the field of teacher education has long known to incorporate into instruction both general cognitive ability and Gardner’s theory on multiple intelligences (Gardner, 1996), however, the distinction between the two is becoming blurrier with brain imaging studies indicating that these two entities may be more compatible, with points of confluence (Branton & Karanian, 2017). Findings such as these can potentially guide how teaching can enhance both academic and other unique talents in all students.

We now know from more than a decade of research that learners, even when they do not appear ‘different’, learn differently from each other - each one with their own preferences in the way they learn, the way they perceive or attend to information and how they process the information and attribute meaning or importance. While it is undeniable that variability exists in the brain and no two individuals are alike, this neurodiversity is however predictable, and can be organized into three major networks of the brain: affective –

the *why* of learning, recognition – the *what* of learning, and strategic – the *how* of learning (CAST, 2018). These networks are associated with the way the brain perceives, engages with or performs/executes a task. This aspect of neuro-variability is important for educators to think about inter-individual differences and also differences within individual in varied contexts, the intra-individual differences. Universal Design for Learning (UDL) addresses these aspects of variability as applied to classroom instruction, giving a blueprint to structure instructional practices around these three major neural networks.

Similarly, sociological influence to education is showing a new dimension of evidence from neuroscience research on impact of culture in learning. Brain diversity in learners has been addressed in many studies that have examined culturally impacted differences such as processing abilities in brains of people who use Arabic numerals and those that use symbol systems such as Chinese and Japanese. These differences could not solely be attributed to language differences but likely shaped by visual reading experience and cultural factors such as math learning strategies and education systems (Tang et al., 2006). The impact of culture on learning is gaining more ground to moving from the individual-experience level to a consideration of cross-cultural psychological perspectives (Ansari, DeSmedt & Grabner, 2012).

The brain function, once thought of as unalterable and genetically derived (ex. cognitive ability as a number), is now found to be dynamic and changing with everyday environmental interactions. Evidence from brain imaging studies show that a child's environment can not only impact brain development but can physically alter the brain (Glaser, 2003). Although the impact of environment in education had been known for centuries, research such as these substantiate the lasting impact of environmental conditions on brain functions. Likewise, the potential of a positive environment in re-altering and alleviating some of these brain functions are being explored, which potentially paves the path for remedial educational teaching.

Data on Diversity and Diverse needs around the world

It is customary to associate the terms 'diverse' or 'diverse learners' commonly with visible diversities like ability levels, cultural/linguistic diversity, disability, sexual orientation, socio-economic status, etc. However, we now have a broader understanding of who exactly is 'diverse'. Neuroeducation has established brain diversity at an individual level, and other aspects - such as learners' past experiences with the context, and differences in perceiving the information from their own frame, 'lens' or perspective, influences how they process information that is read, seen or heard; which make them different at an individual level. Each learner's innate abilities such as attention, motivation, cognitive processing of visual/auditory information vary greatly as well and the use of these innate abilities is shaped by their unique environment and experiences. This current knowledge on individual neuro-variability urges us to change our mindset and recreate another new meaning to 'diverse learner' and include *all* learners in the classroom as *diverse learners*.

The population of diverse categories of students by the typically known common sub-groups appear in *Table 1*, as percent of the total school-age population around the world. It must be noted that these numbers are not mutually independent and there is overlap among the categories. Students may exhibit more than one area of diversity. However, the learner variability category in the last row of the table reflects the newer and true 'diverse' category of learners, where *all* learners fall, displaying variable learning needs or characteristics, encompassing all the categorical classifications in the top rows and including other diverse areas within it as well. This view of looking at learner variability is based on the differences at individual level (neuro-diversity), including ability or disability levels, linguistic proficiencies, processing and memory abilities, varied attention and motivation levels, divergent perceptions and experiences. Learners are dynamic within themselves as well, meaning that our attention or engagement can vary within the same day or the same content learning, depending largely on the environment or our ability to focus at that time, among other intervening variables. This makes all learners unique at some level. Each of them is neuro-diverse and exceptional, which makes us question the rigid 'defined' categorical classification of diversity and move to this individualized level.

Table 1: Percent of school-aged children world-wide with diverse needs

Type of Diversity	Terminology	Estimated % in world population of school-aged children
Disability	Exceptional or Special Needs (Disability)	15%
Cultural-Linguistic	Dual language/School language different from home language/English as a second Language Learners	20%
Socio-Economic	Extreme poverty	13.88%
Trauma	Experienced traumatic event(s)	25%
Learning	Learner characteristic variability including ability levels, linguistic repertoire, attention, motivation, perceptions, processing, memory, etc.	100%

Trends In Teacher Education

Teacher Education around the world is challenged to reflect needs of the society, the expanding knowledge of the learning process and learner diversity. In the nineteenth century, as seen in *Figure 1*, little was known about the potential of students with disabilities which led to their exclusion or stereotypical roles they were assigned to. However, as education expanded, based on research and teaching experiences, schools for teacher training began to include aspects for adapting teaching practices for students with diverse needs. The most visible and obvious disabilities such as hearing and visual impairments were among the first to receive attention in teacher education. The latter half of the 20th century began to see a rise in educational practices and training for teachers of students with other disabilities like dyslexia, attention deficit disorders, intellectual disabilities, and autism (Yell, 2016). More recently, academic skills such as reading, writing and math as it applies to life functioning for students with moderate and severe disabilities has been included into teacher education in the West, as a consequence of evidence-based methods in this field that have determined ways to be able to teach academic skills to this population of students. The emphasis on increasing standards of academic rigor of instruction for all students with disabilities has also been the focus of teacher education, especially those that come from lower socio-economic households, those that have experienced trauma, those that are ethnically and/or linguistically diverse and those that have disabilities. Currently, almost all states in the United States have mandated for special education methodology to be included as part of coursework for all general education teachers at

elementary and secondary levels, including teachers who teach specials such as art, music or physical education. This is reflection of the classroom diversity which has expanded to include students with disabilities within the general education (main classroom) setting, thereby enhancing their education to the same standards as those of their peers and thus necessitating that the teacher be familiar with special education practices as well.

Similarly, to address the heterogeneous student population in the classroom, most teacher education programs are also pushing for coursework and training in cultural and linguistic differences and teaching English to speakers of other languages (English as a Second Language, ESL). Research in language acquisition and acquisition of English as a second language have contributed significantly to what we now know about the linguistic and cultural components of instruction. The essence of addressing this cultural and linguistic difference is to provide specific language-based supports and instruction, while using a culturally relevant pedagogy and a culturally responsive practice (Richards-Tutor, Aceves & Reese, 2016; Aceves & Orosco, 2014), a teaching practice which educates the student by incorporating curriculum that reflects, and methods that align, to the student's culture. Here the term, 'culture' applies to student's traditions, ethnicity, religion, and can also include broadly defined culturally relevant characteristics like age, socio-economic status, family, sexual orientation or community. The foundation of culturally responsive teaching being that education that is relevant to what the student's culture or what the student associates with, resonates more with the student, motivates the student and can bring more impactful connections to deepen learning. These can range from simple infusions of culturally relevant pictures for comprehension to advanced cultural immersion activities that engage the student to ponder from different viewpoints and dynamically engage with the curriculum from their cultural perspectives (See Aceves & Orosco, 2014 for more information).

Another group of students who need specialized supports are those who have experienced some sort of a traumatic event or Adverse Childhood Experiences (ACEs) in their lives. Recent data indicates that traumatic events have a lasting impact on most children and can also lead to alterations in brain, causing reduced learning and cognition, interfering with the child's ability to learn (Trauma & Learning Policy Initiative, 2020). These ACEs include physical, emotional or sexual abuse; witnessing domestic violence, having a parent with substance abuse or mental health issues or living with a household member who has spent time in prison. According to Center for Disease Control (2020), at least 60% of adults have indicated experiencing at least one adverse traumatic experience during their childhood. Other ACEs, not counted in the number above, which impact learning include events such as fleeing conflict-torn country, pandemic-caused anxiety or loss, pervasive community violence,

family with severe trauma-impact such as progressive health conditions, etc. Children from lower socio-economic backgrounds are the most vulnerable to trauma and adverse experiences (Assari, 2020). While it is not just the experience of trauma that impacts the child, it is the response to these traumatic events that drastically reduces their coping skills. Hence, these undermined coping abilities of children who have experienced ACEs can lead to an influx of social, emotional and academic difficulties. It is now conclusively established with brain research that students who have experienced trauma require the need for alteration of standard teaching practices, and adoption of a trauma-sensitive lens for all academic and behavior instruction (Trauma & Learning Policy Initiative, 2020). Several teacher education programs in the United States are now beginning to draw from this research base to incorporate teacher training on trauma-informed practices that can help reach the learner who has experienced ACEs. A key takeaway of the trauma-sensitive approach is the need for teachers in classrooms to understand the common triggers and responses of students who may have experienced ACE, and adopt a more proactive approach to eliminate the triggers and teach pro-social skills, rather than react to the problem.

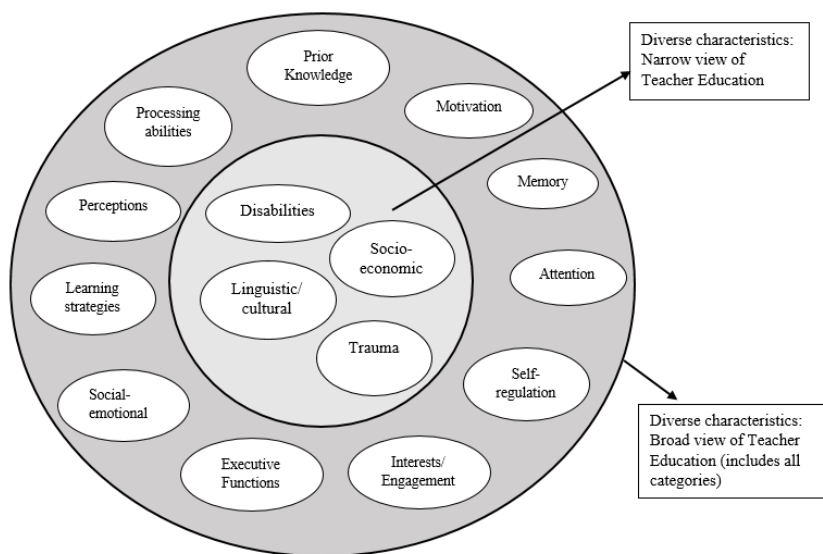


Figure 2: The expanded scope of teacher education reflecting the learner diversity addressed.

Teacher education programs are emerging to include components as shown in Figure 2. The inner circle shows the common diverse need areas that were addressed above – disabilities, linguistic/cultural, socio-economic and trauma-impacted. The outer circle in the Figure 2 reflects the newer perspective on diverse needs, including all types of diversity within it, including neuro-

variability, at the individual learner level. This aspect of individual learner variability in teacher education is addressed by Universal Design for Learning (UDL). The premise of learner variability is based on three processes in the teaching and learning processes: Engagement, Representation and Expression, that correspond to the affective, recognition and strategic networks of the brain (CAST, 2020a). At the onset, engaging and motivating a learner is based on varied factors including the learner's interests, experiences, personal relevance, selective attention, sustained attention, cultural preferences, etc. Similarly, upon being engaged, learners differ in how they perceive or understand information that is presented to them. One may prefer information in print, while the other may require visuals, audio or video. Within an individual too, the preferences may vary for input depending on the subject of study. Likewise, within a text reading, the reading and comprehension levels can vary greatly based on the background knowledge and experiences; which would explain, for example, why a scientific discourse paper may not interest or make sense to a person who is used to historic narratives. Within a video clip as well, the pace and other preferred features vary greatly based on individual preference. For example, preference for a video with or without music/graphics or a high stimulating video, preference for captioned video versus one without. The third aspect of learner variability is the way the learner navigates the learning environment and expresses what they know. This depends on learner characteristics such as processing abilities, preferences, executive functioning skills like planning, organizing, prioritizing, etc., time management, individual working style and other variables (CAST, 2020). Teachers need to acknowledge, plan and instruct learners based on the knowledge that all learners learn differently from one another and all learners learn based on the current context to where they are, what they are learning, who they are learning with and how they are able to demonstrate their skills and knowledge (Rose, Rouhani, & Fischer, 2013). The notion of approaching one's teaching pro-actively, with this variability of learner accounted for by providing multiple ways to engage learners, represent the content and materials and allow for multiple ways for learners to express – the UDL approach to teaching – is now being adopted by teachers in many countries around the world. The UDL guidelines for teaching provide ways to provide these multiple options in the three areas.

The Problems with Teacher Education

It is evident that teacher education has evolved over the centuries and taken many leaps in the past few decades as well. However, the challenge that remains is addressing the diverse learning needs of each learner in the classroom. While there have been commendable strides in teacher knowledge of diversity and disability, this expansion of knowledge is urging us to meet each

learner's needs efficiently in the classroom, while leading each to their true potential.

The first and foremost issue in teacher education preparation is the divergent streams of teacher education preparation such as 'Special educator', 'ESL educator', 'Behavior specialist', 'Trauma-specialist'. It is undeniable that this expertise in each diverse field is desirable and much needed to address the specialized needs in each of these categories. However, the learner in the classroom is rarely ever solely within one category of diversity and often reflects needs that are in several areas. For example, a student who is an English learner may be having a disability or a student who experienced trauma may have a lower socio-economic background and also a disability. Hence, a teacher specializing in teaching English language learners may not know how to address special needs of a learner who also exhibits attention or learning special needs. They may also not know how to accommodate their needs.

Second, the traditional teaching approach of teaching to the middle or the average learner with time-tested methods of yore needs to be replaced. The mythical 'average' learner in the classroom is now replaced by individuals with unique characteristics, interests and potentials, all that need to be addressed in the classroom. It is time to implement the ongoing advances in neuroeducation, special education research, positive behavior approaches, trauma-sensitive practices and practices for teaching students who are learning English as a second language and empower teacher education with ability to address a variety of diverse needs.

Third, another aspect of education, the 'what' of teaching, that was mostly being determined by knowledge and skills, is now being examined from the perspective of making them stick and be useful – students need to be taught how to retain the knowledge and skills, generalize and use them for problem-solving. Teacher education also has historically focused on academic and non-academic skills such as arts, music, physical education, etc. However, while these skills are needed for careers and life, research points out that to succeed in life, students need to use their metacognitive abilities, executive functioning skills (attention, memory, organization, etc.), and self-regulation skills, which are assumed to be incidental in the student's life and hence not explicitly addressed in schools or in teacher education. While many students may eventually learn these skills as they progress through college or careers, these are conspicuously missing from traditional teacher education curricula.

A New Approach to Teacher Education

The science of teaching and learning, emerging neuroscience research, coupled with recent pandemic measures and digression have all made it an imperative need for teacher education to move towards a more integrative approach and seeking ways to educate current teachers on differentiating edu-

cation and approaching it from a perspective of dynamic individualization. In order to streamline teacher education, it is important to see the practices within each of these streams of specializations to address diverse needs. Let us take a look at evidence-based practices that are essential in each of these specialized areas in *Table 2*. As we glance through the practices, we notice that there is considerable overlap in practices in the four columns. Also, the key principles of Universal Design for Learning, in the last column, encompass several key practices from the first three areas of special education practices, English language learner practices and trauma-informed classroom practices. We also see that practices that move a learner to manage their learning: metacognitive skills, executive functioning and self-regulation skills, are addressed in special education, trauma-sensitive practices and also, by UDL. Since no learner is rigid and rarely fits into a single diverse category, an examination into the separate streams of teacher preparation is worthy.

One way to do this would be to merge existing research and practices from specializations into one stream of teacher preparation, to include first and foremost, UDL principles (that encompass the majority of the other practices seen in specialized preparation streams) and include components from other fields in preparation. *Figure 3* provides this model for preparation. There would be two streams of teacher preparation: The *specialized generalist* and the *special coach or co-teacher*. The *specialized generalist* would take coursework in UDL, special education characteristics and methods, methods for teaching English as a second language and addressing trauma within classrooms as part of their coursework. The *special coach/co-teacher* teacher preparation will include aspects that are unique to each preparation stream, such as special education law and methods for severe and profound disabilities, bilingual education, etc., as seen in *Figure 3*. With this model, each classroom will have a teacher who is trained to address diverse need areas at all levels, including neuro-diversity, disability, social-emotional needs and English learner needs, as the *specialized generalist*, while the other, with content expertise that is more unique, will work as a consultant or a co-teacher.

Using this model will solve several dilemmas in teacher education and how we address students' needs in the classroom. The language teacher will no longer be at a loss on how to teach reading skills to students who have a processing disability and have undergone a loss in the family. The whole child will be considered with mindful attention to linguistic, ability, social-emotional, attention, engagement and other diverse learning needs. Drawing from the rich guidelines of UDL (see CAST, 2020b), and a knowledge about disability characteristics, language acquisition and second language learning, culturally relevant and trauma-sensitive practices, the *specialized generalist* teacher will be able to efficiently address individual learning needs from a dynamic perspec-

tive, with intermittent supports from the co-teachers or coaches as needed. Students will also be able to benefit from aspects like strategy instruction and instruction in social-emotional skills, as based on their individual strengths and needs. It also leads to efficient use of resources across specialized areas. For instance, the English as a second language stream has several resources and research based on second language acquisition, specifically related to literacy acquisition, especially listening and speaking; which are commonly not explicitly addressed in general classroom instruction. Merging preparation will help access such resources and making it accessible to all children who need supports for oral language.

In conclusion, globally, it is now time to review teacher preparation with a lens to address diversity at the neuro-diverse individual level and dispel the narrow notion that was restricted to viewing diversity as represented by disability, cultural or linguistic differences. It is time to work collaboratively to seek to respond to the rising diversity and provide accessible quality education to *all* learners, based on their individual strengths and needs. The proposed new model for teacher preparation may work as a solution.

Table 2: Evidence-based practices from diverse need areas showing overlapping practices with UDL

Evidence-based practices in Special Education (Adapted with information from Kauffman, Hallahan & Pullen, 2017)	Evidence-based practices for English Language Learners: Richards-Tutor, Aceves, & Reese (2016).	Trauma Informed Classroom Practices (Adapted from Midwest PBIS Network, 2019)	Key Principles of UDL (CAST, 2020b)
<p>Increase academic engagement time^a</p> <p>Brisk instructional pacing^a</p> <p>Opportunities to respond^a</p> <p>Frequent review of work^c</p> <p>Minimize pupil errors^c</p> <p>Frequent praise of correct responding^c</p> <p>Explicit & Direct instruction^b</p> <p>Model new behaviors^b</p> <p>Guided practice^b</p> <p>Teach strategies for learning and study skills^b</p> <p>Teach self-regulation skills^b</p> <p>Promote attribution and self-determination.^c</p> <p>Transitions between lessons or concepts</p> <p>Monitoring student performance^c</p> <p>Support desired behavior and prevent undesired behaviors by^a:</p> <p>Structuring the environment</p> <p>Clarifying expectations</p> <p>Provide active supervision</p> <p>Use contingent praise</p> <p>Give precision requests</p> <p>Use pre-correction</p> <p>Use behavioral momentum</p> <p>Apply corrective feedback</p> <p>Direct instruction in social skills</p> <p>Use group contingencies and response-contingent punishment procedures such as reprimands, response cost, and time out</p>	<p>Academic Instruction:</p> <p>Opportunity to develop academic oral language while simultaneously teaching literacy and other content areas</p> <p>Teach vocabulary across content areas^b</p> <p>Provide instruction and/or instructional support in the primary language as needed.</p> <p>Provide appropriate interventions for those needing support beyond classroom^b</p> <p>Implement Culturally Responsive Instruction^b</p> <p>Progress Monitoring:</p> <p>Implement purposeful and appropriate assessment practices taking into account their primary language, English-language proficiency, and ongoing linguistic and academic progress^b</p> <p>Utilize curriculum-based measurement to determine risk and monitor progress^b</p> <p>Employ an ecological approach when evaluating possible learning difficulties and to develop appropriate and culturally responsiveness</p> <p>Family-School Partnerships</p> <p>Develop parent involvement programs that are carried out in the home language, are sustained over time, and are responsive to the cultural experiences of the families.</p> <p>Understand the out-of-school experiences of children and how these may differ from the skills demonstrated at School</p> <p>Provide strategies for parents to enhance the effectiveness of parent involvement activities</p>	<p>Create a safe, predictable and consistent environment: Arrange orderly physical environment</p> <p>Promote belonging and relationship development</p> <p>Teach and reinforce Social, emotional, behavioral competencies^c</p> <p>Support cognitive, emotional, and behavioral regulation^{ac}</p> <p>Define, teach, acknowledge rules, expectations and routines^a</p> <p>Employ active supervision^a</p> <p>Encourage appropriate behavior: Direct instruction of expectations, rules, routines, specific praise for behavior, preventative prompts, individual reinforcers, group contingencies and reinforcers, etc.^a</p> <p>Continuum of responses to inappropriate behavior: Praise other students/groups, specific error correction, etc.^a</p> <p>Opportunities to Respond^c and Academic Engagement^a.</p>	<p>Provide Multiple Means of Engagement^a:</p> <ul style="list-style-type: none"> - Provide options for Recruiting Interest - Provide options for Sustaining Effort & Persistence - Provide options for Self-Regulation <p>Provide Multiple Means of Representation^b:</p> <ul style="list-style-type: none"> - Provide options for Perception - Provide options for Language and Symbols - Provide options for Comprehension <p>Provide multiple means of Action & Expression^c:</p> <ul style="list-style-type: none"> - Provide options for Physical Action - Provide options for Expression & Communication - Provide options for Executive Functions

Note: The overlapping instructional practices are listed by superscript a, b, c, that correspond to the three tenets in UDL (last column)

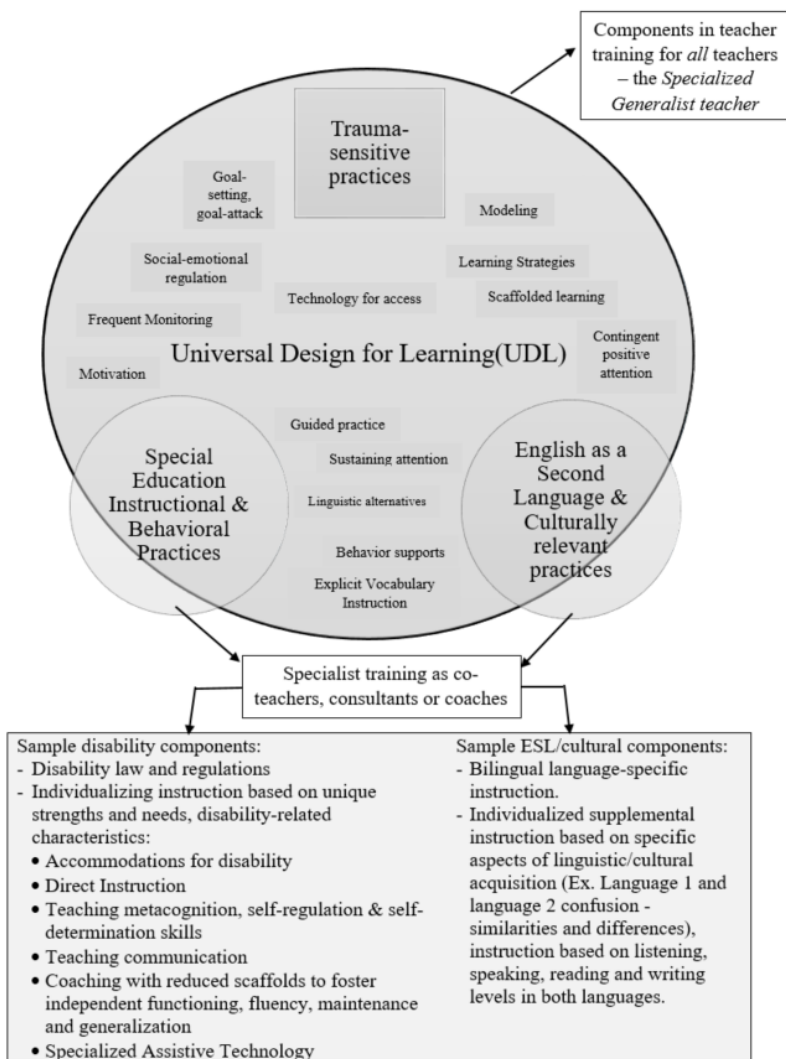


Figure 3: Emergent teacher education streams and components

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THE LASER APPROACH

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Introduction

The LASER Approach stands for Low Arousal Supports Educational Resilience, and is designed to be applied in a wide variety of educational settings by teachers, support workers and families. The LASER Approach was developed through Studio 3 Training Systems in 2019 as a new way of supporting young people to achieve their full potential. The basis of the approach was developed through supporting autistic young people, and although this is referenced throughout the chapter, the approach is applicable for all learners with additional needs and diagnoses. The key difference between this approach and other methods is primarily that resilience is not ‘parked within the child,’ and applies more widely to the environment as a whole and the adults who are supporting the young person. As our colleague Elly Chapple would say, ‘flipping the narrative’ is a key component of this approach (2019). This means focusing on what is within our gift as parents, carers and professionals, rather than attempting to change the behaviour of the child through a prescribed approach.

LASER has a strong evidence base, building on the practical experiences of educators as well as the voices of young people and their families. Co-production and communication between the individual, their family and the school/setting are core elements of the approach. LASER can be adapted for a wide range of educational settings, from mainstream schools and specialist settings to young people who are educated at home. The approach provides an academic and practical understanding of key theories related to autism, distressed behaviour and arousal mechanisms, including:

- Low Arousal (McDonnell, 2019)
- The Saturation Model (Morewood, Humphrey & Symes, 2011)
- Co-production (Morewood 2017; 2019)
- Constant Consistency (Morewood, 2018)
- The PERMA Model (Seligman, 2011)

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- Reflective Practice (Schon, 1987)

The LASER Approach centres around a practical focus towards eliminating the use of restrictive practices and seclusion by implementing Low Arousal Approaches within a whole-school/setting framework. Combining this with positive practice and excellence in de-escalation allows for a completely different model of working, valuing each individual's needs and goals. Working within a person-centred framework, the LASER Approach to supporting individuals in educational environments focuses on stress reduction and co-production to enable every young person within the school to benefit.

Overall, there is a strong focus on the importance of stress reduction and well-being for all members of the school community – including staff, parents/carers and pupils. The individual elements of the programme can be customised based on the needs of the school or organisation. For example, a focus on restraint reduction may be a key area of concern for one school, but less necessary for another. As such, the contents and focus of the programme can be adapted based on an analysis of the requirements of the organisation or school in question.

This chapter represents some of the key concepts that form the LASER Approach. Due to the personalised nature of the approach, it should be viewed as an overview rather than a prescribed approach. In this chapter, we will attempt to explore the key components - theoretical and philosophical - which underlie the approach, and thus demonstrate how all these elements work in unison to create a support network around the young person and throughout the setting as a whole.

The implementation of the LASER Approach is very much about the individual setting; different foci will form key areas depending upon their unique requirements. For example, a young person receiving education in the home will require different emphasis compared to a small rural school, and similarly so for a large international school. The key is to set out a philosophy and support a journey in which there are real alternatives to improving outcomes for learners, wherever they receive their education.

Low Arousal

The Low Arousal Approach is a philosophical and practical approach to crisis management developed in the early 1990s (McDonnell, McEvoy & Dearden, 1994). Based on the concepts of physiological arousal mechanisms and stress, this approach focuses on stress reduction, the behaviour of supporters and reactive crisis management strategies to create calm environments. De-escalation is at the forefront of Low Arousal, and non-aversive strategies such as strategic capitulation, co-regulation and non-verbal cues are used by supporters to communicate calmness and non-confrontation. The original definition of the approach has evolved from its inception as a philosophical,

‘common sense’ approach to supporting someone who is distressed, to a practical method of working with stressed and often traumatised individuals with behaviours of concern (McDonnell, 2019: p.149):

‘A Low Arousal Approach is almost the opposite of ‘zero tolerance’ approaches, which encourage boundary-setting and assertiveness in the face of verbal or physical aggression. Instead, Low Arousal means tolerating behaviours that you may be inclined to want to change, and accepting that the first priority is often not the behaviour of concern itself, but the underlying causes such as stress and trauma.’

The Low Arousal Approach has been applied in a variety of care settings and with a range of individuals with additional support needs, including intellectual disabilities, autism, acquired brain injuries, older adult’s services and mental health services. Whilst the Low Arousal Approach is primarily employed as a crisis management strategy, its effectiveness in reducing caregiver stress and creating calm environments has seen it adopted as a way of life within many support settings. This approach has been successfully adopted within a number of special and mainstream schools throughout the UK, using a whole-school approach to stress reduction, reducing environmental stimuli, and examining the causes and circumstances surrounding crisis situations, including staff’s own contribution to challenging incidents. Low Arousal within the classroom and other education settings means that every child is given the space and time to learn in a calm environment that enables them to flourish.

Stress and Arousal

There is a very clear link between stress and physiological arousal (McDonnell, 2019). Arousal mechanisms are an unconscious part of our day-to-day processes, and our perception of these mechanisms and ability to control them disintegrates the more stressed and hyper-aroused we become. The autonomic nervous system can be divided into two parts; the sympathetic and parasympathetic. The sympathetic nervous system powers the basic processes that affect our fight or flight responses. The parasympathetic nervous system is responsible for slowing the body down, such as when the body is resting. Stress and high levels of arousal trigger the sympathetic nervous system, resulting in increased levels of adrenaline and cortisol in the blood. The implications for this in practice are wide-reaching, for supporters themselves and the individuals being supported. Stressful environments (such as busy classrooms with lots of noise) heighten our senses and levels of physiological arousal, and can lead to moments of crisis, dysregulation, and behaviours of concern.

By focusing on how stress and arousal interact with one another as well as with external factors, the Low Arousal Approach anticipates how arousal mechanisms can be impacted throughout the day, and works to create space

and moments of calmness. De-arousing activities need to be built into the school day in order to allow young people to calm down and learn to self-regulate when they feel themselves becoming stressed or restless. Exercise is a great way of doing this by structuring fun, engaging physical activities into the school day, and has been proven to improve cognitive functioning (Bidzan-Bluma & Lipowska, 2018). Regular cardiac exercise has also been shown to improve not only physical well-being, but also to reduce stress (Alghdier, Gabr & Aly, 2015). This makes it an excellent, pro-active intervention for students, staff and caregivers alike. Mindfulness and relaxation can also be useful tools for reducing stress and arousal in the classroom, and it is helpful to take a 'mindful pause' in moments of crisis before rushing into action. When people are under high levels of stress, they tend to make poorer decisions, therefore building stress-reduction practices into daily routines and schedules should be a key focus.

Co-Regulation Enables Self-Regulation

The ultimate goal with Low Arousal is for the young person or individual to eventually learn to recognise their physical needs and identify their stressors in order to pro-actively respond to them before they reach a critical point. However, in order for self-regulation to occur, supporters role-modelling calmness is a critical first step. The transactional model of stress demonstrates that stress, like happiness and other emotions, is contagious (Lazarus & Folkman, 1984). This means that when a pupil is distressed, their stress can impact on their supporters, causing them to also become stressed and aroused, and vice versa. Supporters should be aware of unconsciously transmitting their own stress onto the young people they are supporting, particularly during moments of crisis. Maintaining calmness – or, at the very least, the appearance of calmness – is essential to prevent situations from escalating (McDonnell, 2019: p. 245):

'By remaining calm and adopting a Low Arousal Approach, you are creating an opportunity for the distressed person to have time to self-regulate.'

This means, to a certain extent, allowing distressed behaviours to occur. This can seem counter-productive, and at times may feel like 'giving in,' but the reality is that engaging in confrontation will inevitably cause the situation to escalate. Shouting at, restraining, or reprimanding an individual in distress will only cause everyone's levels of stress and arousal to elevate. It takes a great deal of calmness and confidence to use strategic capitulation (or 'giving in'), as this goes against many of our instincts and learning around behaviour. Low Arousal challenges practitioners to deconstruct their preconceptions and firmly-held beliefs about challenging behaviour, and forces us to examine *why* we find some behaviour so challenging. The reality is that some individuals need to engage in 'challenging' behaviour as a means of self-regulating. Screaming,

swearing and destroying property may seem to be behaviours driven by anger and violence, but in many cases these behaviours are the only way young people are able to alleviate their stress. Asking ourselves why an individual might *need* to engage in a behaviour can help to shift the focus from changing their behaviour, to helping them to manage their stress and arousal levels.

De-Escalation Excellence

The key to successful de-escalation is stepping back, being compassionate, and allowing the individual time and space to calm down. There are many steps that can be taken to reduce social and environmental stressors in order to reduce the likelihood of an individual becoming distressed in the first place. When a situation does begin to escalate, there are a number of factors that could be contributing to their levels of stress and physiological arousal. Consider:

- The environment (e.g. loud noises, unpleasant smells, other people in close proximity, temperature)
- Demands being placed on the individual (e.g. to finish a task within a certain time frame)
- Physical needs (e.g. hunger, thirst, tiredness, pain)
- Social pressures (e.g. interaction with others)

By observing the various and interacting contexts in which behaviours of concern occur, we can better understand their causes, and thus reduce the likelihood of reoccurrence. Considering all the extraneous factors that might be impacting a person's behaviour and mood means that we can address these discomforts and potentially avoid a crisis. The De-escalation Checklist from *The Reflective Journey* (2019) by Professor Andrew McDonnell is a useful tool to consider when situations become stressful. It encourages professionals, teachers and supporters alike to consider the following questions (pp. 204-205):

- Can we reduce stress in the person's immediate environment?
- Can we give the person a break?
- Can we make their world as predictable as possible?
- Can we increase the person's sense of control over their environment?
- Can we simplify communication?

Thinking outside of the box and anticipating the needs of the individual are important tools for avoiding a crisis. Sometimes, this can mean allowing individuals to escape from the classroom and go to a designated safe space to calm down. Other times, when the individual is too distressed to remove themselves, the rest of the pupils in the class can be moved to a different area to allow the individual space. This is known as planned escape, and is an incredibly useful tool to implement into whole-school policies and practices so

that everyone in the school knows they are allowed to take some time out without reprimand if they feel themselves becoming dysregulated.

Low Arousal Micro-Skills in Educational Settings

The key to Low Arousal is appearing calm, and this can mean many things in practice. It is possible to train individuals in Low Arousal Approaches and thus, over time, triumph over their sympathetic 'fight or flight' reactions to crisis situations. There are also steps that educational professionals and family members can take to *appear* calm during crises, even if they do not necessarily feel calm. There are a number of Low Arousal 'micro-skills' that can be used to communicate calmness and create a non-aversive atmosphere. These include non-verbal cues, which are often the first to be interpreted when a person is distressed. Avoiding direct eye contact, physical touch, and slowing your movements down are gentle, non-verbal ways of communicating that your intentions are not to get into a confrontation with the young person. Avoiding gathering staff in a crisis is also recommended, as the more onlookers there are, the more stressful and arousing the situation can become. Multiple staff members 'ganging up' on an individual in a crisis can be incredibly intimidating for the young person, and can be a subtle and coercive means of control. Staff should be careful about the power signals they communicate, other through their own bodily posture (e.g. towering over a young person, pointing their finger, being physically threatening) or through their collective presence in the side-lines.

Additionally, peer groups of onlookers should also be removed from the situation where possible. Studies in psychology have demonstrated a phenomenon called social facilitation, more commonly known as the 'audience effect,' whereby people tend to behave very differently when they have an audience (Strauss, 2002). This can cause situations to escalate further when peer groups are present as onlookers. Being aware of how these environmental and social factors can be a catalyst to incidents escalating, and preventing this from happening is a key skill for Low Arousal practitioners.

The Saturation Model

One of the most important, challenging and controversial aspects of any system of education for learners with additional or specific needs is improving experiences and outcomes. This is often hindered by systems that reinforce significant disadvantage. The Saturation Model was developed over a decade ago as part of an ESRC funded project with the University of Manchester (Morewood, Humphrey & Symes, 2011). The model was initially developed with the sole purpose of including autistic learners who had been excluded from or were unable to attend previous educational settings. It is useful to note again, that although initially developed to support autistic learners, this model has been successfully used to support many different learners in settings glob-

ally, through direct training and ongoing support from the first author over the last decade.

The outcomes of this study resulted in every young person who participated going on to education, employment or training, and provided a 100% success rate regarding the aims of the project. Since its inception, the Saturation Model has been developed further as part of the LASER Approach, and is a key element of this eclectic and person-centred approach.

As with many things in education, there is of course no 'silver bullet.' Students and learners with additional needs share as many differences as they do similarities, and to expect a single approach or intervention to meet the needs of all is, at best, naïve. However, the Saturation Model is a good investment for improving outcomes, as demonstrated by its success within a number of settings across the globe.

The whole-school Saturation Model can be seen to build a bridge between the 'high, hard ground' of academic research and the 'swampy lowlands' of real-world educational practice, and has been the subject of much interest within the context of training and whole-school development over the years (Marshall, 2013).

What Is the Whole-School Saturation Model?

The Saturation Model provides a framework for a whole-school approach, and was originally developed to illustrate principles for the effective inclusion of autistic learners in a secondary mainstream school. However, it is arguably equally applicable to all educational phases and contexts, and has been applied to many schools and settings, both in the UK and abroad, during the last few years.

The word 'saturation' is deliberately used to emphasise the need for autism-friendly principles and practices to permeate every aspect of school life. Prominence is also given to the integration and co-ordination of strategies, with the hope of avoiding a fragmented, 'programme for every problem' approach, which is neither cost-efficient nor sustainable (Domitrovich et al., 2010).

The model is consistent with the two primary theoretical tools that informed the work. Aligned with Bronfenbrenner's (2005) bioecosystemic theory, the model highlights the importance of micro- and meso-system inter-relationships (e.g. the peer group and classroom) at its core, while also drawing on more distal, exo-system influences (e.g. school systems, policy). Direct support and intervention take account of both individual and group differences.

The following graphic demonstrates the core elements of the Saturation Model as an approach to supporting what is 'within our gift' of influence as professionals. Some of the core principles of the Saturation Model are outlined below.



Figure 1. The Saturation Model (Morewood, Humphrey & Symes, 2011)

The Agent of Change

The central and starting point of the model is the ‘agent of change.’ Typically, this would be the Special Education Needs Co-Ordinator (SENCO) within a school, but it can also apply to the primary educator – parent, carer or teacher. There are many debates as to the need for this role to also be a member of the school’s leadership team, as this may be a crucial factor in determining whether the proposed innovations ‘take hold.’

The agent of change pushes thinking and practice forward, and can often be met with resistance. As such, energy, resilience, and good humour are useful traits for the agent of change to foster, alongside the ability to be a ‘solution broker’ within the context of the system or setting.

Peer Education and Awareness

The role played by peers in determining the educational experiences and outcomes of autistic (and indeed all) learners is vital. We can support and educate peers in several ways. Firstly, we can improve peer awareness (and subsequently attitudes and behaviours) by providing students with accurate information about autism and other neurodevelopmental conditions. The work of Campbell and colleagues, which draws upon social persuasion theory, provides a theoretic framework for considering the role of peer awareness (Campbell & Barger, 2014). Credible, likeable sources of information which are recognised as having authority have been identified as more persuasive. In a school context, this may be a member of the Senior Leadership Team (SLT) who has significant influence with the students. In terms of message, educators should

highlight similarities between students with and without autism, using explanatory information to increase understanding and provide guidance on how students can interact with and support their fellow students. This can be supplemented by exploring the achievements of autistic individuals and hearing 'first-hand' from those with real, lived experience.

Secondly, given the inverse relationship between social support from peers and experience of victimisation and loneliness, peers can and should be used as a protective resource (Symes & Humphrey, 2010). An example is the Circles of Friends approach, in which a small group of typically developing peers form a support network around a focal child. Evidence from a range of contexts suggests that this system may have specific benefits for autistic students and their peers. However, it is also important to take into account the preference (or need) for solitude expressed by some autistic children and young people. Peer social support systems should therefore be a resource which can be drawn upon when needed rather than being forced upon individuals. This is where the application of different approaches in a 'medicalised manner' leads to normalisation; applying approaches in a personalised way is one of the core elements of this model, hence the requirement for the agent of change.

Thirdly, given the greatly increased risk of victimisation associated with autism (Hebron & Humphrey, 2014), interventions that directly address bullying are warranted. A useful starting point is to build upon what is known about bullying prevention in general by students and staff within the setting. Unfortunately, the effects of bullying interventions are not always practically significant, and are more likely to influence knowledge and attitudes than actual behaviour (Merrell, Gueldner, Ross & Isava, 2008). However, approaches which include a component targeting students deemed to be 'at risk' appear to produce slightly better outcomes (Ferguson, Miguel, Kilburn & Sanchez, 2007). Whitted and Dupper (2005) note that 'the most effective approaches for preventing or minimising bullying in schools involve a comprehensive, multilevel strategy that targets bullies, victims, bystanders, families and communities' (p. 169). This is very much in keeping with the 'saturation' approach outlined as part of this model.

Direct Support and Intervention

Direct (individual or small group) interventions are also required in addition to a systemic whole-school approach to effect significant change. Interventions need to balance a consideration of individual needs with the profile of strengths and challenges associated with themselves as individuals, as well as other important contextual factors.

A systematic review of the literature on autism education highlighted a large body of evidence for interventions with a range of foci (Bond et al., 2014):

- Joint-attention
- Social interventions
- Play
- Communication
- Challenging behaviour
- Flexibility
- Pre-academic/academic skills
- School readiness skills
- Cognitive skills
- Motor skills
- Adaptive and self-help skills

This and other reviews (Parsons et al., 2011; Wong et al., 2013) have demonstrated that the majority of the available evidence relates to children rather than autistic adolescents. Much less is therefore known about effective interventions and support for autistic children in secondary school settings. Furthermore, the various reviews have pointed to peer-mediated interventions as offering particular promise in the promotion of social skills (whilst also potentially improving peer understanding of and attitudes towards autism).

Although some interventions reviewed were implemented by researchers, school staff can effectively implement a range of interventions following some initial training. This has obvious implications for both the cost-effectiveness, impact and sustainability of such work.

Direct support and intervention can also be an effective means through which to prevent or reduce victimisation of autistic children and young people, and is particularly effective when developed as part of a whole-school approach, for example with speech and language therapists and psychologists as part of the school-led provision (Morewood, Drews & King, 2016).

Flexible Provision

A pre-requisite of effective practice in the whole-school Saturation Model is flexibility in provision. As noted earlier, despite their sharing of common characteristics, no two students are the same, and provision therefore needs to reflect this diversity of need. For example, some students may be better placed in teaching groups that suit their individual needs (e.g. positive role models and the need for good quality, structured teaching) rather than their 'perceived' ability in a given subject. A person-centred approach is essential to enabling diverse and comprehensive support tailored to suit individuals' needs and abilities. The development of this area as part of the LASER Approach is often an important part of support for school settings.

Routines and Rules

Incorporating Low Arousal principles as part of the Saturation Model means being aware of environmental stressors and changes in physiological arousal, and allowing for fluctuations in concentration, ability and arousal levels as the day goes on. Children and young people's daily timetables need to be adaptable and allow time for them to withdraw from lessons in which they feel that the cognitive and/or social demands are too high. Scheduling these moments of escape and calmness provide an excellent opportunity for specialist support and intervention of the kind noted above, and also builds stress reduction and de-escalation into the daily routine of the young person. These should, ideally, be pro-actively planned as part of Stress Support Plans, not reactively implemented at moments of crisis.

Being reasonably flexible with school rules is also important. For example, some learners may experience disturbed sleep patterns and can arrive to school late. Such cases require staff to be empathic, and understand that rule-breaking behaviour is not always within the young person's control; indeed, after a poor night's sleep our coping responses can be fewer than previously, so things we managed on week may be more challenging in this moment. Allowing the young person time to get settled in a designated area and provide them with the tools to express their readiness to join the class. Engaging in metacognitive approaches is an important element of this way of working and, ultimately, leading to self-regulation.

In some cases, flexibility of provision may even extend to students to having dual-roll placements through the development of formal partnerships between mainstream and specialist schools. The proportion of time spent in each setting can be reviewed periodically and adapted as necessary, with the flexibility allowing for that on a day-to-day and week-by-week basis, thus truly personalising the provision. This approach moves beyond polarised, simplistic debates about whether mainstream or special educational settings are 'the most appropriate' for students with additional and specific educational needs

(Mesibov & Shea, 1996), recognising that a student's needs, and how and where these are best met, are subject to change. Of course, the feasibility of such an approach is highly dependent on local contextual factors, including:

- Availability of funding (although these arrangements cost almost one third of the cost of a full-time specialist placement in reality)
- The existence of different forms of provision or placement
- Relationships between placement sites

Building these kinds of systems and partnerships can have multiple, wide-ranging benefits, particularly regarding the personalisation of provision and outcomes in preparation for adulthood.

Training and Development of Staff

Our personal experiences indicate that teachers generally have positive attitudes towards autistic children and young people with additional needs, but report difficulties around social and emotional understanding. These tensions can often influence the quality of their interactions with students, and potentially undermine the development of positive relationships which underpin learning in the classroom. Effective training and development is therefore crucial. Within a Low Arousal Approach, the relationship between supporters and individuals is of utmost importance, and it is essential to foster empathic, trusting and therapeutic relationships.

The Saturation Model advises that training should be 'regular, on-going and part of a commitment of all staff . . . a one-off twilight session (or training day) is never going to suffice' (Morewood, Humphrey & Symes, 2011: p. 65). It is our view that this process should begin during initial teacher training and, where possible, should include placements in specialist settings. In addition to better preparing teachers for practice, it may also have the added benefit of increasing a sense of personal responsibility for the learning of all students, particularly autistic learners, rather than this being viewed as the sole responsibility of support staff or the school's special education specialist.

It has been reported previously that less than 15% of teachers received any autism-specific input during their initial training (Morrier, Hess & Heflin, 2011). Significant change is required in this sector, perhaps as part of a general shift towards more explicit and detailed consideration of special educational needs during the critical developmental phase in teachers' careers. Although high-quality empirical evidence is currently scarce (Alexander, Ayres & Smith, 2015), there are indications that where autism input is, 'strategically placed within the confines of a teacher training program, [it] can both significantly increase participants' perceptions and knowledge of autism [. . .] as well as reduce overall stress and anxiety levels' (Leblanc, Richardson & Burns, 2009: p. 166).

Why Constant Consistency Matters

Often, more and more problems arise for schools and other settings when consistency and a 'whole-school' approach are lacking. Systems need to be put in place, through policies and procedures, that are supportive of plans and individuals. Fragmented practice and provision can fuel dysregulation and increase stress throughout the staff team and within the school as a whole. Consistent, calm approaches are hugely effective, and this requires a collective and unified approach from management and frontline staff alike.

The concept of corporate responsibility (Morewood, 2018) was developed as an extension of the Saturation Model and means, in essence, that everyone within a school or setting shares the responsibility for any agreed aims or goals. For schools, this is often established through strategic school development plans for the year and onwards. Clear plans help to ensure that pockets of 'good practice' are not undone by inconsistent whole-school provision and systems.

Having a calm, consistent and purposeful learning environment in one classroom, contrasted by a stampede down the corridor when class ends, creates a very dysregulated experience and environment for pupils. These inconsistencies can mean significant stress for students who find these less structured times extremely challenging. It can also be stressful for staff who reactively attempt to calm students down and get them to stop running or shouting. Consistency has to be constant to allow effective learning to take place - both in the classroom and outside of it.

One of the key elements of the Saturation Model is ensuring a clear link between policy and practice, as a disconnect can create opportunities for fragmentation of provision and structure. After all, no-one is harmed by calm, consistent, positive approaches.

Calmness and self-control are connected. In applying the Low Arousal approach to teaching and learning it is all about the culture within the classroom, founded upon a good understanding of stress and consistent proactive approaches. Maintaining a calm, consistent learning environment, applying what the evidence would suggest is a good investment in learning, creates a purposeful environment that allows everyone the opportunity to thrive. It is important to remember that nobody fights when they are feeling calm and relaxed, and actively creating calm environments reduces the likelihood of crisis situation developing. Whilst these Low Arousal environments are especially beneficial for students with additional support needs, they also do not harm other pupils, and therefore help to improve outcomes for all.

The Importance of Co-Production

Co-production means facilitating open and honest communication between all parties involved in the young person's well-being, including family, carers, educators, other professionals and, crucially, the young person themselves. This enables a collaborative approach, suffused into every aspect of the young person's life to achieve a holistic and unified support system. With the well-being of the young person at the core, a truly co-productive network of support can improve outcomes for the young person and their family. Keeping parents and carers informed, providing honest communication and listening to supporters improves outcomes for all, and increases parent/carer confidence (Morewood, 2017). Working together with a shared, solution-focused goal empowers families and young people, and enables them to flourish within a robust and unified support system (Morewood, 2019).

Claire Ryan, a parent and Speech and Language Therapist, identifies co-production as a partnership based on trust and respect, and therefore concerning issues such as (Morewood, 2019):

- Power imbalances
- Identifying and removing barriers
- Identifying and utilising skills
- Distributing workload and roles fairly and appropriately
- Identify joint goals and outcomes
- Respect for all input
- Inclusion

Respectful and trusting partnerships are essential for the success of the LASER Approach, with particular regard to the young person's whole day, not viewing school and home separately, but truly working collaboratively.

The PERMA Model

The PERMA Model, developed by Martin Seligman (2011), provides a positive psychological framework for focusing the positive elements of life and actively fostering moments of happiness. Positive psychological principles place a strong emphasis on well-being, and can be a useful way of re-framing discussions around behaviour to focus more on addressing the causes of distress (Dodge et al., 2012: p. 230):

'In essence, stable wellbeing is when individuals have the psychological, social and physical resources they need to meet a particular psychological, social and/or physical challenge. When individuals have more challenges than resources, the see-saw dips, along with their wellbeing, and vice-versa.'

The PERMA Model identifies five key components to achieving overall psychological well-being and happiness. These five elements are considered essential for all people to promote well-being and achieve fulfilment.

1) Positive emotions

Positive emotions such as happiness help to boost our immune system and improve our overall feeling of well-being. Happiness - like stress - is contagious, and encouraging students to share their positive experiences can help to shift the focus away from negative feelings. The 'three good things' exercise is a useful tool to use with students to help them focus on positive experiences and feelings (Rippstein-Leuenberger, 2017).

2) Engagement

Engaging in hobbies, activities and exercise helps people to fulfil their potential and achieve their goals. Encourage pupils to identify and engage in flow activities that help them to focus and de-stress, and try some out yourself!

3) Relationships

The importance of positive relationships in people's lives cannot be overstated, and many studies have shown that supportive connections are associated with greater wellbeing (Dickerson & Zoccola, 2009).

4) Meaning

Having a sense of belonging, setting and achieving goals and feeling connected to life and the world is another essential component in Seligman's PERMA Model. An important part of this is having a sense of control over your own life. This means empowering young people to make decisions, set goals, and engage in activities that have meaning for them.

5) Accomplishment\Achievement

Feeling a sense of accomplishment is also important for our overall wellbeing. Celebrating the achievement of goals and daily successes within the classroom increases pupils' confidence and their overall wellbeing.

When supporting young people with additional needs, their overall wellbeing and happiness should be an important factor, as people are less likely to present behaviours of concern or 'meltdowns' when they are in a happy and stress-free environment. Working to strengthen overall psychological wellbeing has been proven to reduce stress, increase coping, and prevent behaviours of concern from becoming more challenging by pre-emptively stopping them in their tracks as part of a supportive, personalised framework.

Being A Reflective Practitioner

The key to good practice is self-reflection. The Low Arousal Approach requires practitioners to constantly reflect on their own contributions to challenging situations, which can be quite difficult for some people. Understanding the children and young people being supported, seeing them as individuals and empathising with them is an essential component of the approach, and this does require an open and honest dialogue with everyone and with yourself as part of a co-produced approach about how they can better supported moving forward. When a crisis does occur, ask yourself what steps you could have

taken to de-escalate the situation before it got out of hand. Once they have calmed down, ask the young person how they needed your support in that moment, and how they can communicate that to you in the future. Remember, no-one learns when they are stressed and highly aroused. Learning can only occur after the incident has passed.

There are many reflective exercises teachers, carers and other professionals can engage in to help them take stock of how a situation unfolded, and how their own behaviour may have contributed. *The Reflective Journey* (2019) is a comprehensive guide for practitioners that centres around the core concept of reflective practice within a Low Arousal framework. Professor McDonnell here advocates for a greater understanding of why behaviours occur, and how important it is to be empathic practitioners and view individuals as being highly stressed, rather than ‘badly behaved’ or ‘acting out.’ Seeing the stress, and often trauma, also means accepting that highly distressed individuals are often not in control of their behaviour, thus shifting the focus from their behaviour to ours (McDonnell, 2019: p. 188):

‘In these circumstances, carers may think of solutions that focus on their own behaviour rather than manipulating the individual’s behaviour.’

These moments of reflection and emotional decompression after an incident are important in order to take the next steps necessary towards preventing future crises.

Conclusion

In this chapter, the core elements, theory and philosophy of the LASER Approach (Low Arousal Supports Educational Resilience) has been outlined. Due to the unique nature of the approach, it is important to reemphasise the personalised manner by which LASER is applied and developed within different settings and educational establishments.

It should be noted therefore, that due to the personalisation of the approach (supported through coaching and supervision) to different settings and individuals, the precise methodology will differ from setting to setting. A core part of the approach is ongoing support and coaching, which can be ‘in-house’ or as part of an ongoing relationship with Studio 3 Training Systems. Full details of the LASER Approach can be found at www.studio3.org.

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MOVING ONLINE: HELPING HIGHER EDUCATION INSTRUCTORS

MIGRATE TO AN ONLINE ENVIRONMENT

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Introduction

According to UNESCO (2020), 1.57 billion students from 190 countries have been affected by school closures representing 87% of the world's student population. Humanity has been faced with uncharted territory in the times of this COVID pandemic that has rocked every nation. Much uncertainty has plagued educational systems worldwide with universities and places of higher education being no exception. During early Spring of 2020, instructors scrambled to transition their in-person courses to completely virtual in a matter of days. Some researchers have referred this unprecedented time period as "crisis teaching" (Fisher, Frey, & Hattie, 2020) or "emergency remote teaching" (Bozkurt & Sharma, 2020). Not only were instructors assigned the daunting responsibility of migrating their courses online, but they were also expected to balance their own trauma caused by COVID-19 as unemployment, sickness, and grief hit families around the globe. They tirelessly balanced instruction and life in a world facing uncharted territory and many unknowns.

In addition, institutions of higher education were unprepared and unequipped during this period. Though some may argue that institutions of higher education were in a better position than K-12 institutions due to the fact that many employ electronic platforms such as Blackboard that instructors and students are familiar with using for teaching and learning. But the preparedness of the instructors utilizing these electronic platforms was indeed varied. In addition, there were also specialty classes that required hands-on learning or field experience such as in the area of teacher preparation. Instructors scrambled to try and make create simulated experiences through video or live simulation to meet the needs of their students.

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In our chapter, we would like to share strategies to help higher education instructors with their migration to an online teaching environment including making connections through meaningful interactions and engaging students in an online environment which both encompass a variety of factors that we will explore in this chapter. We also discuss the importance of self-care for instructors, especially during this unprecedented era when stress levels are elevated. In this this chapter, we will share ideas that will provide inspiration and motivation as we continue to trek this journey together.

Making Connections with Online Students Using Meaningful Interactions

With these challenging times, instructors must find innovative ways to connect with their students in ways that are meaningful and purposeful. As shared, there are a variety of factors that affect meaningful interactions between students and instructors. Individuals crave personal connection, especially during times that are minimizing social interaction due to Covid-19 prevention. Instructors that were at one time face-to-face with their students are now faced to make these connections virtually. Dean (2019) suggests that meaningful interactions between faculty and students promote connections creating an online environment more conducive to learning. In their international study with over 4,600 individuals analyzing their social interactions, Litt, Zhao, Kraut and Moira (2020) found that participants defined meaningful interactions as those with emotional or informational impact that enhance their lives. There are many studies (Fendler, 2021; Galikyan & Admiraal, 2019; Peacock, et al., 2020) like this one that provide evidence on the importance of creating meaningful interactions to build connections with students. For example, according to Dean (2019), students are more likely to finish college and even pursue graduate school if they have meaningful interactions with faculty.

There are a variety of factors that impact meaningful interactions. Many researchers agree on the following factors that make interactions more meaningful for students which we will explore in this section (Grantham et al., 2015; Karpouza & Emvalotis, 2019): Instructors can ensure this happens by playing a vital role in providing the following:

- Specific feedback on assignments;
- Approachability;
- Treating students fairly and with respect;
- Career aspirations guidance and mentoring; and;
- Creating inclusive environments

In the following sections, we have shared ways that we have used these concepts to make interactions meaningful for students.

Providing Specific Feedback to Online Students. How and Why Does it Matter?

Someone once said that “Broad feedback is bad feedback”. Every person has received very broad feedback that provides doubt and disappointment to

the receiver. How is one going to improve when is not specific to the task? By providing specific feedback, students can improve on their individual performance. In their study, Grantham et al., 2015 surveyed higher education students on faculty-student interactions and students shared that providing individual feedback showed that their professor cared about their performance. In fact, Gonzalez and Moore (2020) found in their study with university students that instructor feedback was the most engaging element in an online course. Instructors should incorporate this element and ensure that it is specific, continuous, formative as well as summative.

Many instructors may not know the difference between formative and summative assessments and the value they bring to the teaching and learning process. With formative assessments, instructors use both formal and informal methods to assess students and helps instructors plan and modify instruction when necessary (Black & William, 2009; Rottermond & Gabrion, 2021). On the other hand, summative assessments are assessments that provide evidence of students 'mastery and are usually utilized at the end of a unit, mid-term, or end of a semester (Chappius, 2015). By incorporating formative assessments, instructors are able to assess students 'understanding of the material and help them throughout the semester instead of waiting until the end of the semester. In addition, instruction can be modified as needed to maximize the effectiveness of the course. Some examples of formative assessment that can be incorporated include mini quizzes, projects, interactive discussion boards, essays, and class discussions. We have included a table at the end of this chapter that provides examples of formative assessments (See Table 1).

Approachability

Approachability is another factor that makes interactions more meaningful. Merriam-Webster (n.d.). “approachable” as one is who is “easy to meet or deal with”. How does this term relate to higher education instructors and its impact on making interactions more meaningful? Instructors that are approachable encourage students to ask questions or ask for feedback. They listen attentively and seem genuinely interested in what students are sharing. They are able to communicate effectively through a variety of channels (email, class platform such as Blackboard, and be present during in-person as well as virtual office hours). When students have questions or concerns, they try to understand through the students 'perspective and do not talk down or belittle the student.

But it also important to set specific boundaries in regards to time devoted to the course. If not, one can become burned out. Many instructors set a certain number of office hours via in-person or virtual. In addition, there are applications such as Doodle Bookable Calendars (<https://doodle.com/en/>) that students can set up a meeting for times that you select. Applications such as

Calendly (<https://calendly.com>) actually can set up a Zoom meeting for you when students book the appointment.

Treating Students Fairly and Respectfully

Another critical factor that impacts meaningful interactions is treating students fairly and respectfully. All individuals want to be treated fairly and with respect and students are no exception. In fact, the first encounter or first impression, can set the tone for how students perceive instructors. Also, instructors should not assume information without knowing all the facts about a student or his/her situation. As one can imagine, students face many barriers in their journey through obtaining their college degree. For example, one third of students are the first to attend college in their family (Hanover Report, 2020). In addition, 67% of students enrolled in public post-secondary degree-granting institutions are over the age of 25 years of age (NCES, 2017) and 88% are over 25 at private post-secondary institutions with many supporting families as the breadwinner.

We currently work at an institution with over 50% are first generation students in which they are the first generation to attend college in their family with many of them working full time. In addition, quite a few of our students are non-traditional students including single parents supporting their families. With approximately 36% of college students having insecure housing arrangements and 9% are homeless, many college students are also facing dire financial barriers. (Hanover Report, 2020).

In fact, with the impact of the Pandemic, individuals worldwide have been faced with unemployment and have been forced to change careers. Many of these individuals attended college years ago in-person before the popularity of online classes. Many students are having to also transition to learning in an online environment. It is truly important for instructors to try and connect to students to have a better understanding of the barriers they may face on their road to earning their education.

Creating Inclusive Online Environments

It is also important for instructors to create classroom environments that are inclusive in which all students feel encouraged to share their own ideas from their own views or perspectives (Sengupta et al., 2019). Sengupta et al. (2019) shares “Inclusive classrooms are spaces where course content is discussed from many perspectives and respects the diverse views and range of experiences from the students” (p. 5).

Sadly, there is a limited research and resources on inclusivity at the higher education level. As institutions of higher education, we need to incorporate practices that meet the needs all levels from all backgrounds. UNESCO (Kaplan & Lewis, 2013) defines inclusive education as “...a comprehensive process of change across the education system through which the diverse

needs of all learners are addressed and responded to, regardless of their social, economic, cultural, linguistic, physical, or other contexts” (p. 5).

In addition, it is critical that instructors possess cultural competence, skills required to work with students who are different as well as similar from one-self (Vacarro et al., 2018; Jones et al., 2016). Although universities are improving their practices in providing training for their faculty and staff, there is still confusion on the model of practices that work the most effective with higher education students. In addition, if a model has been adopted, there is a lack of professional development for staff and faculty on how to effectively incorporate these skills in their teaching and learning environment (Kruse et al., 2018; . Furthermore, it has been questioned by many researchers, if universities are adequately preparing students in working with diverse populations (Kruse et al., 2018). As instructors, we need to strive to ensure our classrooms are inclusive to all students.

Career and Professional Aspirations

In addition, another factor that can impact meaningful interactions is the role instructors may play in mentoring. As mentors, students look to their instructors for career and professional advice as well as guidance. Mentoring models have been widely researched on its effectiveness for student retention (Crisp et al., 2017). Many times mentors are informal and unassigned but chosen by the student as someone he or she can ask for guidance and answer questions. Mentoring also builds a connection for the student, which is especially important for early undergraduate students. In a study, 64% of recent graduates who indicated that they had a mentor shared that it was a professor (Strada-Gallup, 2018). Furthermore, they found that students are more likely to obtain career advice from their professor than other university staff members (Strada-Gallup, 2018).

Below we have summarized simple suggested strategies that instructors can employ to help make connections to their students using meaningful interactions.

Strategies for Making Connections with Students Using Meaningful Interactions:

- Get to know students (and their name) through ice breaker games
- Communicate, communicate, communicate on a regular basis
- Use video recordings (record a quick video of yourself and have students record themselves and share with class)
- Hold regular office hours virtually
- Provide detailed feedback making it more meaningful to the student
- Try and understand students’ perspectives
- Treat all students with fairness and respect

Engaging Students in An Online Environment

Very similar to building connections with students is the term engagement. Engaging students and sustaining engagement in an online environment were a challenge many instructors were faced with last year as many of their face-to-face courses were transitioned to an online environment. One widely adopted framework for designing online teaching environments is The Community of Inquiry (CoI) model which is grounded in social constructivism (Garrison, et al., 2001; Popescu & Badea, 2020).

The framework is built on three components:

- Cognitive presence-how learners construct meaning (Garrison, et al., 2001)
- Social presence -how learners identify with others in the community and develop interpersonal relationships (Garrison, et al., 2001)
- Teaching presence -design, facilitation and direction of cognitive and social processes that promote learning (Garrison, et al., 2001; Popescu & Badea, 2020).

Research studies have shown there is a connection between these three presences and students' perception of their learning (Almasi & Zhu, 2020; Choo et al, 2020). Below, we have shared a little summary in regard to how each presence fits into the CoI framework for instructors planning and designing a course.

It is also important for students to have opportunities to interact with other online classmates to create a "sense of community" (Gonzalez & Moore, 2020). Incorporating interactive applications such as Flipgrid, Edpuzzle, Pear Deck, Quizlet, Kahoot and Jamboard are great ways to engage students with other students. See Table 2 at the end of this chapter for information regarding these applications. Also, another way to increase engagement among students is to incorporate peer feedback. When incorporating any type of peer feedback, it is critical for instructors to communicate clear expectations of what is expected in providing feedback to other classmates. Designing a user-friendly rubric is a great way to help facilitate this process. Also, creating a model video in which the instructor models how to use the rubric to provide constructive feedback is another suggestion that will help students understand this process. Incorporating group projects in which students work together is another way to increase engagement among peers.

Cognitive Presence

Instructors can build cognitive presence by making learning objectives clear and aligned to the goals of the course. The content should be clear, accessible and aligned with the learning objectives of the course. One way to ensure there is cognitive presence is using a checklist/rubric when designing the course to ensure your objectives are met and the content/assessments are di-

rectly aligned to the objectives. Another suggestion is to have an outside instructor assess the course. Peer assessment is a powerful tool in course design and course accountability.

Social Presence

As instructors, it is critical to create a safe, learning environment in which students engage with one another. It is also important for students to create their own identity as well as a sense of belonging in the class community. To build Social Presence, instructors should incorporate engaging activities that promote meaningful and active student learning. For example, instructors can have students lead the discussions with providing an overview of the week's reading. Using discussion boards or social learning applications such as Flipgrid are great techniques to encourage students to share their thoughts and ideas with their classmates.

Teaching Presence

Arguable one of the most crucial pieces of this framework is Teaching Presence. In fact, Stone and Springer (2019) found a strong relationship between teacher presence and student retention. Communicate your expectations from the beginning and stay consistent throughout the course. Be present and be visible through regular communication and virtual office hours. Since students may not have the opportunity to pick up visual cues as one might in a face-to-face, instructors should be explicit in their delivery. As an instructor, when you are planning and designing your class, be mindful of if your class will be synchronous or asynchronous. Both have advantages and disadvantages but overall are highly dependent on your course delivery.

In addition, it is important for students to see that instructors are interested in the course topic. In his study, with close to 4,500 massive online open course (MOOCs) learners, Hew (2018) humor and passion were two of the top characteristics students enjoyed seeing from instructors.

Using Live Demonstrations and Technology Applications to Enhance Online Teaching

Many instructors have used a variety of tools to enhance their teaching. Wright (2021) used live demonstrations to teach science through the use of remote teaching via Zoom and Google Meet. She also followed up her demonstrations with engaging class discussion using technology platforms such as Flipgrid and Padlet (Wright, 2021). We have shared a list of technology applications we have used or referred to at the end of this chapter for your convenience. See Table 2.

Our first-year teachers are in a special program that is grant funded in which they complete an internship in lieu of student teaching. Due to the restrictions of COVID, our K-12 teachers like all the teachers across the globe had to immediately adapt to online teaching. Fortunately, they were in the

practice of using SWIVL technology (<https://www.swivl.com>). SWIVL are little robotic devices that hold a phone for recording purposes that follow the teacher (teacher wears a marker). Teachers are able to upload their recording to a secured cloud network. This device is compatible with Zoom, Google Meet and Microsoft Teams so teachers can incorporate this device in their teaching to enhance their teaching for students. In addition, in the United States, some states are adopting edTPA as part of their teaching preparation certification program. The use of providing a video component can help students in completing their edTPA portfolio in regards to reflecting on their teaching (Franklin et al., 2018). In addition, we have used SWIVL devices as part of a mentoring system in which our teacher interns upload their teaching, and their experienced mentors provide specific feedback to help them improve their teaching practices. As shared, our intern teachers were in a fortunate position of having experience in using SWIVL and were able to incorporate this technology into their lessons for their K-12 students. In addition, they were also able to be given specific feedback from their mentors on areas for improvement and growth.

Communication Is Key

Online learning, especially if the teaching is asynchronous, requires students to be self-regulated in their learning (Yang, 2021). In addition, the chaos and distress of the Pandemic caused an emotional toll on many around the world. The combination of the emotional toll of the Pandemic and the switch to online learning induced stress among many. Many students typically rely on the in person reminders regarding assignments and deadlines. It is critical for instructors to communicate clearly and consistency their expectations for assignments. In addition, it can be more challenging on the part of the students to not always have the opportunity to ask questions in real time if your class is asynchronous. As instructors, we have used videos to explain or even model our expectations for assignments or simply go over the rubric for assignments. We find that this is helpful for the students. We also include frequently asked questions to help minimize confusion and provide clarity. If the class is no synchronous, we send out biweekly emails to check in with students and also to remind them of the week's assignments. In addition, many students feel isolated, and this is one way to help them feel connected. Also, if manageable (due to the number of students you have), we also try to personalize the emails and check on each individual. This is much easier if your class size is smaller. In her study of over 130 postgraduate Business students in a university in Ireland, Yang (2021) found that though the majority of the students preferred face-to-face class meetings, the students did enjoy the interactive activities with classmates the instructors including live discussions, group work, class activities and ice breakers. There is a strong need for students to feel

connected with their classmates and their instructor especially in a time such as the Pandemic in which social isolation is the norm.

Self-Care

The term self-care has garnered much attention in recent years and especially this past year with COVID as it has induced stress, increased workload for many and provide an unclear picture of the future. Teachers including those working in higher education institutions would highly benefit from adopting self-care techniques, but teachers in general, tend to put their career (and students) before their own needs (Lesh, 2020). Research has shown that self-care can increase self-efficacy, teacher retention while decreasing emotional exhaustion, and burnout (Ansley, et al., 2021; Lesh, 2020; Jennings et al., 2019).

Some reported effective self-care techniques that instructors can incorporate include the following:

- mindful-based interventions (MBIs) (Jennings, et al., 2019; Ansley, et al., 2021)
- exercise (Lesh, 2020)
- creating boundaries (Pate, 2020)
- journaling (Pate, 2020; Lesh, 2020)
- practicing self-awareness (Pate, 2020; Lesh, 2020).
- breaks from work (Corey, et al., 2018)

It is vital for instructors to employ self-care techniques on a regular basis to restore energy and effectiveness in the classroom. Geary (2020) even suggests to model self-care strategies such as using Pear Deck emotional barometer with students to check on how they are doing emotionally.

Zoom Fatigue

Perhaps a fairly new concept with the transition of many face-to-face meetings and classes transitioning to virtual is what is referred to as zoom fatigue. Dr. Jena Lee, director of the Pediatric Consult-Liaison Service and Pediatric Emergency Psychiatry at UCLA Mattel Children's Hospital defines zoom fatigue as "...tiredness, worry, or burnout associated with overusing virtual platforms of communication" (Lee, 2020, p. 38). To help combat zoom fatigue, McWhirter (2020) suggests setting boundaries and schedule time that is free of technology including cell phones, iPads and computers. Sloane (2021) shares that in face-to-face meetings, individuals use nonverbal cues to interpret information but using platforms such as Zoom, it is much more difficult causing tiredness and fatigue.

Sloane (2021) also suggests providing at least 15 minute breaks between zoom calls to regroup and refresh. Use this time to walk around, stretch and take a break from technology. Also, try and use email instead of scheduling a Zoom call. You can even create a quick video for your students if you need to

send them vital information through email for an electronic platform such as Blackboard.

Summary

Across the globe, in the Spring of 2020, instructors were faced with the task of adapting their instruction to best meet the needs of their students with many transitioning to an online environment. This transition can be daunting for many instructors, especially if they are used to teaching face-to-face classes. Online classes bring its own unique challenges including ensuring student are fully engaged as well as understanding the material. In addition, students must be self-regulated in their learning to keep up the pace of an online class. On the flip side, online classes can be very rewarding and beneficial to the students. For example, it can be very accommodating to the students schedule, especially if they are working full time and cannot make the time of class meetings. In addition, online classes can help student and instructors keep up the latest technology.

As an online instructor, as shared in this chapter, it is critical to make meaningful connections with the students, especially during the time of a Pandemic when people tend to feel more isolated. As shared, making meaningful connections can be created through the use of continuous communication, approachability and creating an inclusive environment in which the students feel welcomed.

In addition, instructors need to ensure their online students are engaged in their class. Being present and encouraging interaction between students is crucial to this process. Instructors should incorporate activities that build cohesiveness and active participation including group projects, interactive discussion boards and discussion (if meeting synchronous).

Also, instructors need to adopt self-care strategies, especially during this time of uncertainty and change. Instructors can tend to put themselves last and ensure everyone else is taken care of putting everyone else's needs before themselves. This can lead to burnout and added stress putting themselves at risk for sickness and loss of productivity. The added use of technology applications such as Zoom can contribute to fatigue if individuals do not incorporate required breaks.

We hope that our ideas and strategies inspire instructors as they transition their teaching to an online environment. As shared, migrating to an online environment can be daunting but can also be very beneficial to students pursuing their degree. In addition, especially with the Pandemic, the popularity of online classes has increased and will probably continue to do so as people across the globe balance life and new opportunities due to the accommodating nature of online classes. In addition, some individuals, especially those with weakened immune systems, might prefer online classes minimizing exposure

to illnesses including the Corona virus. In addition, for some instructors once they are transitioned to online classes, may actually prefer to teach online. Below we are so summarized a few quick tips that we hope you find beneficial.

Additional Quick Tips From Experienced Online Instructors

Use Sandboxes To Experiment

One benefit that we have discovered in teaching online is that we can transfer our course materials to the next semester and make modifications when needed. It saves a lot of time and energy providing us to allocate our time to other endeavors including research. In addition, we have been able to help other instructors who might be new to teaching the course and provide them with resources they can use in their course. Another tip that has helped us is to create a “sandbox” which is a class you can build and adapt. Then when your course is ready, you can transfer the material in the sandbox into your actual course. You will always have access to this sandbox and try out features prior to using it in your course. In addition, we might find a great article or resource and we can add it to our sandbox for future use in a course.

Attend Professional Development Trainings

Take advantage of trainings that your institution provides in online teaching. You will learn a lot from the training and the instructors, but you will also be able to learn from others taking the course including what has worked in their courses. In addition, we have learned so much from our colleagues. One of the authors is in a book club in which they also share effective teaching strategies. She has learned so much from her colleagues on how to incorporate technology applications with ease that will engage students.

Give Yourself Grace

If this is your first time teaching online or maybe you are teaching a new course, yourself grace and understand that you are learning what works best for your online class. Some instructors do regular check-ins with students in which they provide feedback on what is working best and what needs improvement. As instructors, we are always making improvements as well as adjustments to our classes and this is part of what good teaching is that will benefit our students.

Be Consistent With Deadlines

One strategy that has helped us is to assign certain days for opening up modules and due dates for assignments. For example, one of the authors shares that she would open up the modules on Mondays and assignments were due on the following Sundays. One feature that many platforms have is the ability to set ahead of time when modules are open. So if it was a course that I already created, I would set the dates ahead of time when Blackboard would make it available for the students. This would be the same for assignments.

Stay Up To Date With Technology

Try and keep up with the latest technology applications. You can use a sandbox to try and experiment with new technologies. For example, one summer, we used Flipgrid as an interactive discussion board. Students really enjoyed this as an alternative and it was an application that they could personalize.

Communicate, Communicate, Communicate

We can emphasize this enough in teaching online. We try and touch base with our students at least twice a week even if it is to touch base with them. Also, it is a great idea to send them a detailed schedule at the beginning of the semester with all the dates for modules and assignments. We share with them that the schedule is tentative and is scheduled to change but students truly appreciate this outline to help them plan for the semester.

Again, we hope that our chapter has inspired and helped instructors as they make the transition to teaching online. With anything, it takes a little patience, time, experience and flexibility. As one continues to teach online, he or she will learn what works for him or her and what also works for students. It can be a little trial and error on part of the instructor, but effective teachers continuously hone their craft to maximize learning for their students.

Table 1. Examples of Using Formative Assessments

Examples	Specific Example	What does it assess?
Student Reflections	The students write a narrative on specific themes from <i>The Great Gatsby</i> . For example, how does social class impact one's life?	Students' understanding of the major themes of the text.
10 Item Quiz	10 question exam based on factual information regarding the assigned reading. This could be multiple choice, true/false, essay or a combination.	Students understanding and comprehension of their reading.
Interactive Discussion Boards	The instructor posts a question. The student responds and responds to others' response. It is important for instructors to also respond to others' post to help students ensure understanding and it also shows the teachers' attentiveness toward the course and content. For example, the instructor might post "Can Jay Gatsby truly blend in the crowd of those from old money? Why or why not?". Then students respond and respond to each other creating an interactive discussion.	Students' understanding of the major themes of the text.
Mini-Projects	Living during in America in the 1920's-In this project students research economic, political social aspects of this time period in the America.	Students' understanding of historical timepoint critical to the text.
Character Portraits	Choose a character from <i>The Great Gatsby</i> . Describe their characteristics and how they interact with other characters in the book.	Students' understanding of the major characters of the text.

Table 2. Referenced Technology Applications

Name of Technology Application	Website	Function
Flipgrid	https://info.flipgrid.com	Interactive Discussion Board
SWIVL	https://www.swivl.com	Robotic Device
Socrative	https://www.socrative.com/	Assessment Tool
Pear Deck	https://www.peardeck.com/googleslides	Engaging Resource for Google slides
Quizlet	https://quizlet.com	Helps reinforce skills for students
Kahoot	https://kahoot.com	Assessment Tool
Edpuzzle	https://edpuzzle.com	Edit and track videos for students
Jamboard	https://edu.google.com/products/jamboard/	Collaboration tool
Padlet	https://padlet.com	Virtual wall (like virtual sticky notes)
Zoom	https://zoom.us	Platform for virtual meetings

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A PERFECT MARRIAGE FOR THE “MILLENNIALS” IN HIGHER EDUCATION: COVID-19 AND BLENDED LEARNING

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Introduction

Since March 11, 2020, when the World Health Organization declared the novel coronavirus (SARS-CoV-2/COVID-19) as a global pandemic (WHO, 2020), there has been a dramatic flip in the education system worldwide. Social distancing norms, which is identified as one of the most effective measures to keep the virus at bay led to a disruption in the status quo of education (Darras, et al., 2021). The COVID-19 lockdown meant that instructors and their students were prevented from meeting physically at lecture halls for learning and examination purposes. The overwhelming impact of the COVID-19 on global education led to a paradigm shift in teaching and learning. Most HEIs around the globe migrated from the traditional face-to-face (F2F) learning to online learning to prevent putting the education of their millennial (individuals born between 1980 and 2000) students at risk. Both instructors and students who were not accustomed to this mode of learning had to adapt to ensure progressive education. Aside the threat of the COVID-19 on health and education, its spillover effect on the economy of many countries meant that funds were not readily available to continue the optimal functioning of HEIs (Bhagat & Kim, 2020; Tan, 2021).

As a result, HEIs in many developing countries such as India, Pakistan, Ghana, Nigeria, just to mention a few, had peculiar challenges with the online learning modality of instruction. Findings from prior studies revealed that millennial students in HEIs in these countries have lamented on their plight in accessing and effectively engaging in learning on the online learning platform. (Adarkwah, 2021a; Adarkwah, 2021b; Adarkwah, 2020c; Adnan & Anwar, 2020; Muthuprasad, Aiswarya, & Aditya, 2021). To this end, many HEIs institutions in some of these developing countries are being forced to resume F2F instruction temporarily (Adarkwah, 2021a). In this chapter, blended learning is positioned as a “game-changer” for millennial students in HEIs in a developing countries’ context because of its affordance of adhering to the COVID-19 social distancing protocols, its cost-effective nature as opposed to online learn-

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ing, propensity to engage millennials who are rapidly exposed to 21st-century technology in both virtual and physical classes. It is significant to explore alternative solutions to the disruption in education. There are few studies that investigate solutions to this problem and reveal how blended learning can contribute to the advancement of lifelong education for millennial students in HEIs in this pandemic era. The interest in blended learning among practitioners and researchers has remained high despite the theoretical development, and debate on it peaked over a decade ago (Hrastinsk, 2019). A research on blended learning can position it as a panacea and cornerstone of education delivery in HEIs in developing countries that are still feeling the impact of the dreadful COVID-19 virus.

The chapter examines how blended learning can meet the academic needs of millennial students in HEIs in this pandemic era, using a developing countries' context as a case study. Specifically, the chapter asks the following research questions;

1. what is the significance of blended learning in this pandemic era?
2. how can blended learning be diffused/integrated in higher education (HE)? and
3. what effective blended learning model is appropriate for HE?

The aforementioned research questions are of keen interest to policymakers, educators, teachers, and students as many HEIs across the globe, especially those low and middle income are contemplating on developing a partial or fully online course, on temporarily resuming onsite instruction for students.

Blended Learning

The definition of blended learning is quite debatable (Darras, et al., 2021). Amir, et al. (2020, p.2) defines blended learning as “the integration of classroom and distance learning to facilitate an independent, interactive and collaborative learning among students”. Bazelaïs & Doleck (2018, p. 2891) also defines it as the “combination of face-to-face (FTF) instruction with the delivery of online video instructions without reducing FTF meetings or physical classroom contact hours”. Hrastinsk (2019) mentioned that the multifaceted nature of blending learning represents its untapped potential. Generally, it refers to a partial online course or a combination of both online and traditional F2F learning (Hamdan, Al-Bashaireh, Zahran, Al-Daghestani, & AL-Habashneh, 2021). Blended learning, therefore, supplements F2F learning by providing opportunities for aspects of the learning to progress through the aid of online tools (Natour & Woo, 2021). The popularity of blended learning in HE results from its ability to facilitate teaching and learning by complementing the strengths and weaknesses of both F2F instruction and online learning (Kim, Bonk, & Teng, 2009). Blended learning increases access to learning content, is affordable, and can also improve pedagogy (Natour & Woo, 2021). The authors argue that compared to the traditional classroom mode of instruction, blended learning is more efficient and effective. An effective blended learning

method provides clarity on online content with explicit links with traditional F2F classes (Gustafsson, 2020). The learning potential of students can be enhanced through blending learning by allowing students to learn at anytime and anywhere (Dhawan, 2020). Blended learning is advantageous in the sense that it learners can self-study using online materials, learners can make contact with teachers or peers outside F2F instruction hours, teachers are able to effectively control F2F classroom discussions, and teachers are able to enhance learning content by the aid of internet facilities (Ariawan & Stipak, 2020). Blended learning results in greater learner motivation, satisfaction, engagement, and performance (Amir, et al., 2020). When tactfully implemented, blended learning can preserve and also enhance the traditional values of HE (Rapanta, Botturi, Goodyear, Guàrdia, & Koole, 2020). In some contexts, blended learning can be adopted to address the pervasive dissatisfaction of students regarding online learning, especially when there is a lack of social interaction and a sense of community in a class (Kim, Bonk, & Teng, 2009). Darras, et al. (2021) believes that blended learning can be a solution to the disruption in teaching and learning as a result of the COVID-19 pandemic.

Millennials rapid use of technology

The millennial generation (individuals born between 1980 and 2000) is believed to be the most of today's learners (Al-Ahmari, et al., 2021; Roberts, Newman, & Schwartzstein, 2012). Millennials are also referred to as "digital natives", "trophy kids", "Generation Y", and "instant messaging generation" (Desy, Reed, & Wolanskyj, 2017), and have distinct traits unique to this digital age (Harvey, Parahoo, & Santally, 2017). They have grown up in an environment of unlimited information and have an aptitude for self-regulated and web-based learning, media literacy, and are opened to customization of their learning (Hopkins, et al., 2018). The manner in which millennials interact with technology is incomparable to any other generation, and this has had an influence on how they want to be instructed in HEIs (Au-Yong-Oliveira, Gonçalves, Martins, & Branco, 2018). Millennials expect technological integration in education and are enthusiastic about using social media for educational purposes (Desy et al., 2017). Millennials feel comfortable with internet and technology (Al-Ahmari, et al., 2021). The millennial generation of students is well-equipped with excellent technological skills (Ali, et al., 2021), which can facilitate the adoption of blended learning in HEIs struggling with full online classes because of the halt in the F2F learning (Adarkwah, 2020c). Ali et al. (2021) stated that the technological skills of millennial students can aid them to attend online lectures, access learning resources, engage in online examinations, and participate in the overall online learning experience. Millennials have access to technology at home in diverse parts of the world, including Africa, which has seen a rise in the advancement of technology (Au-Yong-Oliveira et al., 2018). Hence, neglecting the opportunity to use technology to instruct millennial students in this COVID-19 crisis is unadvisable. According to the

authors, lecturers compete for the attention of students with the usage of social media applications such as Facebook, WhatsApp, Snapchat, Twitter, Instagram, and different online platforms, making it necessary to entice them to utilize the same digital tools for academic discussions. Online learning is much appreciated by millennials (Amemado, 2021). Millennials are strongly inspired to achieve, technologically advanced, and are apt to accept change (Desy et al., 2017). Thus, the rapid usage of technology by millennials and the ability to adapt to change makes it essential and easier for integrating blended learning in HEIs struggling with full online classes in this pandemic era. It is noteworthy to mention that in a blended mode of learning (whether online or F2F instruction), millennials demand collaborative learning environments and more social interactions (Harvey et al., 2017). Hopkins et al. (2018) add that the learning preferences of millennials include interactive group activities, simulation, game-style presentations, and workshops.

Method

Study Design

The scoping review was done to summarise and synthesize prior studies on blended learning and how it can be adopted in this COVID-19 era to ensure the education of millennial students in HEIs in a developing country's context is not in jeopardy. Scoping reviews are performed to examine the extent, range, and nature of research activity, to determine the value of undertaking a full systematic review, to identify research gaps in extant literature, and to provide a summary and disseminate research findings (Arksey & O'Malley, 2005). In the chapter, the reason for conducting the scoping review was because of the latter. Scoping review approach was employed because they are more transparent, reproducible, systematic, and structured than traditional literature reviews (Munn, et al., 2018). The methodological framework of Arksey & O'Malley (2005) was therefore adopted to map out relevant literature for the summary and synthesis.

Search strategy

A computerized search of online databases and depositories (Springer, Taylor and Francis, ERIC, PubMed, Emerald Reach, Elsevier, Wiley, SAGE, and Google Scholar) was conducted for recent and relevant studies on blended learning. The search was undertaken from April 2020 to May 2020. The specific keywords used to perform the search include; "blended learning", "blended learning and COVID-19", "blended learning model", "blended learning integration", "blended learning implementation", "blended learning framework", and "blended learning in higher education". Based on the recommendation of Peters et al. (2015) for scoping review, snowballing sampling technique was used to scan the reference lists of some of the obtained literature for relevant publications on blended learning. The number of potential literature that was obtained after the search was 54.

Inclusion and Exclusion Criteria

The potential papers obtained (n=54) were assessed for inclusion or exclusion based on a set criterion; the paper had to related to higher education, the paper had to be peer-reviewed, it had to be accessible in English, only full-text literature, and had to be published after 2019. All dissertations, case reports, and unpublished studies were recorded. The publication year for included literature, 2020, was used because it was during this time that most universities across the globe, especially in developing countries, experimented on online and blended learning because of the disruption in education caused by the COVID-19 pandemic. Although not essential for scoping reviews, studies included or excluded were judged based on a standard criterion (Kmet, Cook, & Lee, 2004). Examples of studies that were excluded included those that failed to draw a clear distinction between online learning and blended learning, those that focused more on distance education other than blended learning. The included literature (n=13) was made up of literature reviews (n = 4), quantitative studies (n = 3), qualitative (n = 1), and mixed-methods (n = 5).

Extraction of Data

The studies that met the inclusion criteria were further assessed to remove duplicate and overlapping articles. An initial scan of the title of all the studies was done, and each abstract was reviewed to make the judgement. Data were extracted from the selected studies and documented on a spreadsheet according to; author(s), method, respondents, country, and findings.

Literature Analysis

Coding of extracted data focused on the significance of blended learning in the current COVID-19 pandemic era, integrating blended learning in HE and identifying an effective blended learning model for HE post-pandemic. These themes were developed independently by the author based on the research questions, which were underpinned by prior literature. The extracted data and themes were further assessed by two researchers whose expertise is in digitization in education to ensure consistency in the data coding process (Arksey & O'Malley, 2005). The data were derived from varied contexts and participants comprised of academics; students, teachers, and administrators.

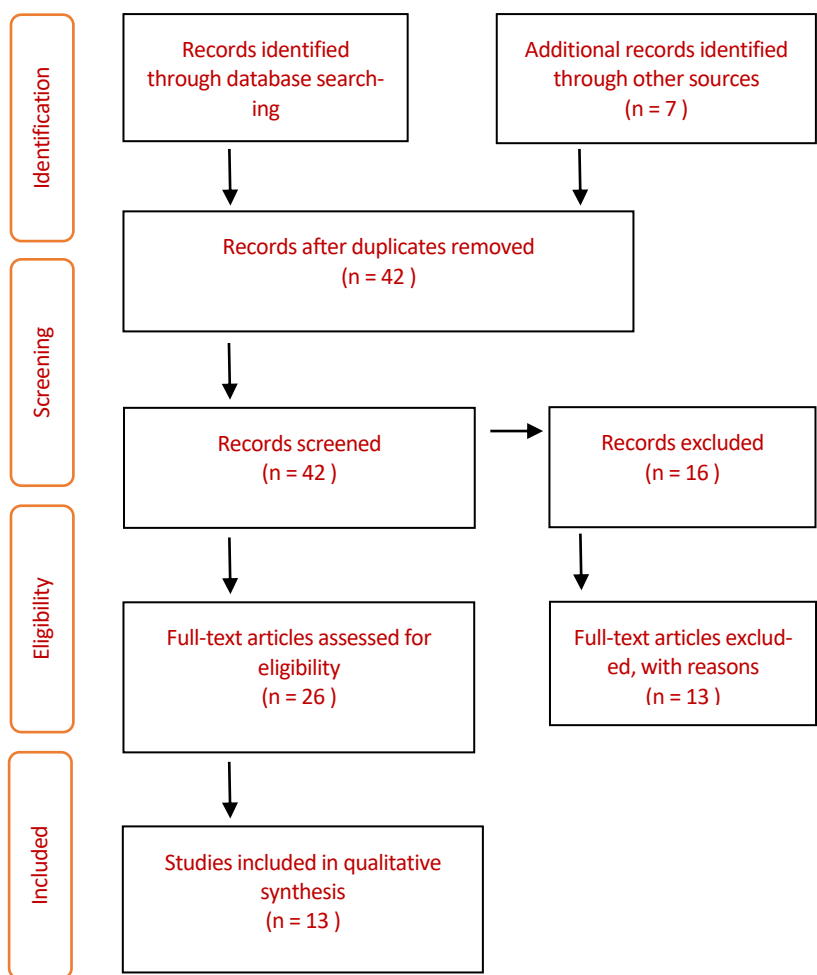


Figure 5 PRISMA flow chart outlining the literature search and selection

Findings

The results obtained from the analysis are discussed in the next section. They are presented based on the themes of the chapter, which emanates from the three research questions.

Significance of Blended Learning in This Pandemic Era

Estimating the time when normal activities will resume in society with education inclusive is an unpredictable problem (Gupta, 2021). Considering the challenges in online education in this post-pandemic period, as highlighted in his research, Gupta advocates for the adoption of blended learning in HE. The author mentions that blended learning is a value-added activity for students and their employers, provide practical learning to students and also bridge the perceptual differences regarding online learning. Giovannella (2020) studied the effect of the transition of educational processes from physical to fully virtual in an Italian university on students and found that a significant part of the students was ready for novel educational processes which are largely grounded on blended learning activities. When students were asked about their preference of instruction for future educational processes, only 32% reported that they prefer F2F instruction, students who preferred a fully online course were 12%, while a large majority of the students, 56%, indicated they prefer a blended type of learning. The study concluded that in the future, blended learning should be advocated in HE in Italy. In another study that explored distance e-learning among medical students in Jordanian universities to identify possible challenges, satisfaction, limitations, and perspectives on this mode of learning, revealed that 406 out of 652 students representing 75%, preferred a blended mode of learning in the future (Al-Balas, et al., 2020). According to the participants, blended learning will be the most suitable approach to instruction for future medical training. This is because only the distance form of education proved to be a barrier to the acquisition of clinical medical skills. A study conducted in a HE in India found that students preferred blended learning in the pre-pandemic period than web-assisted learning in the post-pandemic period (Sharma & Alvi, 2021). The author states that learning will not be effective in this COVID-19 era if instructors focus on only web-assisted learning, and advocate for the improvement of education quality, such as the use of blended learning. In their scoping review, which included five (5) studies on students' experiences with blending learning amid the COVID-19, Jowsey et al. (2020) reported that blended learning could have a positive impact on the academic achievements of students when properly delivered. Colpitts, Usick, & Eaton (2020) found that doctoral students who participated in blended learning before and after the COVID-19 had the opportunity for in-group bonding, and are more likely to be satisfied than those who complete their course fully online. In Poland, students (more than 90% of the partici-

pants) were satisfied with a blended model of teaching implemented during the pandemic and would like to continue it in the post-pandemic period (Nijakowski, Lehmann, Zdrojewski, Nowak, & Surdacka, 2021). In a comparative study of Pakistan and Indonesia concerning online teaching benefits and challenges in the COVID-19 pandemic, teachers expressed success and hope in the online instruction but opined that it should be blended learning (Thaheem & Abidin, 2021). To ensure that there is “no one left behind” in this COVID-19 era, blended learning needs to be incorporated in HEIs in Vietnam and beyond after the pandemic has subsided (Pham & Ho, 2020).

Integrating Blended Learning in HE in This COVID-19 Pandemic Era

Chowdhury (2020) opines that any sort of innovation in education will result in higher productivity, efficiency, and enhancement of educational quality, but a successful implementation of an innovation in education requires the participation of all school stakeholders (parents, students, teachers, academic administrators, researchers, and policymakers). The author state that it is a misconception to believe that any form of technology can be used to teach any educational content. Educators are required to develop blended learning in which the most appropriate medium of technology can be used to match every type of learning content. In integrating blended learning in HE, Chowdhury calls for the application of three basic steps; 1. Clear learning outcomes that set an appropriate assessment technique should be selected 2. Learning outcomes and assessment techniques should be matched to appropriate teaching technological aids by utilizing Bloom’s Digital Taxonomy of Learning (fitting learning into three domains; cognitive, affective, and psychomotor). Chowdhury believes that a successful integration of blended learning in HE will lead to better learning outcomes, greater access, and an upgraded and better quality education.

Anthony et al. (2020) recommend the integration of blended learning in HE because it possesses both the advantages of traditional F2F and online learning. The authors mention that blended learning practices that need to be implemented in HE comprise F2F activities, activities, information, resources, assessment, and feedback for millennial students and technology, pedagogy, content, and knowledge for lecturers. Specifically, it was found that blended learning practices for a successful delivery involve 80% of online learning (this includes activities, information, resources, assessment and feedback), which is supplemented by 20% of classroom instruction (F2F) which is in alignment with the online teaching content. According to the authors, integration of blended learning requires a decrease in F2F instruction hours and an increase in online learning hours. Additionally, the integration should be based on the Technology, Pedagogy, and Content Knowledge framework (TPACK), which enables lecturers to integrate technology in their current teaching. Other variables identified as things to be considered during the integration is the availa-

bility of internet, the self-efficacy of users, communication techniques to be used as a way of providing feedback, the satisfaction of students, how enjoyable the blended learning experience will be, teaching effectiveness, performance expectancy, and student evaluation.

Blended learning integration in HE also requires instructors to focus on students' engagement and satisfaction (Lane, Hoang, Leighton, & Rissanen, 2021). In their study that focused on students' experiences in blended learning, Lane et al. observed that emotionally engaging students predict their satisfaction and success in blended courses. They advocated that lecturers should maintain personal connection with their students, utilize collaborative active learning techniques, and also put emphasis on aligning learning activities with learning goals. Instructional materials should be carefully selected, online instructional videos should also be discussed during F2F meetings with students. Respondents in the study emphasize the need of having a strong online instructor presence. A successful blended learning course requires both cognitive and emotional/social presence.

Effective blended learning model for HE in this COVID-19 pandemic era

In searching for a blended learning model of HEIs with a focus on low and middle-income contexts, a proposed model tested in a developing country, Ghana, was used. The model was developed by Antwi-Boampong (2020) using a university in Ghana through extensive review and interviews.

Rather than adopting frequently used models such as Technology Adoption model (TAM), Theory of Action, and Unified Theory of Acceptance and Use of Technology (UTAUT) model, Antwi-Boampong believes it is more relevant to develop a model or a theory based on the experiences and perceptions of faculty teaching in blended learning mode in a university. The frequently used models are often difficult to replicate or to tie down because of the environmental context in which they were developed. The faculty blended learning adoption model (FBLAM) proposes that some factors influence the adoption of blended learning; 1. influence of technology 2. students' dispositions to blended learning 3. pedagogy fitness, and 4. institutional readiness. These four key constructs were found to motivate faculty to adopt blended learning. According to the model, the adoption of blended learning can be understood via the lens of motivational theories of hygiene, and also faculty construction and definition of competing internal and external environmental priorities. The FBLAM reveals that there is a need for a positive stimulation of motivational factors to yield a positive confirmation by faculty for the blended learning adoption. As a result, management of HEIs should ensure there is adequate provision of resources, institutional support mechanisms, infrastructure, and an alignment of learning management systems with compatible pedagogic materials that facilitates learning to encourage effective and efficient instruc-

tion delivery. All the four (4) key factors were found to be interlinked and contributed to how blended learning activities were internalized by the faculty. Firstly, administrators of HEIs should assess their readiness in relation to policy frameworks and implementation strategies that aligns with and is developed in consultation with faculty who are key stakeholders in driving the blended learning process. Secondly, the ability of faculty to use technology should be assessed and offered training where there are shortfalls to promote their familiarity with computer programs and other forms of technology needed for instruction. Thirdly, there should be institutional support mechanisms such as the provision of technical support in learning management systems, computer components, and instructional technologists to assist the faculty in aligning teaching content for them to achieve pedagogic fitness. Lastly, the convenience of students should be considered by giving lab sessions to faculty on how to stimulate a positive disposition of students towards blended learning.

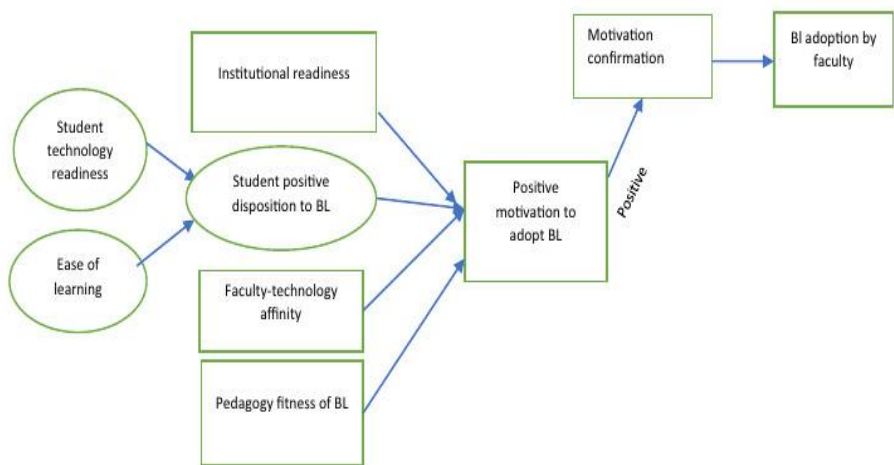


Figure 2 FBLAM developed by Antwi-Boampong (2020)

Table 1 *Synthesis table of included studies*

Category	No.	Author(s)	Method	Respondents	Country	Findings
Significance of blended	1.	Al-Balas et al. (2020)	Quantitative (survey)	Students	Jordan	75% of the participants preferred blending learning for the future because of its practicality.
	2.	Colpitts, Usick, & Eaton (2020)	Mixed-methods	Administrator and teacher	Canada and Japan	Those who participate in blended learning have more opportunities for in-group bonding than those who in online classes.
	3.	Giovannel-la (2020)	Qualitative (interviews)	Students	Italy	56% of respondents (students) preferred blended learning to only F2F/online learning.
	4.	Jowsey et al. (2020)	Scoping review	N/A	N/A	Blended learning can lead to better academic outcomes of students.

Table 1 Continued

Category	No.	Author(s)	Method	Respondents	Country	Findings
	5.	Gupta (2021)	Literature review (commentary)	N/A	N/A	Blended learning provides practical learning and is a value-added activity for students and their employers.
	6.	Nijakowski et al. (2021)	Quantitative (Survey)	Students	Poland	90% of students who engaged in blended learning were satisfied and would like to continue after the pandemic.
	7.	Pham & Ho (2020)	Literature review (commentary)	N/A	Vietnam	Blended learning ensures that no one is left behind.
	8.	Sharma & Alvi (2021)	Quantitative	Students	India	Students enjoyed blended learning in the pandemic period than web-assisted learning.
	9.	Thaheem & Abidin (2021)	Mixed-methods	Teachers	Pakistan & India	There is hope in online learning but blended learning is preferable.
	10.	Anthony, et al. (2020)	Theoretical and Systematic review	N/A	N/A	In integrating blended learning 80% of activities should be online and 20% should be F2F.
	11.	Chowdhury (2020)	Mixed-methods	Academics	Bangladesh	Blended learning integration would be successful when it is accepted by all key stakeholders in HE.
	12.	Lane et al. (2021)	Mixed-methods		Canada	Integration should focus on student engagement and satisfaction

Table 1 Continued

Category	No.	Author(s)	Method	Respondents	Country	Findings
Effective model for blended learning	13.	Antwi-Bo-among (2020)	Mixed-methods	Faculty members	Ghana	Four indicators to focus on in blended learning are; faculty technology affinity, pedagogy fitness, institutional readiness, student dispositions towards blended learning.

Discussion

In this chapter, a literature search was conducted on how blended learning can be used to address the academic needs of millennials in HEIs, especially those from developing countries. First and foremost, during the early days of the COVID-19 pandemic, HEIs across the world which adopted blending learning found it to be very efficient and effective in instructional delivery as well as student engagement (Al-Balas, et al., 2020; Colpitts et al., 2020; Giovannella, 2020; Jowsey et al., 2020; Nijakowski et al., 2021; Pham & Ho, 2020; Sharma & Alvi, 2021; Thaheem & Abidin, 2021). Since millennial students place much value on accessing and sharing educational materials (Hopkins, et al., 2018) and enjoy teamwork and collaboration (Desy et al., 2017), blended learning will be able to meet their needs due to its dual advantage; giving students access to internet to surf for learning materials and watch videos, and at the same time giving them physical meetings which are practical as a means to enhance their skills. In developing countries like Ghana, where a multi-year-track system has been adopted because of limited physical space, introducing blended learning can solve the challenge. Millennial students can largely complete their curriculum through online instruction and briefly supplement the online classes with F2F instruction. In this way, learning can continue amid the COVID-19 pandemic because students would spend little time on school premises and more on online activities. Unlike the fully online learning, the cost-effective nature is more suitable for a developing country's context (Adarkwah, 2020c). HEIs and the government can save money to focus on other projects when blended learning is integrated.

In integrating blended learning, there should be effective communication and participation of all the stakeholders (parents, students, teachers, and administrators) in HE. Since the online aspect of blended learning thrives on ICT resources, school leaders of HEIs should ensure there are adequate technological resources to advance the course of the blended learning. While introducing

the online aspect of the blended learning, a user-need analysis should be performed to enhance the digital literacy of instructors and their students (Adarkwah, 2020c). This is to say that, HEIs which plans to adopt the online learning should themselves be ready, have technological resources and infuse it into the teaching and learning process adequately, have instructional technology expert to guide teachers in their delivery to achieve pedagogy fitness, and also focus on how to meet students' needs such as engaging them effectively and satisfying their needs (Antwi-Boampong, 2020) (Lane et al., 2021). The model by Antwi-Boampong was found to be suitable to many contexts, specifically for HEIs in low and middle-income economies. This is because the model advocates implementing blending learning through the lens of motivational theories of hygiene. The proposed model advocates for the need to address both the intrinsic and extrinsic needs of users.

However, there is no "one size fits all" approach to blended learning integration/implementation (Su, 2019). HEIs should aim to contextualized blended learning which is of interest to the student body. A brief research (through surveys and interviews) can be conducted to identify concerns on incorporating the blended learning in HE. This will help administrators of HEIs on how to foster the acceptance of the blended learning (the online aspect) by both faculty and students, to successfully implement it. A successful blended learning is one that allows for personalized learning (Alamri, Watson, & Watson, 2021)

Conclusion

The ubiquitous nature of internet, the rapid usage of technology by millennial students, and the cost-effective nature of blended learning, makes it necessary for HEIs across the globe who are struggling with fully online courses to adopt blended learning in this COVID-19 era. According to Karma et al. (2021) blended learning is an educational innovation and solution in this COVID-19 pandemic era. Blended learning can compensate for the lack of limited interaction between students engaged in fully online courses, ensure students obtain direct and practical guidance from their instructors, and address other challenges with online learning in HEIs, specifically those in low and middle-income countries. The scoping review has highlighted the challenges faced by HEIs in many countries in their quest to transition from traditional F2F instruction to fully online instruction. It was found that one of the best alternative to the online learning is blended learning. In some of the studies revealed, participants (both students and teachers) were delighted with the online learning which enabled them to continue their education after the disruption caused by the COVID-19 lockdown. But they preferred blended learning and advocated for blending learning to be adopted in post-pandemic instruction. Throughout the chapter, blended learning has been positioned as a

“game-changer” to struggling HEIs to achieve SDG4. However, the review also indicated some factors to consider when integrating blended learning in HE. Overall, the integration is a collective effort of administrators, faculty staff, students, and parents. A great attention should also be paid to student satisfaction and engagement, which have been found to be crucial to the success of all forms of learning, with blended learning inclusive. The scoping review concludes with a blended model that is appropriate for a developing country’s context. Because this model is tested and has proven to be effective, it is believed its adoption will lead to the success of blended learning in HE. The chapter provides room for researchers to find more alternative ways to address the COVID-19’s big blow to global education. Alternatively, further studies can find more ways to make blended learning more suitable and successful in HEIs worldwide.

Review Limitations and Recommendations

The review was conducted using HEIs in different countries, however, the list is not exhaustive. Future studies should draw from a large set of empirical evidence from different continents/countries in the world. Because the focus of the chapter was on blended learning in this COVID-19 era, the publication date of included studies was set from 2020 where major studies about the pandemic and blended learning were published. This means that seminal and key articles that could have been beneficial were not included in the chapter. The review also focused more on students’ experiences/evidence involving student respondents. Future studies can draw findings from studies that used multiple sources of data to support its claims.

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LEARNING BY TEACHING – A RESOURCE ORIENTENTATED APPROACH TOWARDS MODERN INCLUSIVE EDUCATION.

Simon W. KOLBE*

Introduction

In education, we face several complex problems in the structural and personal dimension of schools, teachers, and classes. Both teachers and students are exposed to multifactorial circumstances and suffer from student's exclusion in many dimensions, for example due to their special educational needs, age, gender, religion, socio-economic situation, sexual or political orientation or ethnic origin (Chzhen et al., 2018; Deutsche UNESCO-Kommission e. V., 2010, 2018b; Jahreis, 2014; UNESCO, 2019a, 2019b). Inclusion is a global task to establish freedom of development, educational justice, and equal opportunities (Deutsche UNESCO-Kommission e. V., 2014a, 2014b). Rather, attention is paid to why people are disadvantaged and how these mechanisms can be avoided. It is therefore consistent to see and demand inclusion as a central focus in education policy as well as in the development of educational systems and methods (Deutsche UNESCO-Kommission e. V., 2018a). In this context, inclusion is to be recognized as a new paradigm that goes beyond the prohibition of discrimination and thus represents an imperative anchored in human rights for "*allowing and enabling equal belonging*" (Fritzsche, 2020, p. 308).

It is fairly certain that a variety of educational approaches can lead to successful inclusion and adequate skill development for all students. This article presents an option for developing successful learning in schools: the didactic approach "Learning by Teaching" (LbT – German: Lernen durch Lehren/LdL) according to Jean-Pol Martin (Kelchner & Martin, 1998; Martin, 2018). LbT is globally and interdisciplinary tested, mentioned, recommended, and implemented in several schools or educational institutions (Adamson et al., 2021; Maia & Tercete, 2017; Schuhladen, 2020) as well as in extracurricular programs (Kolbe, 2019a, 2019b) or at universities (Kolbe & Oberhauser, 2020; Oberhauser, 2020; Speth-Schuhmacher, 2019).

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In inclusive settings, teaching and learning processes can establish an active transfer of knowledge learning and skill development through participatory elements as LbT (Kolbe, 2019a, 2019b). Therefore, it is not surprising that LbT, as a constructivist approach, is, firstly, considered to be unaffected by the educational institution and, secondly, to counteract a so-called pseudo-participation in the classroom. Effects such as an increased control competence, additional social competencies and a sense of happiness can be observed (Molitor, 2019). In particular, the LbT-approach is also extremely democratic, flexible, and participatory. The concept invites all participants to act responsibly for themselves, their colleagues, and their environment. Based on human needs, asking necessary questions, problem-solving skills and peaceful cooperation and communication with others are practiced (Ruep, 2020b). This contribution will give a brief overview of the LbT approach in general and highlight its role in the focus of inclusive education and development of competencies as well as social skills and inclusive competencies (Kolbe, 2019a, 2019b).

Theoretical Origin, Historical Developments And REFERENCES

“When learners become teachers, i.e., when they take over the role of the teacher and change from being recipients to producers, various terms can be found for this teaching method: peer teaching, peer tutoring, reciprocal teaching as a kind of cooperative learning. This method of teaching can be called peer teaching, peer tutoring, reciprocal teaching, peer-assisted learning or learning by teaching (LbT).” (Thomä, 2016, p. 13, own translation).

The approach “LbT” (=Learning by Teaching) was originally developed by Prof. em. Dr. Jean-Pol Martin in the 1980’s and its German description is “Lernen durch Lehren”. In his action-oriented research, he first found that students in his classes of French-language learned and performed better when they started being teachers themselves. In the late 1980ies, Martin began to integrate his observations into educational discourses and concepts (Kelchner & Martin, 1998). The concept had been verified through practical applications during this period (Berger et al., 2011; Oebel, 2009a), theoretical consultations and application-oriented long-term studies, and has been continuously applied in teaching practice in various disciplines, and is still received worldwide today (Berger et al., 2011; Grzega & Schöner, 2008; Kelchner & Martin, 1998; Martin, 1994a, 1994b; Oebel, 2009a; Ruep, 2020b; Schuhladen, 2020).

The historical overview of selected publications suggests that LbT as a selective method, but better as a continuous learning-teaching approach, is successfully applied in practically all types of schools, subjects, and ages. Moreover, it is tested in out-of-school inclusive settings (Kolbe, 2019a, 2019b) and is part of modern university teaching (Iberer, 2011; Kolbe & Oberhauser, 2020; Oberhauser, 2020; Spannagel, 2011; Speth-Schuhmacher, 2019). While complex, comprehensive work is still developing the basic work in connection and

collaboration with Jean-Pol Martin (Kelchner & Martin, 1998; Martin, 1982, 1985, 1986, 1994a, 1994b), an almost confusing nomenclature in several publications is developing that deals with the specific application and usefulness of the approach in various teaching areas and topics (Berger et al., 2011; Grzega & Klüsener, 2013; Kelchner & Martin, 1998). International adaptations and field trials are also diverse and multidisciplinary. For example, reports on LbT in English and German classes can be found in Taiwan (Chang, 2009) or in German lessons in Japan (Oebel, 2009b; Weber & Yoshii, 2009). Later, the LbT approach appears in basic pedagogical works and handbooks (Martin, 2018, 2020a) and is often mentioned as a basis for other learning approaches as well as in widely different fields such as in robotic (Adamson et al., 2021), Economics (Tacke, 2011) or as an online project (Guttenberger & Grupe, 2011; Kratky & Schultheis, 2011). However, following the original LBT tradition, the majority of the publications focus on the acquisition of foreign languages or (foreign) language teaching (Berger et al., 2011; Cau, 2015; Graef, 1994; Martin, 2020a; Reichardt, 2012; Schelhaas, 2003; Thomä, 2016), in geography lessons (Rinschede & Siegmund, 2018) or even as a remarkable concept to teaching gifted students English (Thomä, 2016) as well as teaching gifted students in general (Friedl, 2017). Accordingly, it can be concluded that LbT can be applied as an action-oriented approach in all subjects and in every age group in which learners become not only teachers but also knowledge producers (Friedl, 2017). This comes very close to the term "prosumer" by Kreidenweis, who uses it to describe the current form of consumption in the digital age: Consumers are not only consumers, but also producers (Kreidenweis, 2019, p. 5). This parallel already points to the timeless compatibility of LbT in a global context, in the changing school day and regarding digitalization processes in learning and teaching.

The concept of LbT is differentiated between general didactic approaches and specific application in foreign language teaching (Kelchner & Martin, 1998). In addition to the specific connotation, the generalist perspective is very important for this issue. The basic principles of LbT are two essential needs of a person or, as LbT sees it, the student as an expert in learning and teaching: firstly, the immanent human desire to be able to *control* one's life and situations in life. And secondly, the human individual's state of willingness to open new fields of learning and the desire to acquire new knowledge, which is described as *exploratory* behaviour (Kelchner & Martin, 1998, pp. 211–212). In addition, another basic aspect emerges as a kind of motivational resource and objective using LbT: The so-called *flow-experience*, which Martin (2000) describes as a uniform flow feeling, in which a moment-over-moment increase in agency and awareness can be observed which ensures that acute action can be continued in a focused and oblivious manner without losing control over it

(Martin, 2000). The defined relationship of the LbT flow is based on the originally described flow effect of Csikszentmihalyi (Csikszentmihalyi, 1990), which describes the flow as an “*intense concentration and absorption in an activity with no psychic energy left over for distractions, a merging of awareness with action, a feeling of control, loss of self consciousness, and a contraction of the normal sense of time*” (Shernoff & Csikszentmihalyi, 2009, p. 132). Targeting this effect by using LbT might be more understandable when we see that the importance of the combined effects of high or low demands on learners and their competencies can predict different outcomes, with the “*flow feeling*” describing the optimal balance between these demands. To this end, Shernoff and Csikszentmihalyi (2009, p. 132) list the following states resulting from the combination of skills and challenges: *apathy* (low challenges and low skills); *relaxation* (high skills, low challenges); *anxiety* (high challenges, low skills); *flow* (high challenges, high skills). The intense importance of LbT and the flow model is particularly evident in the fact that the founders of the flow approach recognize a high level of student engagement as a relevant option for successful learning and teaching. The inclusion of learners in the classroom also plays a major role and alternative teaching and learning formats to conservative frontal teaching and a related role transformation of the teacher are the foundations for this (Shernoff & Csikszentmihalyi, 2009).

With regard to the possibility that students take on teaching functions, LbT is a model with a historical-pedagogical fundament. Seneca, for example, refers to the aspect of mutual learning in his philosophical compendium *Epistulae Morales ad Lucilius* in the 7th letter. He succinctly describes the relevance of learning by teaching: “[...] *cum his versare qui te meliorem facturi sunt, illos admitte quos tu potes facere meliores. Mutuo ista funt, et homines dum docent discunt.*” (Giebel, 2018, p. 38). This means approximately that people should learn from those who can do things better, but learner equality arises when people learn through teaching.

In addition, the Swiss philosopher and pedagogue Johann Heinrich Pestalozzi recognizes these potentials, joins this group, and concretizes these ideas in the sense of an application- and needs-oriented pedagogy. Pestalozzi not only focuses on the potentials of diversity (or inclusion), but also recognizes the autonomous teaching competence within a group. In the so-called “Stanser Letter” (approx. 1799) he writes to a friend: “*Just as the older and more capable sibling, under the eye of the mother, easily shows the smaller siblings everything he can do and feels happy and great when he thus takes the mother's place, so my children were happy to teach the others what they could. Their sense of honor awoke; and they learned doubly themselves by making others repeat what they repeated. In this way, I quickly had helpers and collaborators among my children. [...] Thus I formed helpers from the beginning. In a short time, I had assistants among my chil-*

dren who, in the abilities to teach the weaker ones what they were not yet able to teach, would have advanced with the institution and become more useful and versatile for the institution's current needs without ambiguity than employed teachers. I learned with them myself." (Pestalozzi & Klafki, 1973, p. 33 own translation). This section is remarkable because it deals with the heterogeneity of the common learners, defines diversity as a positive element for reciprocal knowledge transfer and describes feelings of happiness in the common acquisition of knowledge (=flow). Martin does not refer to Pestalozzi in his texts, but this source can prove the historical relevance of learning by teaching.

This becomes particularly clear as other sources analogize this interpretation and identify indications of positive valuing of diversity in the classroom, appreciation of all participants in the educational process and the resources of the children themselves as teachers and knowledge brokers (Wocken, 2014). Nevertheless, further historical reference points can be found by Gartner et al. (1971) with the approach "children teach children", in a report from Steinig (1985) about the mutual German lessons of pupils with migration experience or by Schiffler (1980), who assigned pupils small teaching tasks to loosen up the lessons. Much later, LbT is described as a form of cooperative learning arrangements at a central location, even if at this point in time a desideratum of rigorous scientific investigations with simultaneous intensive practical use and reporting and rather qualitative-casuistic assessment and efficiency tests is noted (Renkl, 1997, pp. 17–19).

In addition to these historical contexts, LbT refers to several theoretical approaches given in the theories of structural-realistic behaviourism, cognitive psychology, communication and interaction, action theory and second language acquisition. Accordingly, LbT fulfils the criteria of a method since a theoretical compendium is available as a basis. However, it should also be mentioned that the innovative aspect of LbT mainly consists in integrating and combining already known methods, approaches, and findings in a theoretical framework (Stelzer, 2009, p. 180). It is precisely this integral aspect and claim to motivate the autonomous acquisition of competencies and the inquisitiveness of the students in their world of life and interests and to find the didactic and methodical ways of learning and teaching in themselves that makes LbT future-proof and universally adaptable for every location and every institution where learning takes place. How LbT works in general is outlined in the next section (Martin, 2000, 2002a, 2002b).

The Effects of Lbt On Students, Teachers And Classes.

Abendroth-Timmer (2000) defines LbT as a holistic didactic principle with methodological diversity: "Learning by teaching is a teaching principle that aims to transfer some teaching functions to the learners. This is independent of the teaching method used in each case. In concrete terms, LbT is character-

ized by two aspects: the partial assumption of leadership in the classroom and the independent development of new subject matter by the learners as well as its presentation and practice with fellow learners.” (Abendroth-Timmer, 2000, p. 110, own translation). Referring to this explanation, it is obvious that students attending LbT-classes are teachers to their own peers and have general goals: Students are able to distinguish between important and unimportant information but choose the content they want to communicate to their classmates themselves. Differentiation and a didactic autonomy thus take place. Since the students themselves must negotiate and develop the content and the way in which the knowledge is conveyed, they learn to work cooperatively, to foster their communication skills, to engage in a level of meta-reflection about the content and to promote their exploratory behaviour. In LbT classes, students lead reading exercises autonomously, develop questions from textbooks, write their own questions, lead exercises from textbooks, introduce learning lessons independently, implement grammar lessons, expand the learning process by asking their own questions, introduce texts to each other, plan lessons in general and lead conversations freely (Kelchner & Martin, 1998). Using LbT, the learners not only present the learning material, but also continuously check during the presentation whether and how their explanations are understood. They develop the exercises themselves and/or take the prepared exercises from textbooks. In addition, they evaluate the learner's progress by means of a suitable test (Martin, 2000).

Martin (2002b, p. 8) describes various positive effects which can emerge from LbT-practice: While the teacher reduces his/her speaking time, the students overtake up to 80% of the talking time in class. Difficult information and materials are seen and discussed from the student's perspective. In this way, students gain an individual approach that is appropriate to their personal way of learning. In addition, as they work in different groups, students deal more intensively with the learning material, and it is easier for students to express a possible lack of understanding and ask for necessary explanations. While the teacher can identify gaps in understanding of the class or individual students faster, he/she has the time and opportunity to respond appropriately to them. In the end, social learning improves as students practice new roles and turn to each other more often (Martin, 2002a, 2002b). In this context, it should be noted that this particular type of education leads to polite, responsible, self-directed, socially interactive, motivated, and action-oriented learning (Martin, 1994a).

Given the effects, for example, Grzega and Schöner (2008) found that the beneficial elements of LbT could be applied to the skill development of LbT students. So, students of “*LdL [=LbT]-classes see the elements of this model as an effective and efficient way of acquiring expert knowledge and communicative compe-*

tencies, vital for highly interactive information and knowledge societies, such as working in a team, setting up and carrying out a project, gathering information in an efficient way, venturing into new domains and situations and explaining expert knowledge to laypersons.” (Grzega & Schöner, 2008, p. 173). But also Abendroth-Timmer (2000) sees positive impact on teachers and learners: *“Overall, the above-mentioned studies and field reports for LbT consistently report an increase in the level of engagement of the learners in their lessons, an increase in speaking time while at the same time reducing inhibitions due to automatic speaking and social integration, and better learning performance due to a more intensive examination of the topic.”* (Abendroth-Timmer, 2000, p. 118, own translation).

For Martin there are four relevant aspects that describe LbT as a future-oriented approach: First, the essential *basic human needs* as well as the focus and demands of *human rights*. Second, the basic prerequisites *of LbT* as *participatory competence* and *network sensitivity* (Martin, 1994b): The focus on the importance of human rights and the relevance of an approach that has its roots in basic human needs is discussed and developed in some sources of Martin (Martin, 2002a, 2002b, 2018). Finally it has been developed into a holistic concept that goes beyond actual learning and teaching and presents a pioneering initiative to the content of life or diverse didactic and pedagogical systems (school, social work, politics, etc.) that, regarding Maslow's needs, is a combination of these with the Universal Declaration of Human Rights (Martin, 2020b; Ruep, 2020a, 2020b). This approach is in line with traditional needs-oriented concepts and submits a holistic opportunity to align one's own pedagogical and social actions based on human needs *and* human rights. It thus complements the principle of learning by teaching with a fundamental and conceptually profound determinant for teaching and education, which also finds possible connections in social work (Kolbe, 2020). As a result, Martin developed a construct that is presented as "New Human Rights" and does not just meet with consensus (Fritzsche, 2020). This approach distinguishes 6 levels of needs to which human rights can be assigned. As a preamble, the target formulation "happiness" is chosen, which should result from the creation of specific structures for an increase in development for nature and in happiness for all participants. The six parent articles are (Martin, 2002a, 2009, 2018, 2020b):

- *Thinking* as a central basic human need in the form of information processing and conceptualization;
- *Health* as a general state of satisfaction of all physiological needs;
- *Security* in terms of social and economic aspects;
- *Social inclusion*, which occurs as inclusion and participation within a socially supportive environment;

- *Self-development and participation* to enable the unfolding of the potential of each person;
- *Meaning* as a holistic sense of life and individual action.

The second part, the *participatory competence*, and the *network sensitivity*, is based on a humanistic worldview and the subject as the focus of action. Martin subordinates all basic needs to the need for control in the interplay of antinomic categories of needs (e.g., rest and movement, individuality and sociality, simplicity, and complexity). The central condition for this, the so-called *participatory competence*, is described as a combination of characteristics that are subsumed under the term *network sensitivity*: These are both cognitive and emotionally perceived sensitivity to the interdependence and interconnectedness of the world and all of its constituents (people, regions, countries, continents). Regarding networking activities, *network sensitivity* is the ability to recognize other people's network wishes and to implement them fruitfully. It refers to both "real" social networks and virtual networks.

In this context, some insights and five skills that bring people together, real, or virtual, are named as goals and prerequisites for collective knowledge construction:

As Insights should firstly be known that individuals are carriers of resources, and secondly, an increase in the individual resource potential enhances one's own attractiveness in the group. With this foundation it is important to see communication as a capacity so that the resource potential can be optimized through communication. Communication occurs when one knows what the other does not know and communication and knowledge transfer increases one's own knowledge. The five skills required are gathered by Martin (Martin, 2009) as follows:

- The ability to recognize and tap into the potential of other group members and make it fruitful for the group.
- The ability to recognize and mobilize the willingness to act.
- The ability to initiate and maintain communication within a group.
- The ability to guide the transformation of information into knowledge within the group.
- Network sensitivity including the virtual world:
 - The ability to actively seek out external resources relevant to the group and to identify willingness to communicate.
 - The ability to initiate and maintain communication outside of the real world.

The Relevance of Lbt For Inclusive Education.

According to Werning (2014), inclusive education is described in various dimensions for its implementation and efficiency: The prerequisites are (1)

access to (school) education for everyone, (2) acceptance of differences, particularities, characteristics or support needs of all students, (3) optimization of real (extra-)school and (extra-)curricular social participation and involvement, (4) focus on performance improvement and optimization of the areas of development of personality and learning (Werning, 2014, p. 607).

As an essential prerequisite for inclusive education learning-teaching formats at eye level are shown to have high potentials, as joint thinking is meaningful both for the implementation of the content and for the joint design of teaching and learning materials: *„The content of our lessons, and the methods and materials we use, must reflect both the opening of the process and the breadth of experiences of those involved. To create and best use materials and practices we need to work together, drawing upon and reflecting upon each others skills, knowledge and experience.“* (Rix, 2005, pp. 138-139). Referring to these approaches, Allan (2005) recognizes the expert knowledge of children and young people in their own world of needs and life as a reliable resource so that students can not only learn from each other but should equally be integrated in the development of inclusive learning and teaching (Allan, 2005). In related "peer teaching" settings where students with similar social positions who are not professional teachers support each other in teaching and learning, positive effects on student and teacher learning outcomes can also be observed (Yu et al., 2011). Bartsch et al. (2020) thereby identify LbT as a basis for collaborative peer teaching concepts in vocational teacher education. They describe positive effects on student motivation and independence as well as on academic performance. Within that approach, four goals are pursued, which underpin the relevance of the LbT approach as well as technical adaptations: Firstly, they recognize an increasing motivation and transparency of the topic content. Secondly, they describe a rising implementation of deeper learning and a stronger permeation of the teaching content. As a third result, they mention an increasing independence in the context of lifelong learning that arises together, and fourthly, in an optimized promotion of interdisciplinary and subject-specific competencies (Bartsch et al., 2020).

In the first articles about LbT, Martin already points out future developments in education as well as social and technical conditions that make LbT still applicable today, which is quite relevant in times of social media, fake-news and a kind of digital overload: *“It can be assumed that people will have to act much more proactively and autonomously in the future than they do today. Being autonomous means that students will be less able to rely on external control from teachers and teaching materials [...]. In particular, they will have to learn to distinguish relevant from irrelevant content, to work on it independently and in cooperation with others; for this purpose, their communication skills will have to be expanded; and finally, they will have to learn that continuous reflection on individual and*

collective learning processes leads to their optimization." (Kelchner & Martin, 1998, p. 212, own translation).

The role of the teacher is no less important for this, as it is on the one hand his job to provide the students with the information corresponding to the curriculum for the acquisition of knowledge and on the other hand his competence is to equip the students with the necessary competencies for the didactic and interactive implementation of the lessons. In addition, the teacher's function is a regulating and protective one: In an emergency, the teacher ensures that all learners are integrated into the learning process and only intervenes in the case of grossly content-related or behavioural undesirable developments. He accompanies and supports the students in their self-developed learning at eye level. Since the students are given far more freedom and time to develop and implement the teaching setting together, and thus there are often periods of group and partner work, the teacher can take care of students who need his or her special attention. So, the teacher is of course the last instance, but mainly a consultant, guide, helper and most importantly – also a learner (Kelchner & Martin, 1998; Martin, 1994a). Hence, it is inevitable that the teacher will provide students with continuous recommendations, new ideas and methodological hints to avoid monotony. Ultimately, this involves a didactic paradigm shift in which the teacher internalizes professional competencies himself in order to be able to intervene impulsively and, at the same time, learn to hold back. In the meantime, it is the teacher's task to create an atmosphere of calm and concentration on the learning utterances, to promote the exchange of ideas and to observe the communication of the learning community: In this way, didactic instruction turns into the construction of knowledge and the acquisition of skills (Martin & Oebel, 2007).

Werner (2005) can be mentioned regarding a necessary critique of LbT, as he describes some disadvantages within LbT, such as the long time required for the introduction of the special method, the higher amount of work for all participants, loss of learning effectiveness and of partial content, difficulties in implementation depending on the type of school and overstraining of the students, as they may lack meta-knowledge, learning competence and methodological knowledge. These aspects of the criticism are recognized and addressed by Martin, as well as the requirements for the teacher are clarified and it is made clear that LbT is not an approach that involves less work and preparation. Martin even assumes that the teacher has to deal more with the subject: This means that the more comprehensively the approach is applied (i.e., not just for partial lessons), the larger the classes, the more challenging the learning group and the more extensive and complex the subject, the more the teacher has to invest in the implementation of LbT (Martin, 2000).

This modern role and function of the teacher characterizes LbT as an approach to inclusive education. LbT can be seen as a resource-efficient approach and also addresses the global shortage of and need for teachers or other educators who could appear as a necessary professional in the (inclusive) classroom (UNESCO, 2019a). In addition to the lack of teachers, research shows that teachers and educators need to be better prepared for the effects and needs of inclusion and migration in their classes and that their positive attitudes towards inclusive schooling have not yet reached all teachers (Forsa, 2015; Marin, 2014). In view of these problems, it is remarkable that in LbT lessons time resources and opportunities for observation are created which make it possible to react far more appropriately to the students and their behaviour, their level of development, their competence development, and their socio-emotional needs than, for example, in conservative frontal teaching. The teacher is therefore there for the students and can thus be perceived as a partner for joint learning and not as a deficit-oriented controller. Hence the description of LbT as a "*method for the 21st century*" (Schuhladen, 2020) and as a "*preparation for life in information and knowledge societies*" (Grzega & Schöner, 2008, p. 170) is quite adequate. Whereby LbT should rather be defined as a need-orientated, overarching, alternating and reciprocal learning-teaching concept in connection with a certain pro-inclusive attitude and recognition of learners as experts in their learning and living environment, which can be adapted to all learning conditions. It can therefore be recommended that LbT could be one of the possible answers in teacher training for inclusive education.

Lbt As The (Partial) Future of Inclusive Education.

In the meta-analysis of the available sources shown in this article, it becomes clear that LbT is available both as a selective application repertoire for individual lessons and projects, but also as an integral approach to a year-round teaching concept. In order to implement LbT, Martin (2011) first recommends a resource-based focus on the student and recommends that each individual should recognize that she or he is a bearer of resources. Secondly, the learners should actively increase their own resource potential in order to increase their attractiveness in their learning group. The basis of this progress is the personal resource potential and works through communication. This communication occurs when one knows what the other is not doing at a given moment and through communication and knowledge sharing, which means that LbT increases one's knowledge while the knowledge of fellow learners increases at the same time. The focus is on the acquisition of skills. Therefore, each individual should develop and recognize the potential of group members, develop willingness to act, initiate and maintain communication processes, transform information into the group, acquire external resources and constantly implement communication (Martin, 2011).

The relevance and actuality of LbT as a methodical concept of inclusive education is indicated on the structural and contextual level: *“Thus, LbT is an integrative concept. What distinguishes LbT from other approaches is that all activities are designed with the goal of having students ‘teach’ their classmates the result of their own efforts. Thus, more than in the other approaches, the emphasis is placed on students engaging with the subject and, as experts, teaching elements of the material to other students. In this way, the free activities gain an obligatory, subject-related perspective that lends coherence to the whole. The entire lesson becomes a project.”* (Kelchner & Martin, 1998, p. 217, own translation).

In one of his first papers, *“Conditions for Socially Integrative Teaching”* (own translation), Martin (1982) describes the following conditions that are general applicable, even if they are exemplified in foreign language teaching: Transparency of the learning objectives (product) and consensus on them; transparency of the teaching method (process) and consensus about this; creation of spaces for self-determination; enabling authentic interactive discourse (Martin, 1982). These conditions should still be a current part of appropriate inclusive teaching today. Martin also says that teachers should take the methodical and theoretical approach seriously and prepare themselves well before using LbT. Therefore, teachers should be well trained on the one side and should find an appropriate learning environment and circumstances on the other side: *“LbT, which observers perceive as a very effective method for learning, often astounding in its results, needs very well-trained, motivated teachers and tolerable framework conditions. If we want a modern school, we must train our teachers in a modern way and provide them with modern working conditions.”* (Martin, 2002b, p. 9, own translation). In more recent works, Martin takes up his old visions of the future and sees himself confirmed with the LbT approach, again justifying its global and digital connectivity: *“Digitization and globalization have opened up new spaces. This is very beneficial, as competencies are quickly acquired on the basis of LbT, which are looking for new fields of expansion. Here it makes sense to define the Internet metaphorically as a macro brain and to recognize that people can enter into fast and stable interactions worldwide thanks to the new communication possibilities, just like billions of neurons in the brain. Just as thoughts arise in the brain due to neuron interactions, humans can enter the architecture of neural networks, conceptualize together and build knowledge.”* (Martin, 2018, pp. 354–355, own translation). Also, Schuhladen (2020) recognizes LbT as a *“sustainable and innovative concept for the design of school lessons, which fits the digital transformation”*, and therefore it is part of the school of the future (Schuhladen, 2020, p. 193, own translation).

With reference to Martin (1986), Rinschede and Siegmund (2018, p. 259) offer a flow chart for the implementation of LbT in school lessons. Although

this was originally conceived for geography lessons, the points of contact for LBT are symptomatic according to the universal possibility of adaptation:

- *Introduction of LBT:* In the introductory phase, the teacher explains the model and the concept with the learners and distributes work assignments that are temporarily feasible.
- *Autonomous lesson planning:* The students themselves already prepare the lessons. They take in the information, process it, and already store it: In doing so, they decide autonomously and consider which knowledge or learning content they want to impart to their fellow students. The place where this work is done is independent, it can take place in school or in private space. The teaching students save the results in a defined form. The teacher's task in this phase is only to answer questions and observe the process.
- *LBT -Teaching implementation:* Teaching students implement their planned knowledge transfer into reality. They are the teachers. The results are saved, and homework is given. The function of the teacher is still mainly a position of observation and the consultation of the teaching students about their intentions and their planned contents and mediation methods.
- *Performance Review:* The students and the teacher conduct a performance check.
- *Student Evaluation:* The students evaluate the process using anonymous questionnaires and provide feedback, suggestions for improvement and criticism of the use of LbT.

These individual steps appear to be simple and unplanned to implement at first. However, it should be noted that these points include the work and functions of the teacher, the heterogeneity of the learners and the knowledge to be taught. The more complexly these three levels interfere, the more work-intensive it becomes for everyone involved, but since the reports from students and teachers who experience and test LbT, as well as the above-mentioned contributions on alternative teaching approaches and the inclusive orientation of education, mainly report positive learning successes, the author is convinced that LbT will continue to have a stable place in education in the future and that it is an elementary component of inclusive developments and opportunities. In addition, today's education should no longer just be about grades and competition, but also about teaching life and everyday skills (StMUK, 2015; Weisen et al., 1994) as well as the delight of learning and living together for *everyone*, free from deficit-oriented and restrictive schooling. Today's learners are looking at a world full of volatility, uncertainty, complexity, and ambiguity (=VUCA). The approach of the so-called VUCA world is described by originally military terms and has been adapted in management, civil society, and eco-

conomic civil society as well as economic organizational development. VUCA describes global and subordinate organizational spontaneous developments (volatility) and the associated uncertainty, complexity and ambiguity for individuals, institutions, and societies (Lenz, 2019a, 2019b; Mack et al., 2016). LbT can be an answer to these questions in the context of inclusive education, as students and teachers can confidently and flexibly deal with the challenges and possibilities of their acute environment and technology.

Finally, the author can add the implicit condition that LbT as part of inclusive teaching can only take place under the condition of equity and recognition of diversity. Therefore, teachers need to promote skills for inclusive education (Fisher et al., 2016; Holzinger et al., 2019) as well as the students need to develop specific competencies to foster inclusion as a process. While the teacher's point of view is already in focus, the necessary competencies of students have not yet been analysed in this way. However, initial research results demonstrate the relevance and existence of so-called "inclusive competencies" whose theoretical conception is currently being tested empirically (Surzykiewicz & Kolbe, 2020). Based on the development of theoretical models, these skills can be seen as a sub-construct of social competencies: Inclusive competencies are emotional, social, intercultural, spiritual, and cognitive abilities, skills, knowledge, and action resources that enable students to perceive, create and experience inclusive processes. Inclusively competent children can recognize and articulate their own social and emotional needs and those of others: Students use their own abilities and skills to experience equitable participation in different settings and to give or receive assistance to/from others in accessing these. Inclusive competence is based on the factor's perception, cognition, knowledge of disadvantage and exclusion as well as the pursuit of solution options in the form of implementation of inclusive processes (Kolbe, 2021).

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DIGITAL SKILLS FOR PEOPLE WITH DISABILITIES - A CONCEPT FOR A PRACTICE-ORIENTED, BLENDED ONLINE AND FACE-TO-FACE TRAINING FOR PROFESSIONALS WORKING ON DIGITAL INCLUSION IN DISABILITY WORK

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Introduction

"The Covid 19 pandemic has made the importance of digitalization particularly clear. It is therefore important that all people can use the possibilities of the new methods and techniques - even if they are mentally or physically limited." (Leibniz-Institut für Bildungsforschung und Bildungsinformation, 2020) However, this demand for digital participation for people with disabilities, formulated by the German Leibniz Institute for Educational Research and Educational Information in light of the Covid 19 pandemic, also exists independently of the particular pandemic situation. The trend study "Digital Participation of People with Disabilities" conducted by the German SINUS Institute (Borgstedt & Möller-Slawinski, 2020) already examined the digital participation of people with disabilities "on", "through" and "in" digital technologies and media in 2019 and identified a need for action. The study concludes that the opportunities presented by digitalization outweigh the risks for people with disabilities. The opportunities named are: (1) Compensation of impairments, (2) new access to areas of society, (3) autonomy and self-determined living, (4) expansion of skills and competences, and (5) networking. These opportunities are offset by the risks of (1) a lack of digital skills among users and professionals, (2) high costs, and (3) growing inequality.

Regarding the need for further training of professionals in disability care, the SINUS study emphasizes that the currently still insufficient digital competence of people with disabilities is "particularly linked to the caring, teaching and accompanying staff, who themselves have to establish professionalized access to digital media in the first place". In addition, "competences must be acquired to provide these accesses for people with disabilities, to carry out appropriate training and to be able to monitor and accompany their use in a

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professional manner". In addition to basic skills in the use of programs, apps, or assistance technologies, this also involves more far-reaching aspects in dealing with data and consenting to the terms and conditions of applications. Furthermore, questions arise, for example, as to how informed decisions can be made at all in the case of quasi unreadable terms and conditions, how the special need for protection of users can be ensured due to their sometimes-low critical faculties and stress resistance, or how one moves between the dilemma of providing access and the duty of care. Added to these practical questions is the fear that "we are far from a digital code on the internet and that recklessness and harshness in social media are increasing rather than decreasing".

To recognize not only the risks but also the opportunities of digitalization and to use them in a self-determined, critical, and creative way, it is therefore necessary to qualify the caring, teaching, and accompanying professionals. This is where the training we have conceptualized in this chapter comes in, with the aim of promoting a well-founded discussion of digitalization and mediatization and their methodical use by professionals.

To introduce the training concept in the following, in this chapter we will present the project context of the training, the objectives of the training, the participants addressed, the didactic approaches, the structure and forms of the training, and a detailed description of the objectives and activities, the schedule, and the workload. After providing guidance on examination and certification, we conclude the chapter with a discussion of the strengths, weaknesses, opportunities, and issues of the designed training.

Context of the Training

The development of this training concept goes back to a specific request for continuing training from a regional provider of care services for people with disabilities. This provider is represented at 35 locations and with over 2,000 employees is one of the major employers in the region. Today, 45 facilities belong to the organization, in which about 3,000 people with disabilities are cared for. The services include in-patient and out-patient residential care for adults with disabilities, out-patient assisted living, inpatient care for the elderly and residential care for children and young people.

To cope with the diversity of the professionals' working environments and at the same time to ensure the highest possible transfer of theory to practice, the training is designed as an in-house training. For this purpose, the professionals from different fields of work are brought together and taught in groups as well as individually in a blended learning approach (Friesen, 2012), both on-site in the classroom and online.

Objectives of the Training

The long-term overall objective of this training is to increase the digital inclusion of people with disabilities, considering their individual abilities and the

opportunities and risks of digitalization in their everyday lives. Therefore, this training essentially addresses the professionals who accompany, care for, instruct, or also nurture them in their everyday lives. The short-term objective is to enable the professionals to support people with disabilities in acquiring digital competences and thus to shape the digital inclusion of people with disabilities in a way that is tailored to their individual everyday lives. Another objective is that the qualification of the professionals will stimulate the institution's engagement with the topics of digitalization and mediatization, which will ensure the digital inclusion of people with disabilities in the long term.

This continuing vocational training enables professionals working with people with disabilities

- to work with people with disabilities using digital technology by acquiring technical knowledge about hardware and software,
- to acquire personal and professional digital competences,
- to be inspired and to further develop one's own (media-)pedagogical attitude,
- to discuss legal and ethical aspects of digitalization and mediatization,
- to contribute via qualified practice to balancing the tension between self-determination and the duty to supervise and thus to enable people with disabilities to participate in a protected way in an increasingly digitized society,
- to expand one's own horizons and fields of activity through practice assignments by using (digital) technologies for people with high needs for help,
- to transfer competences on digitalization and mediatization to other professionals and thus act as a multiplier, and
- to link up with existing competences and tasks represented for example by the persons responsible for augmentative and alternative communication.

Participants

Conceptualized as a continuing education and training (CVET) (European Centre for the Development of Vocational Training, 2008), the training is aimed at educational and care professionals working with people with disabilities with a qualification level 4 or higher, referring to the European Qualifications Framework (The Council of the European Union, 2017). Typically, these professionals have completed their initial education and training for working with people with disabilities, have already entered working life, and are now looking to improve or update their knowledge and/or skills, acquire new skills for a career move or retraining, or continue their personal or professional development.

The training will be conducted in groups of 10 to 15 professionals from different institutions working with people with disabilities in order to enable a broad exchange and connectivist learning (Siemens, 2005). In the composition of the training group, a diversity of participants in terms of age, gender, field of work, function, position and digitality is aimed for.

Didactic Approaches

The training is based on the following five interrelated didactic approaches:

1. Situated learning (Lave & Wenger, 1991): Training contents are related to the everyday situations of the participating professionals by means of the professionals' own case studies - or, if not available, by means of provided prototypical examples - in order to ensure a high level of theory-practice transfer.
2. Problem-based learning (Schmidt, Rotgans, & Yew, 2011): Concrete everyday pedagogical problems are dealt with and - as far as possible - solved within the training, so that practical self-confidence can be achieved.
3. Self-directed learning (Brookfield, 2009): Adapted to the knowledge level and learning style of the participants, they are encouraged to work on topics as self-directed as possible in order to promote learning autonomy so that competence development can continue appropriately after the training in the dynamic field of digitalization.
4. (Enhanced) Discovery learning (Marzano, 2017): The participants deal with the topics in an "exploratory" way by observing, discussing, trying out and reflecting, which strengthens self-confidence through the independently acquired experience and makes them curious about further experiences.
5. Connectivist learning (Siemens, 2005): Participants learn not as isolated individuals but as networked individuals. They form networks with both human contacts (colleagues, friends, institutions, organizations, and communities) and non-human sources of knowledge (data, images, books, texts, videos, podcasts, etc.). Participants learn by identifying appropriate sources of knowledge and filtering out what is important from the flood of information.

Structure And Forms of Work of The Training

The methodological-didactic elements of the training are, on the one hand, in-house seminars, during which central contents are taught to all the participants, and, on the other hand, consultations of smaller working groups and coaching of the individual participants by trainers. The seminars, consultations, and coaching frame an assignment for a practice-oriented learning project in which the participants work in the smaller working groups together with people with disabilities and colleagues as far as possible.

In these practice-oriented learning projects, the participants work on concrete challenges of the people with disabilities in their digital everyday life and develop and test new professional actions with the people with disabilities and colleagues. Given the wide range of disabilities - from mild cognitive impairments to severe multiple disabilities - that are commonplace in the practice of the participating professionals, the digital methods and tools with which the participants engage are not already specified in the training program. Rather, the goal of the training is to find or develop the methods and tools to be used based on concrete practical challenges. An example of this could be teaching the use of apps or digital services in easy language or with the help of assisted communication. The practice-oriented learning projects ensure theory-practice transfer and stimulate the development of both individual competence among the people with disabilities and the professionals as well as team-based professional confidence.

To round off the learning process, each participant sets him/herself individual learning goals in relation to the support of the people with disabilities, whereby he/she is coached by a trainer. As far as possible, the participants work on these learning goals in an existing or a new working group (learning community) together with people with disabilities and colleagues.

Accordingly, the following six interwoven forms of work are used in the training:

- In-house seminars: Here all participants are gathered in one place for one day. Content is taught (lectures), discussions and exercises are held, and planning and working methods are coordinated.
- Online meetings: For shorter units, for example feedback or work planning, all participants are brought together online using e.g. Zoom or Microsoft Teams.
- Individual assignments: Participants receive assignments that they carry out individually, for example to advance the competence development and digital participation of people with disabilities or to prepare group work.
- Individual coaching: Participants receive individual coaching on the individual assignments.
- Group assignments: Building on the individual assignments and also parallel to them, the participants work and learn in smaller working groups executing practice-oriented learning projects.
- Group consulting: During the work in the smaller working groups, the participants are offered consulting by the trainers to support them.

Objectives, Activities, Time Schedule, And Workload (From the Participants' Point of View)

The activities of the training are prepared according to the didactic approaches and distributed over 16 training weeks with the help of the above-mentioned forms of work. For the participants, this results in a total workload of 69 lessons (one lesson corresponds to 45 minutes). The schedule, objectives and related activities, and workload are presented in detail in **Hata! Başvuru kaynağı bulunamadı.**

Table 1 Time schedule, objective, activities, and workload of the training

Week	Objective	Activities	Workload
1	Kick-Off and input on digital attitude and relationship	In-house seminar #1 "Kick-Off" <ul style="list-style-type: none"> The participants get to know each other and the training. Own personal and professional experiences with digitalization and mediatization in relation to the institution and the people with disabilities and colleagues ("How digital are we already?") are discussed and sorted. Inputs on "establishing digital relationship " and "attitude towards digitalization and mediatization" ("cheerful obsession"), opportunities and risks of digitalization/mediatization. Explanation of the following steps until the next presence day. 	8
2	Kick-off in the participants' facilities	Individual assignment #1 "Project information, target group and needs analysis" <ul style="list-style-type: none"> The participants clarify the question: "What do my clients and colleagues want, need and are able to do?". 	2
3	Forming a project group	Online meeting #1 „Forming a project group" <ul style="list-style-type: none"> Participants present the results of their target group and needs analysis in their facility, agree on goals for practice-oriented learning projects and form smaller working groups. Short input: Design Thinking (Ideation, Inspiration, Implementation). 	2
4	Idea-tion/Empathy	Group assignment #1 "What is the problem/opportunity here?" <ul style="list-style-type: none"> The smaller working groups start working on their practice-based learning project by analyzing the problem/possibility, comparing the different observations, and defining a point of view. 	2
	Feedback	Group consulting #1 <ul style="list-style-type: none"> The small group presents its results so far and receives feedback (-> inspiration) from the trainer. 	1
5	Input on ethics and law	In-house seminar #2 „Is it allowed?" <ul style="list-style-type: none"> Flashlight" status reports of the smaller working groups. Input on ethics and law in relation to digitalization and mediatization in work with people with disabilities. Ethical and legal aspects are discussed based on practical examples and methodical approaches to handling dilemma situations are taught. Explanation of the following steps. 	8

6	Ideation: brainstorming & "thinking outside the box"	<p>Group assignment #2 "I have an idea!"</p> <ul style="list-style-type: none"> The small group develops ideas - as far as possible together with people with disabilities and colleagues - prioritizes them and researches possibilities related to the practice-oriented learning project. 	2
	Set individual learning goal	<p>Individual assignment #2 "Individual competence analysis"</p> <ul style="list-style-type: none"> Based on the previous training experiences in the in-house seminars and the smaller working groups on the one hand and on the training goals on the other hand, the participants deal individually with the question "What am I already able to do, what do I want to learn?" and develop ideas for individual learning goals related to the promotion of the digital participation of the people with disabilities. 	2
	Determine individual learning activities	<p>Individual coaching #1 "Determining the learning goal"</p> <ul style="list-style-type: none"> In individual discussions with the trainer, the participants present the result of their individual competence analysis and receive feedback (-> Determine learning activities for and with people with disabilities and colleagues). 	1
7	Feedback	<p>Group consulting #2</p> <ul style="list-style-type: none"> The smaller working group presents its results so far and receives feedback from the trainer (->prototyping). 	1
	Build learning communities	<p>Online meeting #2 "I want to learn that too - let's learn it together"</p> <ul style="list-style-type: none"> The participants present their learning goals and activities to each other and form topic-centered learning groups (learning communities). These can - but do not have to - be identical to the previous smaller working groups. 	2
8	Implementation: Prototyping	<p>Group assignment #3 "This is how it could work!"</p> <ul style="list-style-type: none"> The smaller working group designs a "ready to try out" solution for and with people with disabilities and colleagues for their practice-oriented learning project. 	2
	Kick-Off Learning Community	<p>Group consulting #2 "Kick-Off Learning Community"</p> <ul style="list-style-type: none"> Together with the trainer, the learning group formed at the second online meeting determines what and how they will learn together and how they will involve people with disabilities and colleagues in the learning process. 	1
9	Run Learning Community	<p>Group assignment #4 "Learning together"</p> <ul style="list-style-type: none"> The learning group formed at the second online meeting starts or continues its work (as far as possible with people with disabilities and colleagues). 	2
10	Input on networking and QM	<p>In-house seminar #3 "My facility?"</p> <ul style="list-style-type: none"> "Flashlight" status reports of the smaller working/learning groups. Input on networking and continuous quality development (QM) Using examples from the smaller working groups, aspects of networking and QM are discussed, especially in relation to the Design Thinking process (implementation) Explanation of the following steps 	8

11	Individual network analysis	Individual assignment #3 "My network" <ul style="list-style-type: none"> Participants individually analyze their personal and professional network regarding its relevance for their smaller working group and learning group activities. 	2
12	Implementation: Testing	Group assignment #5 "The proof of the pudding is in the eating" <ul style="list-style-type: none"> The smaller working group tries out the prototypical solution for their practice-oriented learning project with people with disabilities and colleagues. 	2
	Run Learning Community	Group assignment #6 "Learning together" <ul style="list-style-type: none"> The learning group formed at the second online meeting continues its work (as far as possible with people with disabilities and colleagues). 	2
13	Implementation: Iteration	Group assignment #7 "OK ... again!" <ul style="list-style-type: none"> The smaller working group improves the solution for their practice-oriented learning project in several iterations. 	2
	Run Learning Community	Group assignment #8 "Learning together" <ul style="list-style-type: none"> The learning group formed at the second online meeting continues its work (as far as possible with people with disabilities and colleagues). 	2
14	Evaluate learning community and individual learning process	Individual coaching #2 "What have I learned?" <ul style="list-style-type: none"> In individual conversations with the trainer, participants reflect on the outcome of their learning activities in relation to the promotion of digital inclusion of people with disabilities, which they have carried out individually and/or in the learning community. 	1
	Planning of the closing activities	Online meeting #3 "What? Already finished?" <ul style="list-style-type: none"> The conclusion of the training is planned. 	2
15	Preparation of results	Group assignment #9 "Wrap up" <ul style="list-style-type: none"> Preparation of the results of the project group together with the people with disabilities for the final meeting. 	2
		Group assignment #10 "Wrap up" <ul style="list-style-type: none"> Preparation of results of the learning community for the final meeting. 	2
16	Closing event	In-house seminar #4 "Closing event" <ul style="list-style-type: none"> Participants, people with disabilities and colleagues present the results of the practical projects and learning communities to each other. Evaluation of the training. Future perspectives. 	8

Examination

Whether and to what extent the learning objectives are achieved by the participants, this is the subject of formative and summative examination.

Formative Examination (Process)

The formative examination moments serve to shape the training and learning process and take place continuously during the training in the context of

1. small group consultations,
2. individual coaching and
3. large group presentations and discussions of the work progress.

In the formative review moments, participants receive feedback and feed-forward from the trainers on their learning process.

Summative Examination (Result)

The summative examination moments serve the evaluation of the participation and refer to the training result of the participants. A positive evaluation of the training outcome is a prerequisite for certification. The evaluation takes place at the end of the training (final event) by the trainers based on the

1. presentation of the learning project (group work, in which the individual contribution of each group member must be clear) and the
2. reflection of the work on the individual learning objectives.

The summative examination is done based on the following criteria:

Presentation

1. The addressed problem regarding digital inclusion is described.
2. Different alternative solutions are named.
3. The choice of the solution is justified. The role of hardware and/or software is also described, and legal and ethical aspects are discussed.
4. The participation of people with disabilities, other professionals, and relevant stakeholders in the development of the solution is described.
5. The solution is evaluated in terms of its effectiveness with respect to the problem addressed, on the one hand, and its transferability to similar situations of digital inclusion, on the other.

Reflection (STARR)

1. The initial situation of the learning process is described.
2. The individual learning goal related to the practical work on digital inclusion of people with disabilities is described. The individual learning goal is challenging.
3. The learning activities are described.
4. The learning outcome is described.
5. The learning progress is reflected and new learning objectives that may build on this are stated.

For the examination, the presentation and the reflection will be assessed based on the "pass"/"fail" criteria at the final session. To pass the exam, at least 80% of the criteria (=four out of five) must be assessed as "passed" for both parts (presentation, reflection).

Strengths, Weaknesses, Opportunities, And Threats Of The Training Concept

To conclude this chapter, we will discuss the proposed concept from the perspective of the SWOT analysis method (Leigh, 2009) in order to highlight some of its strengths, weaknesses, opportunities and threats in relation to achieving the set objectives of fostering digital inclusion of people with disabilities through mediating digital competences.

Strengths

The concept is not only effective, it is at the same time economical, targeting all relevant professionals and achieving a multiplication effect that will cover several thousand people with disabilities and that will also cover the other professionals within the institution. It is expected that this training will have a significant impact on the digital daily life of people with disabilities and achieve a sustainable change for them.

At the same time, the training was developed in close consultation with the management and professionals of the service provider, which suggests a high ecological validity of the training concept. Furthermore, the training is clearly oriented towards the practice and everyday life of people with disabilities and professionals and ultimately leads to the development of methods that can be used directly in practice.

Weaknesses

One weakness of the approach is that its methodology makes it very dependent on the commitment and activities of the professionals addressed. Everyday work in facilities for people with disabilities is often characterized by staff shortages, substitutions due to illness, overwork, and stress. This can make it difficult for participants to engage, as they may simply not be able to free up enough quality time to make the training work for them.

Another weakness is that while the care provider's management and professionals were involved in the conceptualization, the people with disabilities themselves were not at the table. This weakness, which is often found in the development of didactic concepts, is very regrettable in that the needs of the final target group may not have been sufficiently taken into account here, which at the same time means that the idea of inclusion has not been consistently implemented.

Opportunities

One chance of the training is that, after positive evaluation and possible adjustments, it can be transferred to other providers of care services for people with disabilities and thus also unfold a change in the digital everyday life of people with disabilities beyond the care provider now addressed. We do not know of a comparably massive approach to promoting digital inclusion in a single and at the same time such a large care provider here in the northwest of Germany and are confident that this will leave its mark beyond the facilities.

Another opportunity is that the participants of the training, the addressed people with disabilities and other stakeholders within the care provider form a

permanent working group that continuously and sustainably advances the topic of digitalization and mediatization within the facility. We have already seen such developments at other facilities where we have conducted comparable training.

Threats

One threat for the development targeted by the training is that the participating professionals will attach the importance of the training primarily to the Corona pandemic, and therefore place less emphasis on the topic of digitization and mediatization as the Corona crisis subsides. This could lead to an anti-digital rollback in individual areas.

Another threat is that the targeted professionals fail to adequately engage all participants in their multiplicative activities, thus reproducing the digital divide (Rogers, 2016) within the institution, which is the very aim of the training to overcome.

Ultimately, a threat to training is that it requires the adequate and timely provision of sufficient financial, time, and technical resources. This training concept can only be reasonably realized if, at the same time, an expansion of the digital infrastructure takes place or has already taken place. And good trainers cost money.

Summing Up Swot

We ourselves are aware of the weaknesses and threats, but we see good opportunities to keep them in view and to counteract them. The training concept has many components that can be used flexibly and, due to our own flexibility, can be tailored to the capabilities of the participating professionals. This limits the risks of failure. In particular, we will counter the danger of a post-Corona rollback through the concept itself and our didactic approaches, but also through intensive internal communication that emphasizes the importance of digital inclusion of people with disabilities. Whether and to what extent we succeed in managing the weaknesses and threats and in exploiting the strengths and opportunities will be the subject of formative and summative evaluation.

Conclusion

The training presented in this chapter addresses the topic of education for digital inclusion of people with disabilities in an innovative way by implementing a variety of didactic approaches in a contemporary blended learning setting. The concept thus takes up current educational trends (e.g. connectivist learning, blended learning) and implements them practically for the field of continuing education and training (CVET). It is described in an implementation-oriented way and can thus be directly implemented by training and practice organizations. The SWOT analysis of the concept shows the good balance of the training in terms of its different aspects.

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TOWARDS A PEDAGOGICAL PARADIGM SHIFT: AN EXAMINATION OF ONLINE HIGHER EDUCATION IN BANGLADESH DURING THE COVID - 19 CRISIS

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Introduction

In the world of development, sustainability is one of the important catch-phrases of the 21st century (Mensah, 2019). On the one hand, education is crucial for productive life and the attainment of sustainability. On the other hand, we must overcome the obstacles and challenges to make the educational process sustainable (UN, 2017). The global society is evolving rapidly and moving with the new technologies. Technology is providing us with a sustainable life by eliminating different kinds of barriers like disaster and unprecedented emergencies that can hinder the smooth progression of education. Learning evolved beyond the hard copy of books and physical barriers of the classroom. The online classroom or e-classroom has emerged as one of the important paradigms of science and technology (Posey *et al.*, 2010). E-learning helps students perform better in classes and able them to participate in educational activities from home. Online classes are mostly useful when students cannot go outside due to disaster, pandemic, or emergency. The current pandemic, COVID-19, which is a public health emergency, has made huge impacts on the economy, society, and education respectively. Several universities around over the world have moved their classes online. But students, as well as teachers unfortunately in alarming numbers cannot easily cope up with this new platform.

The scenario is rather challenging in Bangladesh due to several conditions. This article examines the challenges and scopes for the adaptation of online

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classes in the higher education system in Bangladesh during the COVID-19 pandemic. The primary research questions of the study were as follows:

- i. What are the scopes for teaching and learning during this emergency of COVID-19?
- ii. What are the challenges teachers and students encounter in adopting online classes during this emergency?
- iii. How to mitigate the challenges of online classes during the emergency of COVID-19?

ICT Adoption Models in Education

The integration of IT in education can take many forms based on different purposes, varying from technologizing education to transforming education (Law, 2008). Teachers' use of ICT in teaching-learning and pedagogical orientations are guided by personal, organizational, and system-level aspects (Law & Chow, 2008). Technology Acceptance Model (TAM) posits that two distinct constructs, Perceived Usefulness (PU) and Perceived Ease of Use (PEU), which affect the attitude towards target system use and actual system use (Davis, 1993). TAM conceives those beliefs, attitudes and intentions are important factors for the teachers to accept or reject ICT in teaching and learning. In addition, the TPACK (Technology, Pedagogy and Content Knowledge) model includes technological, pedagogical, and content knowledge (Bull & Bell, 2009) and illustrates ICT integration in an educational setting (Koehler & Mishra, 2005). However, Nyvang (2006) advocates a theoretical model based on Activity Theory to implement ICT use in higher education. The implementation is comprised of mainly selection of ICT; adaptation of ICT and change of practice with ICT. Moreover, Wang (2008) proposed a generic ICT model which involved three fundamental elements: technology, social interaction, and pedagogy. The proposed generic model in Wang (2008) can be applied in the design of learning environments, facilitation of online discussions and comparison of ICT tools. Hence, based on the concept of above adoption model, we move forward to identify students and teachers perception towards technology oriented paradigm shift in terms of enjoyment, performance, satisfaction and cost.

Online Learning

Online courses had been experimented in the early to mid-1990s and then day by day it was spreading due to popularity (Kentnor, 2015). In the USA alone, almost 6.66 million students took online courses which was 33.7% of the total enrollment during Fall 2017 (Education, 2018). Learning online is gaining acceptance from students for its flexibility, access to a huge amount of Information, learners' choices, and community education through interactive behavior among students of different cultures (Arkorf & Abaidoo, 2014). Online learning has some drawbacks too, such as problems of adequate infra-

structure, bandwidth, and hardware constraints (Arkorful & Abaidoo, 2014). In addition, it is recommended that online learning be adopted as a long-term strategy (Allen & Seaman, 2010). However, some researchers suggested moving the schools online so that flu outbreaks and bioterrorist cannot disrupt the learning process until it is feasible for the students to attend the school physically (Laprairie & Hinson, 2006, Appenzeller, 2005). The COVID-19 pandemic was first traced to the human body on December 31, 2019 in China and spread very rapidly throughout the world (WHO, 2020). COVID-19 has caused 129.57 million people were infected and 2.83 million people faced death globally as of 1 April 2021 (Worldometer, 2021). To protect the students from COVID-19 as well as to continue the education during emergency, several universities in the world began online classes during the pandemic. However, this has become a huge concern for the stakeholders due to lack of previous experience of both teachers and students in the digital space, inconsistent internet support, as well as dropout risks of students (Pfleger, 2020). According to a recent circulation from the University Grants Commission (UGC) of Bangladesh, almost all the private and public universities have begun online classes from the end of June 2020 with multiple barriers to avoid academic and financial loss (Abdullah, 2020, Amin, 2020).

Methodology

Recognizing that both qualitative and quantitative methods have inherent limitations, a mixed method was adopted to enhance the understanding of the impact of the COVID 2019 pandemic on higher education in Bangladesh (Creswell and Plano Clark, 2007). This approach proved beneficial as the findings from the qualitative aspect of the investigation were triangulated with the findings from the quantitative aspect of the study which have enhanced the validity of the conclusions of the study (Molina-Azorin, 2016). This method of enquiry was conducted in a concurrent manner in order to provide a comprehensive analysis of the research problem. In the study, a convergent parallel design of mixed method research was followed for in-depth understanding of the impact of the COVID 2019 pandemic on higher education. Within this research design, one data collection form supplies strengths to offset the weakness of the other form and that a more complete understanding of a research problem results from collecting both quantitative and qualitative data (Creswell, 2015).

For the qualitative aspect of the research, 6 teachers were from purposively selected both public and private universities in Bangladesh. These teachers were interviewed and asked questions about the role and relevance of online teaching within the Bangladesh context. In addition, an online survey was conducted with 500 students alongside an FGD where 8 students were conveniently chosen as part of the qualitative approach. In both cases, the univer-

sities and teachers were selected through a purposive sampling technique while the students were selected through a convenient random sampling process. Quantitative data collected through the survey were analyzed using MS Excel 2013 while qualitative data was collected through interviews and FGD.

The qualitative data was collected through FGD and interviews via online platform using Zoom software. The collected data were recorded first and then transcribed by the researchers. For more accuracy, the recorded interviews and FGD were rechecked after transcription as the original data were collected using native language Bangla. After that, a deductive thematic analysis was conducted to find out the data related to the research questions, more specifically, scopes for teaching and learning during this emergency, challenges of online classes and ways of mitigating these during these emergencies. Braun and Clarke's (2006) six stage thematic analysis process were followed to conduct the thematic analysis. Extensive coding was done for both FGD and interviews. Predetermined themes were identified from the noted data, major themes were find out from data according to the research questions, subsequently review (similarities, differences, compatibility, and conflicts around the research questions) and ordering were taken place, and finally data narration were developed against the major findings related to the research questions. In addition, data accumulated form each tool had been triangulated and presented for a constructive discussion along with a reasoned conclusion.

Findings

Demographic information of the participant students and teachers are given in Table 1.

Table 1. The profile of university students

Year of study	Frequency	Percentage
1st year	178	35.60%
2nd year	163	32.63%
3rd year	72	14.40%
4th year	51	10.17%
Postgraduate (Masters)	36	7.20%
Total	500	100.00%
Location	Frequency	Percentage
Urban	173	34.53%
Suburban	68	13.56%
Rural	260	51.91%
Total	500	100.00%
Prior Online learning experience	Frequency	Percentage
Have (edX, MITx, Coursera etc.)	218	43.64%
Have not	282	56.36%
Total	500	100.00%
Used applications	Frequency	Percentage
University apps	23	4.66%
Zoom	321	64.20%
Google Classroom	115	23.09%
Others	40	8.05%
Total	500	100.00%
Internet Connectivity Mode	Frequency	Percentage
Broad band	159	31.73%
Mobile data	341	68.27%
Total	500	100.00%

Table 1 describe the profiles of the university students 'that participated in this study. Overall, there are 500 students from five different academic years. Most of them are the first year and second year students. Additionally, half of the students live in rural areas. Furthermore, around 56% students had no prior online learning experience. Interestingly, Zoom is the most common platform for online learning achieving about 65% response rate. Moreover, the prevalent internet access modality is based on mobile data that attained around 68%.

Table 2 describe the profiles of the university teachers 'that participated in the study. Overall, there are 6 teachers from public and private universities. The majority of them are male reaching over 80% of participants. Public and private university participation and ICT training is balanced. Most teachers are relatively young and are below 35 years.

Table 2. The profile of university teachers

Gender	Frequency	Percentage
Male	5	83.33%
Female	1	16.67%
Total	6	100%
Institution Type	Frequency	Percentage
Public	3	50%
Private	3	50%
Total	6	100%
Age Group	Frequency	Percentage
25-30	2	33.33%
31-35	3	50%
40-45	1	16.67%
Total	6	100%
ICT Training	Frequency	Percentage
Trained	3	50%
Not Trained	3	50%
Total	6	100%

Additionally, we used 5 points Likert-scale for estimating the online learning experience of university students with respect to enjoyment, performance, satisfaction, and cost of online learning. The results from the responses of the students are presented in Table 3. Students are divided with a shared percentage of around 40% in terms of comfort with online learning ($M=2.95$, $SD=1.31$). Even though students were split (around 38% each for and against) in terms of ability to adapt the new technological learning platforms ($M=2.95$, $SD=1.22$), more than 58% students stated that they have low academic performance in online learning ($M=3.58$, $SD=1.19$). Overall, with regards to satisfaction, more than 44% of students were satisfied with feedback from online teaching and learning processes ($M=3.11$, $SD=1.25$), however, around 40% students were dissatisfied with learning assessment of online teaching-learning ($M=2.81$, $SD=1.22$). Near about half of the students recognized that online learning is quite expensive ($M=2.81$, $SD=1.22$).

Table 3. Students' responses towards different factors

Aspects	Statements	Strong-ly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Mean	SD
Enjoyment	I am comfortable with online learning	19.49%	17.79%	22.46%	28.81%	11.44%	2.95	1.31
Performance	I can easily adapt to new online learning platforms	14.83%	23.51%	22.46%	30.3%	8.9%	2.95	1.22
	I have low academic performance in online learning	6.14%	13.98%	21.4%	32.63%	25.85%	3.58	1.19
Satisfaction	I am satisfied with the feedback from online teaching-learning	14.83%	16.53%	24.15%	32.20%	12.29%	3.11	1.25
	I am satisfied with the learning assessment of online teaching-learning	19.92%	19.28%	27.75%	26.27%	6.78%	2.81	1.22
	I am satisfied with lecturer's time management in online learning	6.36%	14.41%	21.82%	40.68%	16.74%	3.47	1.12
Cost	Online learning is costly	7.20%	34.11%	14.41%	11.02%	33.26%	3.75	1.22

From the qualitative data, most of the FGD participants described themselves as enthusiastic about the sudden transition of educational platforms. They felt that the sudden transition from offline to online platforms provided a new opportunity, which resulted in a comfortable and motivating environment as well. Furthermore, some of them also feel thankful to the stakeholders that initiated this radical change within the educational sector.

Furthermore, it was apparent from both students' FGD and teachers' interviews that most of them feel that online classes would be instrumental in bridging session gap caused by the COVID 19 pandemic. Most of them opined that the online class is an effective strategy during the pandemic situation. This enabled schools remain open and avoid the disruption of learning activities. Some of them added that to create an attitude for depression, and anxiety; online classes during emergencies might be helpful.

Albeit most teachers were familiar with technological platforms, a large portion of the teachers agreed that they had no prior experience of facilitating online classes. Besides, not every one of them had the required devices, for example, laptops and smartphones, internet support for conducting classes adequately. As per the teachers' perception, the poor and costly internet connection was the main reason behind the negative mindset of students. Furthermore, most of the teachers responded that proper training is required for leading a fruitful and compelling online class. According to Teacher-1,

"Not only online classes, but also for all types of effective classes need to be supported by various training to increase its efficiency. However, this training should be in the short term."

Moreover, teachers shared several perceptions online classes. All the participating teachers agreed that they usually followed the lecture method for conducting online classes. They added that they can rarely use other methods except sharing slides and providing a brief on the related content. One of them claimed to use pulling options through the zoom and another teacher implemented group work for online classes through the zoom platform. Identifying this as a challenge, all the teachers agreed that they faced difficulty in finding and implementing innovative pedagogy to which supported creativity and interaction. With regards to flexibility during these emergencies, five of the six teachers suggested that they are flexible with the time scheduling in order to ensure it suits the students and increase attendance. All the teachers added that they have to be more prepared for online classes. Two of them suggested that they prepare PowerPoint slides prior to the online classes wherein a typical class set-up they rarely use these for teaching and learning. Though all the teachers claimed that they are taking classes virtually, reluctance was also an issue. Teacher-5 addressed that

"Though I am practicing online teaching during this situation, some of my colleagues especially the senior teachers are not interested to do so."

Besides, most of the teachers claimed that they are willing to podcast and broadcast study materials on their different learning management systems. They added that they provide supporting study materials mostly through Google classroom and Facebook group on the day before the class. One teacher claimed to post the relevant video links on a Facebook group in order to steer

the proactive mindset of the students. Only one teacher replied that he provided all this on Google drive and gave the link on a Facebook group. Three teachers claimed that they had no problem in supplying study materials and records of classes. But one of them replied that sometimes due to poor internet connection and frequent electricity disruption, he faced technological difficulties for sharing records. Another teacher claimed that the absent students and those students who lost connection as a result of poor internet connection were advised to explore and learn from the class recordings. But he found that most students are ignored this recommendation. Consequently, to verify their learning through records of his university, he wanted to use an app for tracking the students' participation in his learning management system. Teacher-3 added in this aspect that

"If I share the records and study materials, some students assume that they need not attend classes as they can easily study these from the records."

On a different note, teachers mentioned anxiety issues, students' negative mindset, poor and costly internet connection, a large number of participants, completion of laboratory-based activities, home environment, preparation for the presentation, assessment and feedback procedure, time management, and home tasks as the major hindrances to learning. All the teachers agreed that online classes need different strategies for classroom management. Furthermore, they opined that internet connection should be priced at a lower cost with uninterrupted mode. Three of them mentioned web-based content development may help holistically. Two of the participating teachers mentioned that online classes should also be taken regularly on specific topics. Two teachers suggested that the teacher should get less course load as online courses need more effort and more training is required for successful online facilitation. Moreover, the majority's opinion was that taking lab classes in online mode is not effective. According to Teacher-4,

"Conducting lab classes online is very unrealistic as there was no preparation for that."

From the FGD, lack of motivation appeared as a widely cited challenge. However, students also expressed that poor internet connection is one of the distinctive challenges regardless of urban and rural areas. It emerged as well that "high-cost internet" is one of the significant challenges encountered by students. Furthermore, these students faced difficulties with the "homely environment" as most of them mentioned that it was hard for them to create a "noise-free" and "clam-study place" within their environment. Moreover, "time-table" for the online class was an issue as FGD participants thought that being "flexible" some students, as well as teachers, are taking advantage of it.

Furthermore, some of the students mentioned that they do not have a proper device for online classes. Nevertheless, very few of them mentioned

that they are not comfortable appearing in an online class as some of them are camera shy. In addition, students suggested that the teacher should not pressurize during classes but keep them motivated by providing mental support. On a positive note, most of them suggested that the teachers made learning effective and interesting utilizing different pedagogical approaches. Besides, most of the students suggested that teachers should provide study materials before the class. With regards to lab sessions, teachers were asked to provide software and different support through which students can learn more. In hindsight, some of the students observed that teachers were focusing on finishing the content rather than letting them understand in-depth. Additionally, some students mentioned that teachers tend to be more “friendly” in appearance and flexible for the online class. A very few students marked that teachers’ interventions could be more efficient if they were properly trained. Moreover, most of the FGD participants suggested that universities can create an expert IT team, recruit a psycho-counselor team, and social media influencer for mental support from the student ambassadors. Lastly, a need for flexibility for semester fees was another well-examined factor that was revealed by the FGD participants.

Discussion

The findings show that majority of students in the study did not have previous experience in online education. Rural students are less comfortable than urban students and they also feel that the adaptation of online classes is neither simple nor easy. According to Xu and Jaggars (2013), most of the students were not familiar with the online platform in their earlier academic life, so many of them are facing adaptation challenges. The Student responses to the online assessment process was not positive in our study. Here, rural students were less satisfied than urban ones. Teachers mentioned that they are implementing different strategies for constructive assessment, however, that might be challenging for some students and some of the students similarly expressed their concerns regarding this. Another research provides support to our result that online assessment is challenging and the distance between teachers and students, workload, time management, and the use of the technology create challenges in the online assessment process (Kearns, 2012). However, some researchers argued that online assessment is better and faster than paper-pencil form (Özden et al., 2004). (Alruwais et al., 2018) pointed out that inexperienced students will struggle in online assessment and they should be trained before moving to the online environment. Moreover, many students perceived that their performance through online classes was poorer in comparison with physical classes. In addition, it is perceived that lower attendance is observed in online classes. But researchers found that students of online classes achieve significantly better grades than students that attend physical classes on campus (Dutton *et al.*, 2002).

Online classes were found costly in our research which is similar to the findings of Poulin & Straut (2017). Similarly, our findings of slow internet speed and bare affordability of high price internet data packages for conducting online classes are similar to the findings of Farhana *et al.* (2020). Additionally, students were found to be quite satisfied with the online class time management, however, the negative effect of the home environment was a concerning issue. It is a matter of concern that students of rural areas face more difficulties than students living in urban areas. Teachers were also concerned that students could not create their own space for the online class as they might not have this opportunity. In the study of Smith & Northcote, it was revealed that learning is influenced by expenditure factors, the experience of using technology, lack of significant course content, downbeat learning experiences, interpersonal learning skills, family environment, and work responsibilities (Smith & Northcote, 2017).

Even though, teachers are acquainted with this technology-based pedagogy, they are not adequately trained to use it to capacity. It was revealed that experienced teachers were less keen on this sudden transition. Most teachers faced challenges in coping with online teaching-learning activities. They perceived that it was a challenge to find a proper teaching method for better learning outcomes. In a study, it had been suggested that proper monitoring, need-based assessment, small class size, and interaction between teachers and students are essential for creating more engagement of students for online classes (Arsham, 2002).

It has been observed that there are challenges with providing teaching materials, class recordings, and creating learners' centric education. Lack of infrastructural support was also a major questioning point from the students' perspective. This study found that the assessment strategy for online sessions are not at par with physical classes. Proper assessment technology and strategy are needed for better pedagogical success where rubrics, consistent communication, feedback, etc. are demanded (Gaytan, 2004).

The pandemic also affected students' and teachers' mental health, creating a negative mindset and sometimes a lack of will-power for study. With the migration of the system, occurring very suddenly, both the faculties and students are struggling with mental health. It was reported that in South Asian region pandemic-related terms, like social distancing, isolation and quarantine, lack of social and financial safety are resulting in sadness, anxiety, fear, anger, irritation, frustration, nervousness, and hopelessness (Ahorsu *et al.*, 2020).

Despite having a lot of obstacles, this sudden transition of online classes is afforded a new platform for communication between students and teachers. Students and teachers alike are gaining skills in technology and excelling in distance learning and globalized standard education. In addition, the study revealed that students and faculties are not derailing from teaching-learning thankfully due to these online education initiatives by different institutions. In

a study, it was also agreed that e-learning comes up with significant scopes like multiple sources, generation of a global platform, providing accessibility, time and resource-saving (Raju et al., 2019). From the qualitative data analysis, it can be inferred that implementing well-planned, creative, applicable, and eye-catching modules and course contents could be a new idea to satisfy the needs of the students for the future online education.

Conclusion

The study demonstrated that online classes have scopes and challenges as it is not well- established in Bangladesh. Students and teachers perceive that distance learning is more flexible and sustainable than the traditional classroom. Many of the courses found more convenient online platforms than the physical class. For developing the standard of the education system, blended learning can be a good strategy. It can help to reduce the problems of physical facilities and limitations of the universities. Hence, it can be helpful for students by providing a wide range of learning opportunity from distance which otherwise would not have been accessible. Furthermore, learning online can make students competent users of different technologies which will help them to overcome the information gap compared to advanced students in terms of 21st-century skills. However, mitigating the challenges and developing the areas of scopes through fruitful collaborations of policymakers, stakeholders, institutions, teachers, and students are crucial for success. A holistic approach that may transform the education system should be adopted. This will enable new solutions transcend the current pandemic situation. This study further recommends that drafting a robust national policy for proper funding for online pedagogical strategies and infrastructural development, allocation of resources and proper training would provide a sustainable way forward for the overall education system and promote distance learning as well.

Limitations

The study has some limitations too. The samples of all levels-quantitative and qualitative were collected in a convenient way due to complexities of communication during emergency like covid. The sample size of the qualitative data was not large enough to generalize, but this was not the intention of the study. In addition, students who are not experienced in extensive online classes during these circumstances and may or may not got opportunity to express their views as data collection were conducted through online. Moreover, quantitative data were analyzed using only descriptive analysis, no inferential analysis and reliability test was done within this study.

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THEORY AND PRACTICE IN TEACHER EDUCATION: ACADEMIC DIMENSIONS AND SOCIO-POLITICAL IMPLICATIONS OF A CONTENTED POLARIZATION

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Introduction

The relationship between theory and practice in teacher education is part of the wider issue of the relationship of the theory/practice divide at the social science level. As such a broad topic cannot be covered in this paper, I aim to encompass three related frameworks, which will be examined in detail. I begin my analysis from the broadest framework delving into the evolution of the relationship between theory and practice; highlighting its historically significant turning points, and particularly, the transition from pre-modern to modern societies. I then continue within the narrower context of the relationship between theory and practice in pedagogy, examining how pedagogical science and teacher education function as communicating vessels. Finally, I focus on the particular field of teacher education, examining the specific issues based on three questions: (a) How does the gap between theory and practice arise? (b) What are the consequences of this gap on initial teacher education? What are the consequences when the student becomes aware of the theory/practice divide during their teaching practice, i.e., before they enter the teaching profession? (c) What can we do about, or, how should we deal with this gap in the context of teacher education?

Theory And Practice: An Attempt to Bridge The Divide

The terms theory and practice first appeared in ancient Greek thought in the works of Pythagoras, Plato and Aristotle; they were also dealt with in the works of the Roman Rhetoricians Cicero, Seneca the Elder, and Quintilian; and when the terms reached the Middle Ages, they meant two different versions of life (Böhm, 1985).

There are three key points of the different versions of life: first, determining the purposes of human action; second, providing an evaluative judgment on these purposes, and especially on the primary, the ultimate goal of human action; and third, a basic - in the sense of fundamental - idea as to how life is

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formed according to this primary purpose each time. Out of these three, the focus here will be on the second, i.e., on the evaluation of the purpose of life, where Heraclitus' theory of Opposites, which passed from the late Middle Ages to modernity, applies. This comprises the idea of the incompatibility between the two polar opposites of life, that of *vita contemplativa* and *vita activa*, or in other words, the polarization of theoretical and practical life (ibid.:17).

The issue, of course, of the strict demarcation between what constitutes theory and what practice, including their polarization, arises for the first time in modernity and, in a sense, is a result of this. In the ancient and medieval worlds, to the extent where theory did not take precedence over or completely determine practice, their relationship was self-regulating. Logic, Metaphysics, and Ethics were inextricably linked through a permanently irreversible cosmic order, which had been revealed to humans by God, who, moreover, guaranteed its correctness.

This split is salvaged by the etymology and meaning of the ancient Greek word "theory", and the latter Christian *contemplatio*. Through the notion of the Divine, and later the Christian God, each person knew their limits, and consequently what they must and must not do. Theory as knowledge and the recognition of human conditions and limitations has always had practical consequences. From Antiquity through to the Middle Ages, there is a pronounced shift towards the perspective of *vita contemplativa*, where theoretical life is upheld as a higher form befitting free people (Kamper, 1989). Regarding the position of theoretical life in antiquity Livingstone wrote: "*Plato and Aristotle still believed that the highest thing in man is reason and that human perfection consists in the function of reason in a theoretical life.*" (Livingstone, 1986:72 [page number refers to the Greek translation]). At another point, to this dominant position of theoretical life he also attributes the lack of technological achievements of the ancient Greeks, at least in comparison to their scientific achievements. "[...] *the development of applied science in Greece was hindered by the opinion that, while pure science is a natural and wonderful occupation of the human mind, its application for practical purposes is rather vulgar*" (ibid., 49).

For the first time in the civil society of the modern era, an acute and intractable problem appeared in the relationship between theory and practice, which was largely due to a contradictory process. On the one hand, there was the severance of the connection between the "metaphysical-theoretical ideal of the Platonic and Aristotelian praxis, including its Christian form (*contemplatio Dei*)" (Kondylis, 1991: 52), the effect of which was to elevate 'action', and more precisely 'moral action', to what was then considered a person's highest destiny. The result of this was to overthrow 'pure theory' from its until then lofty position. On the other hand, the belief in the omnipotence of the

Logos/Ratio as a regulatory factor at all levels of social practice led to the absolutization of theory (ibid.).

Theory was further reinforced by another process which has its roots in the dawn of modernity, namely, the separation of Logic from Metaphysics, and the separation of Logic from Ontology. This led to the formulation of the scientific method, which established the basis of science as we know it today (Kondylis, 1983; Rosenberg, 2017).

A huge effort was made through science, based on *Logos/Ratio*, to discover the secrets of nature and humankind, which set in motion secularization as a process of liberation from the heavy 'yoke' of ecclesiastical guardianship and metaphysical bonds. Great expectations were associated with the progress of science: "if a rational method could illuminate nature, revealing a rational order of things, then it would be possible to illuminate both human nature and human society; if the human world had proved to be less well organized than the rest of nature, science would show us how to better organize it; and impulses that lead to conflict could tame people and, at the same time, cultivate people's cooperative feelings." (Hollis, 2005:18)

The split between theory and practice in modern times is linked to yet another social process, which also has its roots in modernity, and which is directly related to the progress of science, that is to say, the (growing) social division of labor. This led to the formation of different social groups, which, on the one hand represent *theory as a science*, and on the other, *practice*. These social groups all have different norms in terms of their actions, their aims, and their commodities (Heid, 1994).

Describing and specifying the same process, Habermas referred to the idea by Max Weber, who characterized cultural modernity as being the division of the self-existent *Logos/Ratio* into three autonomous domains of life: science, ethics, and art. In each of these three cultural spheres, the structures that appear as inherent are: cognitive-instrumental rationality (science), ethical-practical rationality, and aesthetic-expressive rationality (art). Each of these structures is developed under the "control of scientific experts who give the impression that they are more qualified in these fields compared to other people. This results in a widening of the separation between the culture of experts and that of the general public. What accumulates through specialized examination and thought does not immediately and necessarily become the property of daily practice." (Habermas in Hall et al., 2003: 525).

According to Habermas, the gap between theory and practice is constantly widening as the dominance of experts at all levels of social practice is being strengthened. More specifically, the emergence, development, and progress of science that has become increasingly more specialized clearly shows that theory - scientific theory in particular - has not only become autonomous of the

sphere of practice, but it has also prevailed over all other informal 'theories' which have been passed down from generation to generation, and which through tradition have preserved accumulated human experience (Habermas, 1978).

Progressive social division and specialization as key features of modernity have not only led to the autonomy of theory as science over practice, but also to an ongoing and 'self-sustaining' differentiation and expertness within the sphere of science itself. The basic distinction between the natural and the social sciences, on the one hand, reflects this development, but on the other, it emphasizes the great difference in relation to the issues posed here, i.e., the relationship of theory and practice. In the natural sciences, theory is applied to practice first as technique, and then, with dramatic advance, as technology. In one respect, this relationship has been, to a large extent, without any serious friction or great tension. It must, however, be noted that after the atomic bomb was built and deployed in World War II, and continuing to this day, matters have ceased to be as straightforward as they were, since now the connection between the natural sciences and technology tend to raise increasingly complex ethical issues (Habermas, 1969, 1984).

In the social sciences, however, the situation becomes even more complex, since both the formation of theory and its practical implications, i.e., its 'applicability', depends on agents who are socially, politically, and culturally determined, while the practical implications always have social and political consequences. This is especially evident in particular fields, such as that of education, where the scientific theory produced (pedagogy, psychology, sociology) is 'applied' - when and if - through multiple 'mediations', which are linked to social, cultural, and economic, among other factors, including their correlation at a given point in time (Habermas, 1965, 1984; Hollis, 2005; Rosenberg, 2017).

The divide between theory and practice, in conjunction with the continuing division and specialization of science, which involves an endless process of fragmentation within the sphere of theory itself, has presented one of the most curious paradoxes of the 20th century. In the previous century, Morin (2000) explains, despite the enormous progress in all the domains of scientific knowledge and technology, a blindness to the fundamental, complex, global problems had befallen the experts in these fields, leading them to errors and illusions. The cause was due to the basic principles of correct knowledge being misconstrued. Added to that was the fragmentation and segregation of knowledge which has made scientists and technology experts unable to see that knowledge needs to be intertwined in order for the complexity of reality to be understood. Moreover, this trend where all fields are dominated by experts has the result of decreasing not only the responsibilities but also the ca-

pabilities of citizens, and this is where democratic decline in all the areas of politics has its roots as well (Morin, 1999).

Theory And Practice in Pedagogy

Questions regarding the relationship between theory and practice are different for each science, particularly the social sciences and/or the humanities, and thus of Pedagogy, as well. Three pertinent questions which arise are: (1) What has priority: theory (as scientific knowledge) or practice (as a social or individual reality)? (2) How, by whom, and for whom is scientific knowledge (theory) produced? (3) What kind, for whom, and for what aims is scientific knowledge used (practice)?

Thus, the relationship between theory and practice is essentially an epistemological question, insofar as the context for answering the above questions is provided by the respective epistemological 'paradigm' in accordance with Kuhn (1962). Due to space limitations, the extensive topic of the epistemological dimensions of pedagogy will be dealt with only to the extent of shedding light on the perspectives concerning this paper. Concerning epistemological 'paradigms', the field of Pedagogy these days seems to be dominated by the empirical-analytical approach to research, which can be seen in the plethora of empirically oriented papers published. This is carried over at the national, European and international levels, where educational policy regarding scientific discourse is clearly biased towards research proposals, and subsequently, funding of research programs that promise large-scale 'objective' data and findings, which are produced with the reliability and validity of increasingly sophisticated statistical methods and techniques.

The increased demand for measurable indicators, as well as the promotion for teachers and students to acquire all manner of competencies, follow a similar logic and practice (Baumert & Kunter, 2006). It goes without saying that the epistemological dominance of this empirically oriented research model is not accidental but is linked to the social, economic, political, and cultural conditions imposed by postmodernism forming a new framework not only for science and scientists, but educational policy as well (Apple, 2006b; Giesecke, 2009). More specifically, the primacy of the empirical-analytical 'paradigm' in research, along with the corresponding social imperative (measurable indicators, performance optimization, reciprocity, evaluation) most definitely derives from the dominance of the market economy (Apple, 2006a; McLaren & Farahmandpur, 2013). In the western world, the market economy in conjunction with the knowledge society acknowledge the economic locomotive in education, and so, the orientation and the results of educational research constitute a socially controversial issue, since in recent decades, "*knowledge [has become] indispensable to productive power*" (Lyotard, 1993: 33).

The dominance of the market economy, however, dictates the marketization of social and individual life as a whole, as market logic penetrates and alters all other spheres by imposing its norms and values. It is no coincidence that the laws of supply and demand, as well as the rationale and practice of consumerism have eroded the academic space. For instance, the law of supply and demand has been undermining the foundations of academia, especially the Humanities, resulting in the dismantling of university departments with a long academic tradition but which are seen as no longer guaranteeing direct labor market accessibility; meanwhile the justification of consumerism is clearly reflected in the frantic rate of the 'production and consumption' of scientific knowledge, in terms of the speed with which it becomes outdated. This occurs because *"knowledge is and will be produced in order to be sold, it is and will be consumed in order to be valorized in a new production: in both cases the goal is exchange. Knowledge ceases to be an end in itself, it loses its use-value"* (ibid.).

In this dominant epistemological model, there is a complete separation between researchers as exclusive producers of scientific knowledge (theory) and teachers/educators as users and consumers of this knowledge (practice). Action research, which laid the methodological foundations for the Teacher Research Movement developing the idea of 'teacher as researcher' has come to confront and to pit itself against this state of complete separation between researchers and users of knowledge (Altrichter et al., 2008; Elliot, 1991; McNiff, 1999, 2003).

Action research, from an epistemological perspective, is an alternative model of educational research, where teachers conduct the research themselves, either alone or in collaboration with others within broader research teams. In essence, its basic assumptions radicalize the relationship between theory and practice, as it attempts to decrease the tension between the two, and eliminate the gap (real or hypothetical) that separates them, by the same person (the teacher-as-researcher) conducting both (Carr & Kemmis, 1986, 2010).

If from an epistemological point of view, action research is an innovative approach, the social implications and political consequences are even more significant. Effectively challenging the dominance of the 'expert' as sole producer of socially valid and credible knowledge (scientific theory), both the social and professional role of the teacher is enhanced, making them responsible for (and therefore capable of) producing scientific knowledge, which is necessary for the solution of real problems (practice). The priority of social - and in this case educational - reality (practice) as opposed to scientific knowledge (theory) - in the empirical/analytical terms discussed earlier - is apparent (ibid.).

Theory And Practice in Initial Teacher Education

The relationship between theory and practice in teacher education is given concrete expression in the questions: How is scientific knowledge related to educational practice? How are studies related to the profession? How is university related to school? Of course, the question of paramount importance that arises concerning the unity of theory and practice, based on what has previously been discussed regarding the dynamics of knowledge in postmodern societies, is: How is acquired knowledge applied? The issue becomes even more pressing when one knows that initial teacher education programs cannot provide students with all the necessary knowledge, skills, and points of view to help them meet the challenges of the profession in societies like ours. Societies, that is, in which the expectations for academic performance and the corresponding education for its achievement are constantly redefined as our world changes (Hammerness et.al., 2005).

Empirical research has shown the gap that exists between theoretical knowledge and the corresponding practical skills that teachers should have is in effect generated by the scientific theory/educational reality divide (Kaiser, 2002; Mandl & Gerstenmaier, 2000). In other words, it appears that first-time teachers are not able to implement very much, at least at the beginning of their professional career (educational reality), in relation to what they learn or should learn during their studies (scientific theory). This finding, stated thus, i.e., as a disparity between the theoretical/scientific preparation and the skills that teacher candidates actually possess, concedes their theoretical preparation to be sadly lacking, whose value has been underestimated; not to mention that it seems to 'conceal' some other very important parameters, which, however, due to space limitations, will be dealt with only briefly here. The two major parameters are the following. The first is of an epistemological nature and is related to the erroneous assumption of this type of research data that scientific theory is *one and comprehensive* and is transferred as such, i.e., as a compact and indisputable body of knowledge, to prospective teachers. This involves the 'naturalization' of scientific theory, which often deliberately ignores the particular epistemological directions and their differences, as well as the conflicting process of constructing the respective scientific knowledge. The second parameter is related to how the theory is translated into practical skills, or in other words, the *what* and *how* teacher candidates learn. The transformation of scientific knowledge into professional skills, that is, the transition from theory to practice, can no longer be perceived as a straightforward, one-dimensional process. In fact, it proves to be ineffective when it is defined by 'technical rationality' seeking to implement university knowledge indiscriminately through a normative model of teaching, while ignoring both the dynamics and singularity of each educational reality, and neglecting the dialectical and multifaceted

mediated relationship which the student teacher develops with knowledge (Schön, 1983, 1987; Xochellis, 2005).

Three questions are examined in relation to the theory/practice divide: (a) How does the gap between theory and practice arise? (b) What are the consequences of this gap on initial teacher education? What are the consequences when the student becomes aware of the theory/practice divide during their teaching practice, i.e., before they enter the teaching profession? (c) What can we do about, or, how should we deal with this gap in the context of teacher education?

First of all, let us keep in mind that scientific theory operates to a high degree of generalization (i.e., it recognizes the general within the specific) and deduction (i.e., it isolates and removes from the specific all its distinguishing elements), so that through its general application, it can simultaneously refer to many, different, special cases. If it did not follow this process of deduction and generalization, we would not have a theory, but an endless and insignificant chain of case studies. On the other hand, each unique and unrepeatable case presents and preserves the specific within the general.

Of course, if by the term theory we simply mean a closed system organized by fixed rules of interconnected definitions, determinants, and principles of a cognitive area, while by the term practice we understand it to be the problem of the applicability of general proposals in specific situations, then we would merely need to deal with the one and only problem of implementation. In the field of the natural sciences, the problem of theory versus practice can be interpreted as the issue of theory and its application. In the field of the social sciences, however, the issue is much more composite, since human beings and their societies are much more complex. Here, under the threat of it becoming self-cancelling, praxis (referring to practice as understood in the Aristotelian sense) cannot be narrowed down to the application of mere technique. More specifically, as regards pedagogical practice, we must keep in mind that pedagogical action takes place in an open field that is diverse and manifold; also, that pedagogical actions, counter-actions, and re-actions cannot be reduced to simple causal patterns. There are always alternatives to what we do and the way we choose to do it (Giesecke, 2009). These alternatives come from the rationale of practice itself, which is composed of social actions that are always decided and selected from a wide repertoire of possibilities. It is this repertoire of possible actions that scientific logic can neither exhaustively examine nor predict (*ibid.*).

Things become even more complicated when we consider that during their studies prospective teachers do not encounter pedagogical theory at only one level, i.e., science, but at least another two. These three levels of pedagogical theory correspond to the three levels of awareness of pedagogical action that

not only the teacher candidate but also the inservice teacher should have. At the first level of pedagogical theory, we have what is usually referred to as *personal theory* or *subjective theory* (Dann, 1994; McIntyre, 1993; Matsagouras, 2002). It includes all the of prospective teacher's attitudes, perceptions and biases which guide their actions, of which, however, they are unaware, and quite often are unable to state what these are. At this level, these are the mental patterns and structures that arise effortlessly from what we call 'everyday knowledge' (Alltagswissen), and which we usually neither control nor question (Groeben et al., 1988; Mandl & Huber, 1983). At the second level are the accumulated experiences of inservice teachers that have been processed through reflection. These are theories that are formed through a process of generalization based on accrued experience, which most of the time, have not been 'formulated' as such, but which, with a little effort, can be conveyed to others. At best these theories reach the stage of being considered professional know-how or pedagogical practice. In the literature they are referred to as *practical knowledge*, *professional knowledge*, *Handlungswissen*. The third level comprises the only theory that can be characterized as scientific, since it results from the use of scientific methodology (Merkens, 1994).

We need to, therefore, keep in mind that students are trained by us, who are ourselves bearers of a strong though unspoken *personal theory*, whose scientific knowledge we are accountable for. This is enmeshed in many and unfathomable ways with the practical professional knowledge of their mentors, as well as that of the classroom teacher of the schools where they do their teaching practice.

Pedagogical theory at the scientific level can examine and analyze the relationship between theory and practice as it appears at the other two levels. However, what is also important is to be aware of the fact that the theories at the first and second levels are inherent in the basic structure of every practice that we define, whether as education or as teaching. This last point, although fundamental, is not easily grasped by either teacher candidates or inservice teachers. In other words, they find the fact hard to comprehend that every practice has a theoretical basis, whether one is aware of it or not. This failing is a consequence of the gap between theory and practice in teacher education (Van Manen, 1977; Mandl & Gerstenmaier, 2000).

Anyone who is involved in the teaching practice of prospective teachers definitely knows how easily one can fall into the trap of considering theory as not being such a necessary resource for practice. Thus, students doing their teaching practice often place greater value on the experiences they gain at school, considering them to be far more important to their future profession than any theory they have been taught, even if these experiences are not only purely personal but also random (Böhm, 1985). Another form of devaluation

of theory is the fact that students often during their practical training observe and note down “some teaching actions that ‘worked’” (Zanting in Loughran, 2006: 45), and which they can adopt in their own teaching practice, whereas they seem to be completely impervious to the theoretical background of these pedagogical and didactic choices (ibid.).

Such a position, however, signifies a slippage from the field of science “towards a naive experiential knowledge management” (Tsardakis, 2001: 753), which can at a socio-political level become ambivalent and reactionary, especially when the teacher uses it in order to legitimize their social practice, occurring on a daily basis in the classroom.

So, if this is the case and the theory-practice relationship is experienced as a divide of theory and practice, what can we who are involved in the field of initial teacher education do? What has already been extensively discussed on the relationship between theory and practice in teacher education from a philosophical point of view in previous publications will not be repeated here (Zmas & Papadopoulou, 2007; Papadopoulou, 2016). However, because nowadays an ambitious goal of almost all teacher education programs is to produce ‘reflective teachers’ let us think of reflection as a wager to be achieved in our own teaching practice, i.e., at the level of higher education.

In Greece, there is no research direction to examine the type of teaching carried out at the level of higher education, despite the fact that university is in and of itself an institution of research and teaching. This gap becomes more pronounced in Departments that train teachers, since, it is we who work in teacher education university departments who, through our teaching, teach the students how *they* should teach.

Paraphrasing McLuhan's famous saying “the medium is the message” (1964), Russell stated that “the way we teach is the message” (Russel, 1997). And this way, in which we teach, we have a long way to go together with our students. Particularly in relation to how we teach, and especially in the context of university supervised teaching practice, the emphasis should be shifted from general theory to cultivating the teacher candidate's ability to intuitively feel the dynamics of the individual circumstance and to act respecting the particularity and the significance of each situation (Eisner, 2002; Binneberg, 1985). This can be achieved if in the teaching practice, no attempt is made to eliminate the tension between scientific theory and practice, for the sake of the student-teacher. During their teaching practice, it is necessary to enable the teacher candidate to discover for themselves the gap between theory and practice, and the consequent insecurity it provokes should be seen as a ‘necessary evil’, a heavy burden, so to speak that can be turned into a much-needed ballast. The gap between theory and practice contains a valuable vitality, as it puts the teacher candidate on the alert, prompting them to think and reflect. In

contrast, the superficial or - even worse –a forced agreement between theory and practice - hinders a critical approach to pedagogical reality. The general consequence of such a perspective is that it becomes difficult to consolidate the teacher candidate's critical thinking ability, resulting in indiscriminate practice, as described earlier.

To conclude, if the issue is for all of us, teachers and learners alike, to realize that in this liquid reality (Bauman, 2009) and fragmented spheres of life, we need to return to the (now lost) unity of theory and practice, which, however we still have a long and difficult way to go, let us remember the words of a great educator of our times: "Within the word we find two dimensions, reflection and action, in such radical interaction that if one is sacrificed—even in part—the other immediately suffers. There is no true word that is not at the same time praxis. Thus, to speak a true word is to transform the world" (Freire, 1974: 101).

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SPECIAL EDUCATION AND THE USE OF MNEMONICS

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Introduction

There is a widespread opinion that skills teaching should replace teaching activities based on knowledge transfer in today's world, where the increase in knowledge has become too fast to follow. These developments make the acquisition of basic knowledge as important as transforming them into permanent skills. Turning it into permanent skills requires adjusting the quality and quantity of instruction. The most important indicator determining the quality of teaching is goals. Goals can be expressed at different levels. Bloom's taxonomy of goals (1956; 1985) ranked goals from bottom to top, where Remembering is the form of Understanding, Applying, Analyzing, Evaluating and Creating. The first two of these goal steps (Remembering, Understanding) are listed as low-level, others (Applying, Analyzing, Evaluating and Creating) as high-level goals, and it is known that these target areas are vertically coalesced.

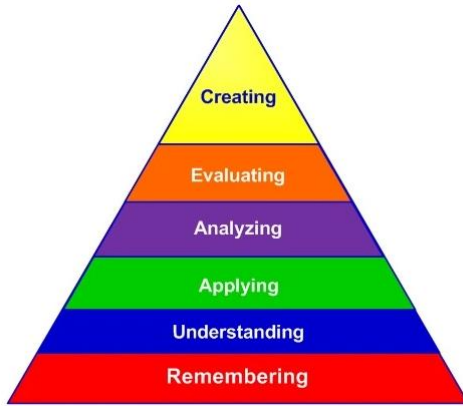


Figure 1. Bloom's Taxonomy (Krathwohl, 2002).

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In other words, data that are not formed at the remembering level cannot be expected to reach the level of understanding and then turned into a skill. In the skill acquisition process, a minimum level of remembering and understanding is a prerequisite. It is natural that storage systematics are needed in the formation of such a systematic structure (Bloom, 1956). The transformation of knowledge into comprehension is made possible through the process of concretization. This reification process can be accomplished in many different ways. For example, one-way learners transform knowledge into comprehension by using learning strategies. Another way is through the coding or schematization of information by means of techniques that assist in memory retention.

Mnemonics

Mnemonics are the methods, techniques and tools used for the effectiveness of the processes of storing and retrieving knowledge and skills from short-term memory to long-term memory (Bakken & Simpson, 2011). The term memory enhancement technique is preferred instead of the concept of memory supporting technique (Mastropieri, 1988). The main purpose of mnemonics used in knowledge formation, transformation of knowledge into comprehension and skill formation is to help students remember facts and concepts. This goal is imperative for school success, as it refers to content that needs to be remembered and quickly recalled in every field. Mnemonics provide students with tools that they can use to encode information better so that the information is easier to remember at a later time. In general, it is known that mnemonics are useful for any academic task that requires factual recall of information and are effective in increasing performance in subject areas (Therrein et al., 2011). This proven effectiveness of mnemonic makes it a valuable tool in the classroom (Lloyd et al., 1998). Mnemonic strategies that provide verbal or rhythmic stimulation are especially important for students who have difficulties with storing or recalling information.

Mnemonics are intelligent picture associations, keywords, or letter strategies that help students recall or recall information by establishing relationships that do not naturally exist in content. It requires associating unfamiliar content information with previously known information using a visual image or letter/word combination. In other words, they are systematic procedures applied to strengthen memory and make information more meaningful. It has been developed to facilitate the recall of new and unknown information and consists of many different strategies that can be implemented. The main purpose of using mnemonic strategies is to find a way to relate new information to information already in students' long-term memory. When this connection is established, it is possible to remember the information for a very long time.

The way information is initially encoded makes it easier for the student to store and recall. In other words, students direct memory to remember facts by associating the memory with simpler and easier and available information.

Students' failure to master knowledge is due to the use of inappropriate cognitive techniques or strategies. There are different methods each student uses to remember the information they need. In this context, it is important for students to choose mnemonics that are suitable for them. The increase in the frequency of using mnemonic increases due to the increase in basic acquisition and retention problems. In the memory storage model systematized by Atkinson & Shiffrin (1968), it is seen that individuals use storage processes while placing information and skills from short-term memory to long-term memory, and then repeating these processes to ensure the permanence of knowledge and skills.

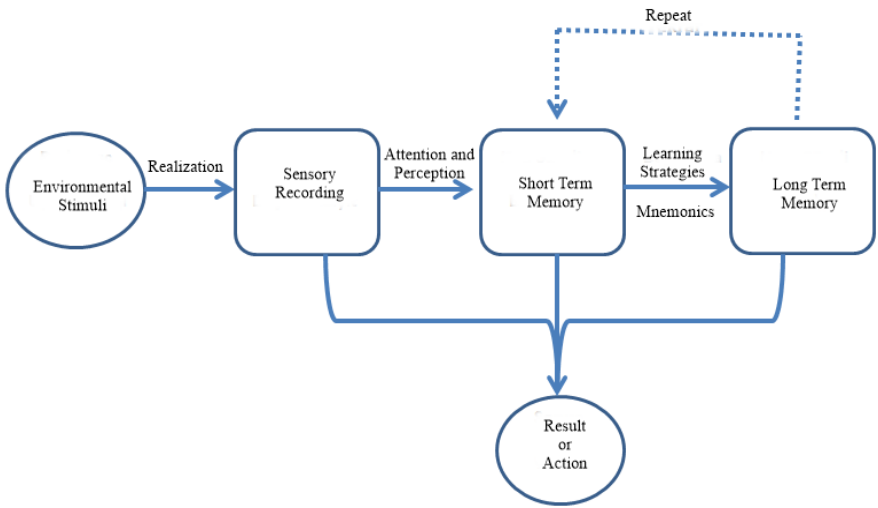


Figure 2. Atkinson & Shiffrin, 1968

Many kinds of knowledge and skills can be complex and inextricable, not only for special education, but also for individuals in general education. Often times, individuals use repetition as the only tool to determine a path in storage processes and to settle knowledge and skills. This form of application is considered to be both uninteresting, tiring and inefficient. Reducing rework is possible with efficient storage processes of the content. Diversification in storage processes can be achieved by using mnemonics (Bakken & Simpson, 2011). Mnemonics are learning enrichment and deepening tools that are used other than repetition of learning and are more systematic than repetition (Jurowski et al., 2014). In our country, there are subject areas that deepen and expand with the introduction of abstraction and exams that intensify with the second level of basic education (secondary school). This situation creates a

problem for the academic learning processes of all secondary school students, especially those with special education needs at this stage (Wolgemuth, 2008). For example, Figure 3 demonstrates how two more English words can be added by making links from a learned English word using mnemonic techniques. There is the possibility of encountering disadvantages as well as advantages in the use of mnemonic tools and techniques. Mnemonics that are not formed correctly appear to be useful in short-term applications, but they appear as confusion as a result of the increase in the learning cluster and may cause the complete collapse of the desired structure (Bellezza, 1996; Levin & Levin, 1990). You can turn a hundred-unit learning space into a ten-unit memory-supporting code. When the code of ten units is associated with the whole of one hundred units, that is, when it is guided to be remembered easily, it is reduced to eleven units. However, if the ten-unit coding made cannot be associated with the area of one hundred units, then a burden greater than the first one hundred and ten units may be encountered. If there is no pre-experience and a meaningful relationship established with these experiences, the burden increases for individuals who need special education.

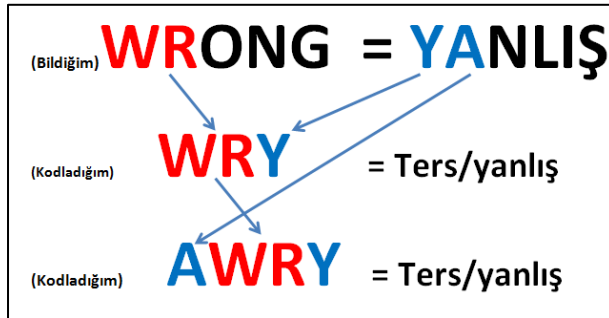


Figure 3. Mnemonic Sample

For example, the greatest common divisor (GCD) will be meaningful as long as it is known that it is the largest value that can divide both numbers. Especially in the exam preparation processes, it is seen that long but meaningful wholes are replaced by abbreviations (acrostic), and their relation with the meaningful whole is cut off. When the students are asked 'What is GCD?', it is possible to see that the concepts of GCD and LCD (the lowest common denominator) are mixed as "it was something starting from the small divisor according to the division of two numbers by two, three ...", "If we multiply all the divisors, the other ones will come out". It is necessary then to save the individual from unnecessary memory supportive loads when mnemonics cannot be created with that concept and skill by considering by considering the kinds of knowledge to be taught and by creating memory supplements.

Mnemonics are memory tools that help remember systematic parts of wider information in the form of lists, such as levels, parts, and stages. Because mnemonic techniques strengthen remembering, the success of the test results of students who regularly use mnemonic techniques increases by up to 77% (Miller & Strawser, 1996). The effectiveness of these techniques is limited by the imagination of the practitioner, but the wider the practitioner's imagination, the stronger the effect of the technique. Some basic principles need to be addressed when using mnemonics (Amiryousefi & Ketabi, 2011):

a) Using mental images: Since visual images are easier to remember than words, information must be converted into mental images.

b) Making it meaningful: By making everything meaningful and memorable, it is possible to transfer information from short-term memory to long-term memory. Therefore, if something is wanted to be remembered but does not make sense, then giving meaning to what is wanted to remember makes it easier to remember.

c) Make information an ordinary thing: It is necessary to relate information to something that is already known.

d) Use of strange, extraordinary and exaggerated forms of mental association: Strange or extraordinary images make the information that is required to be kept up-to-date permanent.

Generally, 9 basic mnemonic techniques are mentioned.

Music

Music is a rich structure that divides words and sentences into parts, defines their lengths, adds emphasis and focuses on reminders of the audience (Wallace, 1994). In addition to entertaining and resting individuals, it has a positive effect on remembering important details of the subject and main idea in any discipline. Research on the brain and memory reveals that exposure to music not only alters but also increases brain function. When lyric or song is integrated into the learning process as a learning strategy, memory and recall abilities also improve. New information that is desired to be remembered is absorbed more easily when associated with previously known information (Jacobs, 1984). Therefore, the use of a melody familiar to the student reduces an item of information that must be processed into the memory. A simple and catchy melody is effective in remembering a repetitive and consistent rhythm, as well as the use of alliteration, rhymes and imagery.

A song is the best reminder tool to make it easier for a student to remember definitions and concepts. When many students need to learn a list of information, they easily learn it by converting that information into a song. Textual information is likewise better remembered when presented as words of a song or a familiar melody (Gfeller, 1982; Wallace, 1994). For example, some students learn the order of the alphabet better with ABC songs and remember

the order of the letters by muttering. Companies attach importance to using music in TV, radio and Internet advertisements so that customers remember their products while shopping. Ads enable shoppers to start humming the song lyrics or melody of the advertised product when they see the company's products. Music reminders work best when trying to remember a long list. It is sufficient to prepare melodies in various music genres (pop, rock) in order to remember such a list when needed. Considering how a song is remembered, it is possible to use the techniques used to recall the lyrics from memory to recall academic skills and information. In doing so, music and rhythm should be given importance while organizing the information to be memorized. Wallace's (1994) research supporting music as an effective tool in learning and retrieving information found that when three lines of text were transferred to music, students remembered the text better than when it was presented orally and without music. He further found that when he presented a different melody for each line, the students remembered the spoken text better. In this context, it seems that the key to accessing correct information is repetition and familiarity.

Keyword

The keyword method is used as an effective strategy, especially to improve the vocabulary of foreign language learners. Mastering proficiency in the mother tongue can be used to learn technical vocabulary in a field, as well as to teach social studies-related information (e.g., cultural elements of a country, products, cities, etc.). The method has two stages: for example, associate a foreign word with a Turkish word that sounds like part of a foreign word. For example, in Spanish, the word "ropa" means clothing, and in Turkish, the word "urba" is used to mean thick clothing. To learn the word "ropa" in Spanish, the Turkish word "urba" can be used as a key word. If we want to understand what a word means, the keyword method is probably the best memory support strategy. For individuals in need of special education, establishing a connection with the unknown based on what is known constitutes the basis of education. For this reason, the keyword method increases learning efficiency as it associates with new concepts and situations by using existing schemas.

Acrostics

Acrostics are the mnemonic reminders that the most known, used and found useful by students (Bloom & Lamkin, 2006; McCabe, Osha & Roche, 2013). While preparing a name reminder, the first letter of the words to be remembered is taken and transformed into the name of a well-known person or object. Codes can also be created. This is because sometimes codes are easier to remember, even if the name is not the whole. If the order is not important in the names to be learned, the order can be changed to create a meaningful name from the letters. For example, for the colors of the rainbow, the

first letter of each item in the list is arranged to form a phrase or word so that an expression can be a reminder, and the first letter of each word is combined to form a sentence. In other words, acrostics are sentences created for students to get the first letters of the words. The first letters of the words that make up the sentence represent something students need to remember. However, there are also acrostics where the first letter is not always used, abbreviations consisting of a single word are not produced and the remembered information can be a specific word or phrase. In general, the goal is to use key letters to make an abstract concept concrete and to make it easier to remember. In order for acrostic to be used effectively, students must first know the words. For example, acrostic techniques can assist students in remembering the names of the winds in Turkey.

Permanence of learning is important in terms of significance for individuals who need special education. Acrostics are techniques used for definition, rather than for acquiring meaning. It is useful in terms of coding small areas with meaningful problems in large learning integrations. As the number and amount of use of acrostics increase, the permanence of learning problems arise, and the relationships encoded with coding get mixed up, and the learning process can then become more complex than it is.

Model Reminders

In a reminder, which is an example or a model, some form of representation is made to help understand and recall important information. Examples may include a circular array pattern, a pyramid model, a pie chart, and a 5-box array. It is much easier to recall important information during a test when students utilize words, lists and models. In both general and special education, the teaching process progresses as whole-part-whole. While this teaching model in general education can be perceived and transformed by the student, in special education this process is tried to be embodied by giving ready-made models. For this reason, mnemonics created as a model reminder are one of the techniques that help individuals in need of special education learn.

Rhyme

Rhyme refers to putting knowledge into a poem form. We can use rhyme technique in teaching concepts, teaching numbers, and teaching skills, such as sequencing and grouping. The positive response of the human mind to rhythm, the rhythm of everything hidden in it makes these elements attractive in teaching. For individuals who need special education, rhyme-based techniques will be useful as much as any technique that helps with memory. The rhyme technique is one of the techniques that can be used in general education in the pre-school period and in all stages of special education. It is important to record with as many different senses and emotions as possible in the learning process. The connections to be established between the right and left brains in

brain-based learning are considered important for the integrity and permanence of learning. In ensuring this integrity, giving academic information paired with poems, songs and visual representatives will provide permanence.

Note Editing Reminders

The way the textbook and its notes are organized has an effect that prevents learning or facilitates the recall of what has been learned. The arrangement of the notes can encourage recall and can also be used as a memorization technique. Note cards that support recall are an easy way to organize key ideas and related details to recall. When the main ideas are transformed into test questions, note cards help students see the question and remember the answers they need to mark in the exam. Likewise, note-taking, editing and note-producing tools, such as Mind Maps, are brain-based techniques that enhance memory support. The association and linking method, which is one of the memory supporting principles, and key concepts, visuals, and numbers can be given as examples of reminders to support learning and note editing. These learning strategies assist individuals in need of special education in becoming more productive in their academic learning. Further, note-taking and editing processes can be used as a learning strategy for both repetition, coding, and interpretation. The shortness of the temporal memory of the short-term memory makes it important to process and encode information in a short time.

Image Reminders

Visual reminders represent new information as a detailed image. The information is created in the form of a picture that supports the retrieval of information when needed. In other words, the information is transformed into a picture. These images can be mental or drawn on text and lecture notes. Image reminders will help learning and remembering, as long as the meaning of what is drawn is known. There are many studies showing that individuals with autism differ in the use of their visual memory. By taking advantage of these features developed in private individuals, this area can be used in order to teach undeveloped areas and to improve their academic skills.

Hanger Technique

In order to ensure the permanence of the concept to be learned in the hanger technique, the target concept to be remembered is connected to a visual reminder, rhyme, or other mnemonic memory support. The hanger technique is based on association with other memory supporters. Often times this technique is used as a mnemonic that involves combining words with numbers. It is used by creating mental relationships between items that need to be remembered and items that are already associated with numbers.

Map Creation

The map can also be called the docking or Loci method. This method of learning new information involves placing each item to be remembered on a

point that has been previously formed and learned in the mind during an imaginary journey. The information can then be recalled in a specific order, following the same route along the imaginary journey. This method has inspired many TV shows and memory shows. The heroes in these programs are able to attach some features of the newly given information to the maps they have memorized before (preferably the object and place orderings in their homes or rooms) and thus create the perception that they have extraordinary mental capacities. In special education, these associations can be supported with visual images and stories and work towards ensuring permanent learning.

Special Education and Mnemonics

Mnemonics are specific techniques and strategies that are often used deliberately to improve memory by facilitating the learning process and the recall of information. They help to use information stored in long-term memory to make it easier to memorize information. Mnemonics are one of the most important methods and methodologies used in the field of education, dating back to ancient times. Today, mnemonics are rarely used by teachers and students in general education classrooms and even less in special education classes, where students with limited mental activities, attention, learning and memory capacity are taught. Since students with special needs cannot learn the course contents with general teaching methods, there is a need to use differentiated teaching methods or make teaching adaptations. These adaptations are called techniques that help students define, organize, understand and remember information. All students, whether they have special needs or not, learn better when: (1) they actively participate in activities; (2) abstract concepts are presented in concrete form; (3) knowledge is presented in an organized manner, and parts and all relationships are made clear; and (4) important information is distinguished from insignificant information. Instructional adaptations are also made taking these principles into consideration. When special educators who have knowledge about mnemonic techniques make their teaching adaptations within the framework of these principles, a more effective education is realized.

The effectiveness of mnemonics in teaching students with different types of disabilities has been experimentally verified (Berkeley & Scruggs, 2010) and proven to be a research-based method (Brigham, Scruggs & Mastropieri, 2011; Conderman & Pedersen, 2005; Scruggs et al., 2010). The aforementioned studies emphasize the importance of mnemonics in teaching concepts to individuals with special needs. For students with memory problems or processing disorders, mnemonics act as a tool to link new ideas to old ideas. Considering that different ways or methods are needed to enable students to learn basic concepts while teaching students with special needs, mnemonics play an important role in these students' storage of information and making connections

between concepts in fields such as science, mathematics and concept teaching. In special education, mnemonics are used to a) increase the capacity of information storage, b) create accurate, permanent and effective records, and c) retrieve information easily (Boutsika, 2014). In order to achieve the aforementioned purposes, In order to achieve the effective results as mentioned above, memory boosters can be used separately or in combination. The richer and differentiated the learning activities are, the more possible it becomes to increase learning and ensure permanence (Bakken & Simpson, 2011). However, it may be difficult to find activities that will always attract the attention of the students and encourage them to participate in learning voluntarily. Such difficulties may arise from the inadequacy of the teacher, the inappropriate content or the perception differences of the students. A content that is uncomplicated or less complex for normal individuals may seem too complex for students with special needs. Mnemonics play an important role when the content needs to be systematized (Bakken & Simpson, 2011).

Mnemonics help students learn information, as well as help store and retrieve information in long-term memory (Mastropieri & Scruggs, 1998). It is seen as one of the effective ways to ensure the progress of students who are left behind from their peers, especially academically. These students often fail to develop the knowledge, skills, willpower and self-regulation necessary to succeed in core academic fields, such as mathematics and reading. Considering that the students are not familiar with the content, the information is complex and there are many concepts that need to be taught, mnemonics have effective results for students who have trouble recalling information (Levin, 1993). However, students with intellectual disabilities experience difficulties with attention, memory, logical reasoning, and these difficulties mean that they will also have difficulties in learning new information, organizing and elaborating information. Considering that these students need to learn how to learn effectively, the need to use mnemonic arises. It is known that students with learning difficulties also experience memory-related difficulties (Mastropieri & Scruggs, 1998). This situation provides a prediction that students with special needs will process information differently than their normally developing peers (Mastropieri et al., 1997). Mnemonics help these students to link academic content with information processing. Scruggs & Mastropieri (2000) state that mnemonics are effective in teaching students with learning difficulties because they help them use their cognitive powers. Mnemonic techniques assist in eliminating confusion. Consequently, students with learning difficulties are able to master the learning content more easily. The retrieval of data that could not be placed with life activities and learning experiences creates a problem. Mnemonic techniques contribute to the process of retrieving such content and transforming it into practice.

The working principles and learning processes of the human mind follow the same path in everyone. Mnemonics are techniques based on this basic feature of the human mind. Since mnemonics are a framework for learning and various techniques can be applied, they can serve all kinds of needs of students. For example, while students with communication disorders can use images, students with Attention Deficit Hyperactivity Disorder tend to use abbreviations. Students with Autism Spectrum Disorder (ASD) are more willing to work individually due to communication problems, inability to initiate communication and to benefit from cooperation environments sufficiently. Since mnemonic techniques are based on individual learning, it is both easy and efficient to use in these areas (Boutsika, 2014). Although students with ASD have limited skills in many areas, they have extraordinary skills in other areas. Features, such as strong memory, attention to details, extraordinary musical skills, speed of operations with numbers and superiority in visual memory can be counted among these. Based on their strengths in visual memory, methods that employ attention to pictures and details, such as PECS and TEACCH, were developed and used in their education. Apart from these methods that predominantly use pictures and visuals, pictures are frequently used in areas such as language speaking, concept teaching, replica teaching, hint-based methods, social skills, leisure activities in ABA or developmental-based approaches used in the education of students with ASD.

Scripts teaching is an effective technique in teaching conversation skills to individuals with autism. While preparing scripts, it is necessary to consider mnemonics such as music, rhythm and rhyme. It is easier for ASD students to learn, repeat, remember and apply the scripts prepared in this way. Voice scripts are recorded on magnetic cards and used by reading them in various card readers. While preparing scripts, techniques, such as memory-supporting music, rhyme, and image reminders are taken into consideration. Learning and repeating the scripts are easier and faster when teaching is done with images that support memory on cards on which the scripts are recorded beforehand. The scripts card is brought closer to the card reader and the machine reads the scripts. The replic, which is taught by associating with the visual, enables the student to remember and repeat the visual reminder without the need to read a machine at the moment he sees it. The same method can be used effectively in naming names, concepts and actions. For students with learning or mild disabilities, musical reminders are also particularly effective in enhancing learning and retaining skills. When the subject they want to be taught is presented through rhythm/song, these students learn more and hide what they have learned. Students who have difficulty retaining information because they cannot read or because no memory strategy is taught usually learn effortlessly

with rhythmic and musical reminders. Textual information is better remembered when presented as words of a song or a familiar melody (Gfeller, 1982; Wallace, 1994).

The use of technology is frequently used in teaching subjects to students with special needs. The aim of technology use is to progress from the intense hint process to gradually decreasing the hint process. It is ensured that learning efficiency is increased with the use of mnemonic tools, which have an important place in learning processes. It is possible to use mnemonics in educational studies using computers and other technologies (Boutsika, 2014). Mnemonics contain a variety of strategies that can be applied in multiple environments and can be used effectively with students of different abilities. From repetitive recordings to abstracts containing acrostics, technology can be used effectively in visual supports using diagrams and links, as well as in the most professional use of rhyme and music (Joyce, 2004).

Literacy Skills, Concept Teaching and Mnemonics

Teaching literacy skills includes the acquisition of basic components of reading and writing that students will use throughout their lives in the following periods with academic success (Avcioglu, 2016). Reading skills, which is the key skill in learning all academic skills, consists of three basic components: decoding, comprehension and fluency. Decoding is the first and most important skill because when the student lacks the ability to decode, the student will use most of his working memory to find letters, syllables, words and sentences. In addition to learning how to decode sounds and words, students are also expected to improve their vocabulary and understand the sentence, paragraph and the text as a whole. Students having sufficient vocabulary depends on associating the meanings of new words with previous knowledge, making multiple repetitions to make it easier for them to retain new meanings and using words meaningfully. Students with learning difficulties may experience difficulties in each of these components. Sheryl & Handle (2010) stated that students with reading difficulties could not understand what they read because they either had difficulties in decoding words or letters, or they had difficulty retaining the texts they read, or they lacked the ability to pay attention.

Teaching vocabulary requires the provision of multiple application opportunities to the students, having the word-meaning knowledge and the active processing of the information. Adequate level of vocabulary is associated with students' memory, language and strategy use skills, and the inadequacy of these skills for students with learning difficulties negatively affects word learning. Teaching techniques to increase the vocabulary of students with learning difficulties should focus on learning the meaning of the word, storing it, and transferring the meaning of the word to the text in order to make it understood. In

general, when students with learning difficulties encounter a new word, attention should be paid to choosing methods that effectively teach how to process and understand the meanings of these words. For school-age students, mnemonics are often applied as a teaching strategy for word recognition and teaching vocabulary. The use of mnemonic has significantly improved the retention of vocabulary learning (Amirousefi & Ketabi, 2011; Berkeley & Scruggs, 2010; Scruggs et al., 2009).

The act of reading can be expressed as a complex process that works not only to see letters and words and to vocalize them (Luma, 2002) and to determine which words are included in the text, but also to understand their meanings. Reading alone is not a passive activity in which words are listed one after the other, and it is an activity of reinterpreting and interpreting the information in the text according to the reader's own thoughts, goals and knowledge as a result of this information (Brügelman & Balhom, 1990). For reading comprehension, the words should be recognized accurately and easily. As well, the words should be read by grouping them meaningfully (Akyol et al., 2014), and the text read by activating the reader's preliminary information should be examined in line with the reader's knowledge and experience. Readers' understanding of what they read is associated with various factors, such as motivation, interest, vocabulary, general knowledge, knowledge about a particular topic, word recognition skills, reasoning skills, using effective strategies to find the main idea and text structure (Torgesen, 2000). It is known that comprehension is not achieved at a sufficient level because students with learning difficulties cannot expend enough cognitive energy to remember and understand the text (Jozwik, 2015). Students with learning difficulties may not be aware of the simple strategies required for rereading texts, as they experience difficulties in reading comprehension due to their inability to read words automatically and accurately (Williams, 2000). These students have difficulty in finding ways to follow the re-planning of the stories. Lack of information affects comprehension and memory. For this reason, they often find it difficult to remember less information about the stories they read and to separate important information easily (Roth & Speckman, 1986). In the reading process, mnemonics is used to increase recall, and as students recall more information, they thus become more successful in applying mnemonics to the comprehension process (Mastropieri & Scruggs, 1998). Mnemonics have the task of finding a way to relate new information to background information stored in long-term memory. Thus, by finding more effective ways to store information, it is possible to remember and recall information. Mnemonics provide structured ways to help recall and retrieve information by creating associations that do not naturally exist in content (Allsopp, 2003).

One of the areas where mnemonic techniques are most commonly used is concept teaching. While the pre-school period focuses on learning concepts such as color, shape, size, smallness, and numbers that ensure school readiness, students are expected to learn many concepts related to different disciplines in the curriculum with the start of the school term (Varol, 1996). Before the concepts are learned with all their features, students learn to recognize the objects or phenomena they encounter, to match similar ones and to distinguish them from other objects (Gallagher, 1989). There are many concepts and terms in courses, such as in social studies (Bakken & Simpson, 2011).

Students with special needs cannot learn the concepts that normally develop naturally in their family and friends environment without going through a systematic teaching process. The generalization problem experienced in concept learning may lead to failure to create a complete conceptual representation in the mind (Hayes & Conway, 2000). Concepts can be taught using different mnemonics techniques. For example, concepts can be taught by placing them in songs, using modeling methods such as concept maps, rhyming them into poetry, and using note-taking techniques such as mind maps. In addition, it can be interpreted by creating a photo novel. Analogies can be created about similar situations, and concepts can be taught more effectively by developing spelling symbols and coding. In addition, the presence of formulas and abstract concepts and relationships in science and mathematics requires the use of memory supports (Jurowski et al., 2014).

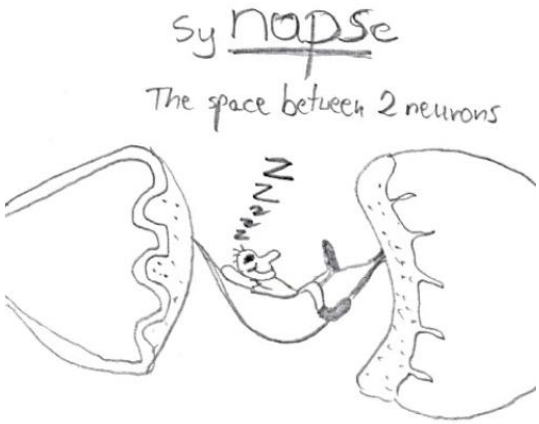


Figure 4. (Jurowski et al., 2014)

The above image was used by Jurowski et al. (2014) in a memory-supporting study involving high school students. The image depicts a person taking a nap in a hammock (the snaps / synapse) tied between the brain cells (neurons / neurons). The concepts used in this example illustrate how associated mnemonics and visual learning serve permanence.

Learning reflexes of individuals in the special education field are either not formed or are limited. Therefore, mnemonics in Special Education have a function beyond the function of ensuring the permanence of learned knowledge and skills. This function is to be the trigger of the learning processes first and then to ensure the permanence. Mnemonics serve for the realization of learning with the generalization processes after this stage.

Mathematics / Science Teaching and Mnemonics

The skills and operations in mathematics are both abstract and sequential. For this reason, learning a mathematical skill depends on learning the previous skills, and having difficulties in learning these skills and passing them without being learned negatively affect the learning of the next skills. Individuals with special needs have the skills to shop in daily life, manage time, use money, make simple calculations and gain independence in society, depending on their competence in mathematics. Mathematics require basic skills, conceptual understanding and speed, and students with learning difficulties may have problems with one, two or three of these factors. The excessive number of concepts learned and the difficulties in associating existing knowledge with newly learned information increase the difficulties experienced by students with mathematics learning difficulties in the future (Kurnaz & Sari, 2020). In addition, these students show deficiencies in four operations skills (addition, subtraction, multiplication, division). Although they need to internalize the skills in order to be functional in these skills, students need a lot of repetition to ensure that these skills come automatically when necessary.

Special education teachers, as well as general education teachers, need to be familiar with strategies that will help students with mathematic difficulties gain access to the general education curriculum and achieve success in all areas of mathematics, including mathematical literacy and conceptual knowledge (Gargiulo & Metcalf, 2013; Powell, Fuchs & Fuchs, 2013). Since there are many concepts that students need to know automatically in order to perform more complex tasks in mathematics, mnemonics are needed to increase the performance of students with learning difficulties (Miller & Strawser, 1996). At the same time, mnemonics are used as one of the strategies to help students develop their mathematical vocabulary. In order to facilitate the recall of the meanings of mathematical concepts/words, it is beneficial to teach mnemonic techniques to students and to use reminders to keep new information in the memory. Greene (1999) claims that mnemonics increase the rate of retention of mathematics knowledge by students with learning disabilities by 28%, compared to traditional teaching. For example, increasing the ability to memorize information can improve math performance, given computational difficulties (Miller et al., 2011).

Teaching mathematics cannot be considered separate from metacognitive strategies. Skills, like problem solving and decision making, for instance, are an important dimension of mathematical thinking. While the majority of students in the general education process acquire these metacognitive skills by discovering themselves, these skills are given to students with special needs in the form of steps and initials. It is provided with mnemonic with meaningful content, such as coding, visualization and schema (Mevarech & Amrany, 2008).

Science education aims to improve the concepts acquired through experiences in memory and to teach thinking and questioning the cause-effect relationship (Tobin, 1986). In science education, students are guided to find problems, to form hypotheses in their search for problems, to reason scientifically and to produce new solutions by collecting data (Jo & Ku, 2011). Further, science education benefits students throughout their lifetime in many ways. For instance, as students learn basic science concepts, facts, generalizations, laws, theories and scientific operations, students demonstrate increased interest in their environment. Moreover, as students advance in their scientific learning levels, their problem-solving skills are also improving (Diken, 2015). For this reason, it is thought that every student, whether or not they have a disability in the information society, will be able to gain knowledge, skills and attitudes of science in the education process to the extent of their inadequacy (Villanueva et al., 2012).

Activities carried out within the scope of a science-based curriculum lesson contribute to the development of students' thinking and learning skills. In addition to being a lesson with abstract and foreign concepts, the content of the course focuses on students' gaining problem solving skills. In this context, it is possible to give a problem situation to all students in the classroom in science lessons designed based on inquiry. However, students with special needs experience difficulties in understanding science concepts (Karaer, 2017). While students with normal development in learning science-related concepts can easily recall information from memory, students with learning problems, however, often have difficulty remembering science-related concepts (Therrien et al., 2011) and may perform significantly lower than their peers (Mastropieri, Emerick & Scruggs, 1988) in science exams. They tend to perform poorly compared to their peers who do not have any disabilities in science courses that require abstract thinking skills. They have trouble understanding, answering, summarizing and remembering the thought. Because of the limited speaking and language skills, most students with disabilities have limitations in their learning and applications (Salend, 1998).

In traditional general education classrooms, teaching is typically carried out using textbooks, and students with learning problems often have difficulties in learning the concepts related to the subject because they are the only

type of techniques used in classrooms (Therrien et al., 2014). The success of students with special needs in science lessons can be increased by providing permanence in learning by choosing teaching methods that can be effective in science teaching (Mete, Cross, & Yildirim, 2017). For this reason, mnemonics are needed to improve the ability of students with learning problems to memorize and remember information related to science (Brigham et al., 2011; Scruggs et al., 1985; Therrien et al., 2011). It is known that students can learn science concepts (such as water resources, air, pollution, nutrition and solar energy) if effective applications are used and problems are presented in relation to real life situations (Salend, 1998). Creating appropriate experiences regarding the solution of the problem situation, providing students with special needs the opportunity to reach results based on inquiry and discussing these results with concept maps and reminder pictures (Watt et al., 2013) will also increase efficiency in science lessons.

Skill (Psycho-Motor) Teaching and Mnemonics

A physiological movement and response of all spiritual and intellectual formations, understandings and approaches in the human body take place in the brain. Stimulants taken from the external environment through sensory perception recording channels are transferred electrically inside the cell and chemically between the cells (Duman et al., 2009). Emotions provide attention, help form meaning, and have unique memory pathways (Le Doux, 1994). Emotions always follow the brain's widest and fastest paths. In the central part of the brain, there is a nerve, a bundle of neurons that passes directly from the thalamus to the amygdala. Prescott (1980) states that when the movement is restricted, the relationship between the cerebellum and other parts of the brain weakens. In a study conducted by Gilbert and Thach (1977), third grade students learned language concepts through dance activities. While the average reading score of the schools in the education region where the school is located decreased by 2%, it was observed that the reading scores of the students increased by 13% in 6 months. In practice, by including familiar activities, such as crawling, rolling, spinning a wheel, swinging and somersaults, students' attention and reading scores were significantly increased through such stimulating activities (Palmer, 1980).

Exercise, movement and sports muscles help shape the heart, lungs and bones and strengthen all important areas such as the cerebellum and corpus callosum. Exercise delivers oxygen to the brain. In this way, it enables the development of neurons and more connections (Krustrup et al., 2006). In a study showing the relationship between movement, physical activity and learning, it was concluded that the learning level of students with good movement coordination was better because more oxygen was provided to the brain during movement, and movement affected the part of the brain related to cognitive

skills (Bidzan-Bluma & Lipowska, 2018). An exercise / movement program focused on the development of structured and complex movement skills is more effective than a computer-based mind training program in the development of an individual's cognitive skills (Moreau, 2015). It has been demonstrated that advanced movement skills activities in early childhood, cognitive development and academic achievement development in children with this skill are more effective than computer-based cognitive training intervention programs (Cadoret et al., 2018; van der Fels et al., 2015). The area of the brain associated with movement is the cerebellum. The cerebellum is one tenth of the brain in volume, but more than half of the neurons in the brain are in the cerebellum (Krustrup et al., 2006). The nerve fibers here are 40 times more than the nerve fibers in the visual area. They not only feed the information coming from the cortex to the cerebellum, but also what goes from the cerebellum to the cortex. The part where the movements are processed and the part where learning is processed is the same place in the brain. There is not a single center of action in the brain. Movement and learning constantly affect each other mutually (Greenfield, 1995).

Brain plasticity is the ability of brain cells to change themselves in response to the stimuli they receive. Brain plasticity is the foundation of learning and memory, the center where learning and teaching occur. Adapting the neuron system according to environmental requirements is called the number and power of connections between neurons and the ability to rearrange and renew itself as a result of each experience (Caine, Caine & Crowell, 1999; Sylvester et al., 2007). It is seen that traces of psychomotor learning stored in long-term memory are located in the cerebellum (Krustrup et al., 2006). There is a consensus among experts that the hardware in the brain is determined by 30-60% inheritance and 40-70% by the influence of the environment. Brain cells consume oxygen and glucose as fuel. The harder the brain works, the more fuel it consumes. Increasing the rate of oxygen in the blood gives more energy to the brain. It strengthens the communication and connection between brain cells (Krustrup et al., 2006). The brain requires much more oxygen than other organs in the body. The brain makes up only 1/15 of body weight but uses 1/5 of the oxygen in the body (Blaydes, 2008). Oxygen is important for learning, and movement ensures that oxygen is transported to the brain for efficient functioning and learning. Movement is an activity that increases blood circulation and indirectly increases the amount of oxygen in the blood. It contributes to the development of the structure necessary for the formation of learning even when it is not directly instructive.

All kinds of influences and intellectual approaches find a biological and physiological response in the brain. When a person is aware of the physiological, biological and chemical changes in himself while learning, he becomes

happy, renews himself and improves himself. In this case, the brain changes itself physiologically. Cells in the brain rebuild networks of connections. The network of connections is the source of positive associations, memories and joys, images, sounds, and colors for later learning. It awakens new interests for new learning. Previously learned ones release twice as much serotonin for new learning, triggering success. According to Krustup et al. (2006), those who have sufficient levels of brain chemicals, such as serotonin and dopamine, are successful. On the other hand, Jakobs discovered that dendrites in the brain of students who are more willing and make more effort in their school life create more branches and connections than students who do not (Krustup et al., 2006).

There is a reciprocal interaction between external stimuli such as fear, anxiety, threat, and brain and hormone reactions. Emotionally profound moments are handled differently from natural events. In stress situations, the brain adrenal glands stimulated by the hypothalamus secrete adrenaline and noradrenaline. The veins narrow, the heart works faster and stronger, the brain releases adrenaline and noradrenaline. This disrupts the balance of the body, when the rate of hormones in the blood increases, the synapses that provide the passage between cells in the brain stop the transitions and block communication (Duman et al., 2009). If fear, anxiety, and unmanageable factors are determined in the brain, the amygdala activates the body's tension responses. It occurs as a war or escape behavior in the individual. Blood passes from the neocortical area to the amygdala, a collapse occurs in the neocortex area, and the logical decision-making and thinking process is closed (Gazzaniga, 2005; Sousa, 2001; Sylvester et al., 2007). A student who falls into a troubled psychological situation in a learning-teaching environment cannot process, organize and understand the questions he / she knows at the desired level because the communication between cells in the brain cannot be established properly (Duman et al., 2009). In such a situation, what needs to be done in order for the brain to perform its normal function is to awaken the feeling of curiosity, to present information with an effective method, to establish a body-brain relationship, to ensure movement and to use different perception recording channels (Duman et al., 2009).

Synaptic development in the brain varies according to the type, location, intensity and time of the activity. New bodily movement learning creates new connection points, synapses, in the cerebellum cortex. The repetition of kinetic learning makes the blood vessels in the molecular layer more intense. The use of physical movements in learning enables the communication warning systems in the body to activate in the brain. It enables the student to call his / her own body for help, to pass various subjects through different sensory perception recording channels and to strengthen the perception (Krustup et al.,

2006). Ayers (1972) and Hannaford (1995) found evidence demonstrating the effects of motor stimuli in reading, writing, and attention. Although research on the general importance and value of motor skills goes back a long time, their effects on reading, writing, stress, attention, memory, and emotional development are only recently investigated. The exercise itself does not make the individual smarter, but it facilitates learning and focus and optimizes the brain for learning. The problem with the current classroom setup is that students stay still in the classroom environment.

Brain scans show that students learn best while moving and learning at the same time. The movement stimulates the necessary neurons and electrical wires that facilitate the student's ability to receive and learn information. Krustup et al. (2006) states that movement facilitates learning by creating more synaptic connections in the brain. There are many studies showing that students need adequate amounts of play and physical education during the school day. Among the reasons are not only preventing obesity-related problems but also increasing academic performance. Science has provided real visual evidence that new brain cells are grown when physically active. The area of the brain called the hippocampus, which is examined before physical activity, shows increased blood flow after physical activity. Play activities increase blood volume, revealing evidence that new cells are forming in this area. Blaydes (2008) states in his study that 80% of the blood in the body is in the hips after just 20-30 minutes of sitting. If the blood is in the hip and not in the brain then learning can be more difficult.



Figure 5: Physical Activity Brain Relationship (Blaydes, 2008).

Teachers, families and administrators need to acknowledge students' being more active as a part of education, not only to benefit classroom culture and student health, but also to make learning more effective, and take measures and make arrangements in this direction. In addition, new research shows that

Social Skills Teaching and Mnemonics

Social skills are the most important skillset required for an individual in order to meet society's expectations and live effectively and independently within society (Ciftci & Sucuoglu, 2004). Social skills are learnable behaviors that include both observable and unobservable cognitive and affective elements. Social behaviors vary according to the target and social context. As well, each individual's social behavior varies in how they obtain, analyze and understand social knowledge in their interpersonal relationships (Sahin, 2001). Social acceptance is associated with a sense of competence, self-confidence, resistance to stress, cooperation and controlling aggressive behavioral impulses (Berkaley, 2006). Skills, such as initiating and maintaining interpersonal relationships, working with the group, expressing emotions and understanding others' feelings, dealing with negative situations, planning and problem solving constitute social skills. In addition, the skills of individuals, such as using public transportation, eating at a restaurant and using cash machines, are also included in social skills.

One of the most important requirements that students need in their daily and personal lives is to have social competence. Having social competence requires the individual to have acquired social skills and to use these skills according to the appropriate time, place and situation criteria. Students with social competence understand and recognize someone else's feelings, they express their own feelings appropriately, are capable of empathy and know when to engage or end a conversation; They also have skills such as understanding non-verbal expressions of emotion. However, individuals with special needs are incapable of communicating and looking from the perspective of others. Students with special needs cannot understand social cues. For instance, insufficient social skills make it difficult for students with special needs to interact with their peers who do not know the social skills necessary for making friends or how to react to their friends in various social situations. Low respect and social status, problem behaviors and emotional problems also occur due to lack of social skills.

The fact that students with special needs have acquired social skills enables them to adapt to the school and to be accepted by their peers. The acquisition of social skills also affects students' academic achievements and emotional-behavioral states. Since students with social skills will work in harmony and cooperate with their peers in group work, it is easier for them to achieve academic success and progress. In daily life, the teaching of social skills is very important, as it includes behaviors that enable the individual to initiate and develop positive relationships with others, to meet the expectations of the individual in his environment and to convey the individual's needs, wishes, desires, preferences appropriately and to maintain this communication

(Siperstein & Rickards, 2004). Although normally developing students have the potential to learn social skills by observing their families, friends or other individuals around them without realizing it, individuals with special needs need a systematic education to learn social skills. Mnemonics are used to help students learn social and emotional skills that enable them to be ready for school and achieve success. Mnemonics can also be used to teach special needs students to react appropriately to a social situation. For example; it can be taught to students with learning disabilities to enable them to give appropriate responses to verbal messages from their peers.

Suggestions

- Mnemonic techniques will not only teach everything but will be an important assistant of the teacher and other components in the teaching of every subject. It is recommended that teachers receive training in how to prepare and use mnemonic materials
- It is recommended that teachers use mnemonic techniques to provide more opportunities for students who have difficulties in learning, storing and recalling related concepts in the various subject matter content areas.
- In order to ensure that mnemonics are used effectively, it is recommended that teachers develop a plan, model the use of the technique, and teach students the mnemonic techniques explicitly.
- Finally, it is recommended that educators working with individuals with special needs receive training on mnemonics. Teachers should use special teaching methods to address the special needs students' limitations in remembering, learning and using information.
- Using mnemonic techniques in the classroom strengthens the mind potential in learning and remembering information, as well as enriches the student's learning experience. In order to increase learning performance of students with special needs, teachers should also keep in mind the type of disability of the student, the subject matter being taught and the appropriate teaching method.

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POWERFUL INSTRUCTION AND POWERFUL ASSESSMENT: THE DOUBLE-HELIX OF LEARNING

Garfield Gini-NEWMAN,* Laura Gini-NEWMAN**

Education should expand horizons, inspire wonder and stimulate the intellect.

The Double-Helix of Learning

Nearly 70 years ago, Francis Crick and James Watson ushered in the new era of modern biology when they first published the now ubiquitous double-helix DNA structure first drawn by Crick's wife Odile. A DNA double-helix consists of two complimentary strands of nucleotide bases held together by hydrogen bonds. This 3-D structure represents the most stable conformation for a DNA molecule, based on the chemical and physical characteristics of its building blocks (Gini-Newman, 2019). Similarly, learning can be seen as an organic living force that is dependent on its own double helix. Instruction and assessment - two strands that when linked – are the backbone essential for learning to occur. Remove either of the strands and the structure malfunctions, as its ability to serve the purpose of learning is impaired. Also, much like the DNA of life, the strength of the double-helix of learning is dependent on the bonds that exist between the two strands. In other words, assessment and instruction cannot not merely exist as independent parallel components of learning but rather need to be understood as co-existing elements that complement one another. They are connected through the intentional use of structures, routines, and practices that promote deep understanding, quality thinking, and provide the essential elements required for learners to flourish.

Assessment And Instruction: The Artificial Divide

A long-standing issue in education has been the unfortunate separation of assessment from instruction. This separation is evident in the fact that in provincial ministries of education across Canada separate curriculum and assessment branches, often housed on different floors, and too often pursuing conflicting educational goals. Similarly, in most faculties of education assessment

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courses stand-alone from methodology courses in which instruction is typically addressed. Although many will claim to examine the intersection between assessment practices and principles of teaching and learning, the focus in assessment courses tends to be on task design, formative feedback and grading; all essential for beginning teachers but also too often disconnected from supporting powerful learning. Consider most rubrics – how well do they actually support students learning? Are they really learning tools or are they scoring tools masquerading as supports for student learning? Furthermore, the unfortunate misunderstanding of formative and summative assessment reinforces assessment as periodic checks on learning rather than an essential element of learning. Far too frequently teachers will refer to the “formative” vs “summative” tasks – which to students translates to work that doesn’t count and work that does count. Dylan Wiliam articulated the all too often misuse of “formative assessment”:

Typically, the feedback would focus on what was deficient about the work submitted, which the students were not able to resubmit, rather than on what to do to improve their future learning... I remember talking to a middle school student who was looking at the feedback his teacher had given him on a science assignment. The teacher had written, “You need to be more systematic in planning your scientific inquiries.” I asked the student what that meant to him, and he said, “I don’t know. If I knew how to be more systematic, I would have been more systematic the first time.” This kind of feedback is accurate—it is describing what needs to happen—but it is not helpful because the learner does not know how to use the feedback to improve. It is rather like telling an unsuccessful comedian to be funnier—accurate, but not particularly helpful, advice. (Wiliam, 2011)

Compounding the problem is the use “summative” assessments as demonstrations of completed learning rather than invitations to engage in learning. In this paradigm of assessment, formative tasks remain periodic checks of understanding or performances that follow a period of instruction. The introduction of the terms “assessment for, of and as learning” have attempted to clarify the confusion and address this problem. Unfortunately, without a fundamental re-thinking of the relationship between assessment and instruction, assessment as learning will remain an amorphous term that may fit a catchy edu-babble phrase but rarely plays out in a meaningful way.

Harnessing The Potential for Curatorial Thinking And Prospective Thinking

The past couple of decades has seen an exciting expansion of approaches to learning that attempt to tap into authentic learning opportunities powered by the arrival of new technologies. As information has become increasingly available at our fingertips, educators have realized the need to move away from the mere delivery of content. This has spawned a variety of alternative pedagogical models including the infusion of “Genius Hour” in the school calendar

and the creation of “Maker Spaces” within schools. Some educators are advocating for and implementing a “Design Thinking” approach while others advocate for Case-Based, Project-Based or Problem-Based learning. What all of these approaches share is a foundation in inquiry – where students become active participants in the learning process. As we move away from didactic lecture and textbook driven classrooms to more dynamic and active learning, we redefine learning as an act of knowledge creation rather than knowledge consumption, and curatorial thinking increasingly becomes a key competency for all learners. Through the active participation of gathering, meaning making and story-telling, we all contribute knowledge by adding our micro-narratives to the broader story of the human experience and to an understanding of the world both past and present.

At its core, curatorial thinking is a subset of critical thinking as it relies on the ability to thoughtfully select, organize and use information to communicate a compelling story. What distinguishes curatorial thinking from many other forms of critical thinking is that its purpose is primarily explanatory rather than evaluative, and consequently, curators hope to open doors to intriguing stories and invite others in. By its nature, curatorial thinking is active and participatory as it requires the thoughtful selection of evidence and artifacts; the ability to organize materials and see connections between artifacts and across disciplines; the careful analysis and creative interpretation of the insights that can be gleaned from the sources; and, the ability to craft a compelling story to be shared with others.

While the Internet is opening up whole new worlds to children, even in remote communities, this new information age is fraught with considerable challenges. Along with the explosion in information available to students has come the challenge of recognizing fake news, sifting through information that may have no filters, and making sense of disparate perspectives. Engaging children in learning through inquiry in a digital world requires a great deal more than providing an interesting task and time to gather information. It also requires developing the tools of effective digital researchers including; being able to read laterally as well as for depth, to be able to filter information so as not to be either misled or overwhelmed in information; to carefully consider both purpose and audience when designing a response to a challenge; and to thoughtfully select the best digital tools to use when engaging in rich and authentic learning tasks. (Mant, 2020)

When curatorial thinking takes on a perspective twist the value and meaning of learning is significantly enhanced. Prospective thinking (meaning “thinking to the future”) is the art of imagining and differentiating possible and impossible scenarios for the future based on trends from the past and the data available today. Through the collection and interpretation of valid and

reliable sources of evidence from a wide range of perspectives, an integrated understanding of trends relating to human and natural well-being is constructed. Prospective thinkers project these trends into the future and make ongoing revisions based on unanticipated changes as they seek to make a positive difference in the world over time.

Essentially, prospective thinking involves developing **Memories of the Future** which are formed by linking the past through the present to the future. It also involves creating simulations of future events and working through the consequences. It is mental time travel; reliving the past as it might happen in the future. Most importantly, prospective thinking helps students use their learning to become effective agents of change. (Gini-Newman and Gini-Newman, 2021)

What Should Be at The Core of Our Learning Goals?

Before delving into the nature of the shift needed let's define our goals for learning. We propose that for learning to be powerful requires a focus on four key goals – deep learning, meaningful learning, active learning, and connected learning.

Deep vs superficial understanding: To achieve deep learning requires a shift in focus from recall and replication to conceptual and transferable knowledge that has the potential to have a transformative impact on the learner. When students achieve deep understanding they are able to see connections within and between subjects and more importantly beyond school to see the relevance and importance of learning to everyday life (Gini-Newman & Case, 2015).

Meaningful learning: For students to see value in what they are learning it needs to be culturally relevant, awe and wonder inducing, and set within an authentic context. Although some students may be able to achieve deep learning despite a lack of meaning it will fail to engage and inspire a future desire for independent learning. Equally concerning is that meaningful learning that is superficial may capture interest but fail to achieve deep intellectual engagement. Hence there is a need for learning at the intersections of deep and meaningful learning. (Gini-Newman & Case, 2015).

Active learning: Achieving deep understanding through the passive transmission of information, regardless of how important the information is to a subject area, is difficult and antithetical to powerful learning. Students retain better and more deeply understand concepts, ideas and facts when they are actively engaged in constructing knowledge. Knowledge construction involves both the building of background knowledge and conceptual understanding and the application of new knowledge to respond to authentic and meaningful challenges (Gini-Newman & Case, 2015).

Connected learning: *Powerful learning occurs when we teach at the intersection of deep learning, meaningful learning and active learning. To learn at this intersection requires the constant and seamless interplay between effective instruction and assessment as well as the cultivation of relationships among students and between students and teachers that create a community of supportive learners invested in each other's success.*

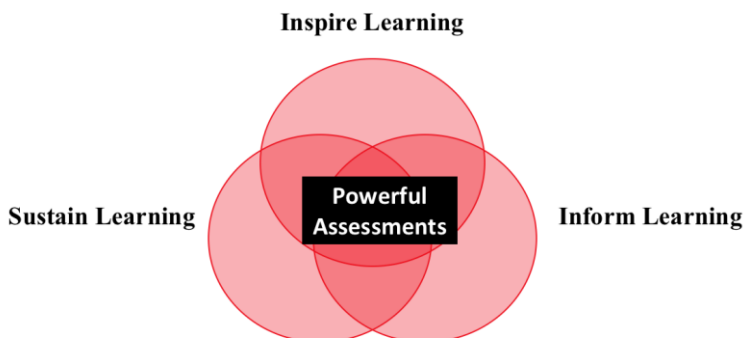
In a community of learners, the children do not just carry out pieces of an activity without connecting them to their purpose in the overall activity (Brown & Campione, 1990). The instructional discourse

in a community-of-learners classroom is conversational rather than using the traditional question response-evaluation format (Mehan, 1979; Tharp & Galimore, 1988). The adults' roles are supportive and provide leadership, rather than controlling all interactions in the classroom. In a community-of-learners classroom, organization changes from dyadic relationships between teachers responsible for filling students up with knowledge and students who are supposed to be willing receptacles to complex group relations among class members who learn to take responsibility for their contribution to their own learning and to the group's functioning. Instead of one individual trying to control and address 30 students at once, it is a community working together with all serving as resources to the others, with varying roles according to their understanding of the activity at hand and differing responsibilities in the system. (Rogoff, 1994)

Powerful Learning Driven by Assessment

When the primary focus of assessment is on gathering proof of student learning and the degree of success in achieving learning outcomes, its true value in learning is deeply inhibited. Undoubtedly, it is important to gather evidence of learning so that we can make instructional decisions about next learning steps as well as to allow for effective grading and reporting on learning. But, for assessment to support student agency, which involves both the will and capacity to learn, we must focus on empowering students as learners. We can not only better gather evidence of learning that is valid and reliable but also help students understand and be participants in instructional design as self-reflective learners. What evidence is considered and how it is interpreted to arrive at a fair and reliable grade matters when determining students' level of success for a defined period of learning. (Rogers, 1993). This focus on effective grading brings with it its own set of challenges and considerations but is not the focus of this discussion. When examining the efficacy of assessment as an integral part of learning, our focus needs to be on the key functions of "powerful assessment".

Powerful assessment occurs at the intersection of three essential goals for learning - inspire learning, inform learning and sustain learning.



Of the three key functions of powerful assessment, inspiring learning is most often the one that raises eyebrows. Ask many students and adults as former students if they felt inspired. Assessments and inspiration are terms they would typically not connect and you are likely to find the majority either reply in the negative or are perplexed by the question. A common response is often, “assessments create perspiration not inspiration!” In other words, for most learners, assessments are stress inducing tasks-- activities that are designed as a culmination of learning to measure the degree to which they have been successful. Used as an end of learning measure of success, assessments can seldom be a source of inspiration for engaging in learning and instead create anxiety as students perceive assessments as judgments on their abilities.

Similarly, when assessment tasks and activities are used as either periodic checks or culminating evidence of learning, their effectiveness at informing learning is limited. Used effectively, assessment should provide useful guidance for students that helps them to affirm strengths, revise to improve areas of weakness and to extend learning to push them beyond what they may have thought themselves capable of. Concurrently, assessment should provide clear and useful insights for parents and students on learning progress creating opportunities for parental guidance and support in learning. Of course, ongoing and timely assessments are essential for teachers to be able to make informed decision on how to choreograph learning in their classrooms to ensure all students are receiving the guidance and instruction necessary for them to flourish.

Finally, for assessment to truly be a powerful element of learning it must be much more than a periodic check and a culminating activity. Powerful assessments are designed to launch and sustain learning so that they underpin a rich intellectual journey for students by serving as a source of inspiration not merely a demonstration of learning (Scott, 2016). When learning is launched with an engaging provocation that invites students to immediately consider a response, the conditions for sustained learning are set. Under such conditions, every form of instruction, be it a lesson, a field trip or independent work by

students, serve to help them develop and refine their response to the challenge that initiated the learning. Through an iterative process of meaningful learning and reflection students develop open-mindedness, perseverance and a willingness to take risks as they see the value in productive setbacks.

Powerful Learning Through Instruction

What teachers do matters. Powerful learning needs powerful instruction. When teachers employ powerful instruction that is carefully choreographed to scaffold student thinking classrooms support the natural learning process of the brain. For students to be able to engage in deep critical inquiry they require the requisite background knowledge and conceptual understandings that allow them to reach thoughtful and reasoned judgments (Gini-Newman & Case, 2015). Similarly, when teachers ensure students can identify important criteria and equip them with a range of thinking strategies they prepare them with the intellectual tools required for deep learning.

A common misconception around inquiry is that teachers do not need to teach content as, the false belief goes, students will independently uncover the necessary background knowledge through their inquiry. This misconception carries several dangers. First, it often leads to surface knowledge as students see their task as retrieving information related to their area of research. Secondly, the assumption that all students can come to understand complex concepts and detect trends and patterns on their own is naïve at best. In many situations, it takes the skilled use of instructional strategies used by teachers for students to develop a deep and transferable conceptual understanding as well as develop the capacity you think conceptually (Willingham, 2010). Finally, when inquiry becomes mere retrieval of information, the necessary practice and processing of information is lost. For students to develop automaticity in subjects such as math, music and languages or to be able to use historical insights or scientific knowledge, they must be able to recognize patterns and make connections beyond the specifics of the topics they explore (Gini-Newman, 2019). Instruction like this must bond with assessment so that students also are encouraged to monitor and self-assess their abilities to do so. While data and information can be shared or transmitted from the teacher, a textbook or the Internet, knowledge must be constructed by the learner and wisdom can only occur when that knowledge is used in new and current contexts to help make reasonable choices. For students to construct knowledge and for wisdom to be nurtured they must be actively engaged in iterative learning opportunities (Sternberg, 2003). Learning should always begin with a provocation that invites an initial response and students should be encouraged to continually affirm, revise or extend their response as their learning deepens. By launching learning with a rich and meaningful provocation, students see a purpose to their learning and are able to continually make connections as new

learning develops. Powerful instruction that is both active and iterative helps to ensure the conceptual understandings and necessary background knowledge for responding to rich and complex assessments is constructed with students. Through a sustained critical inquiry approach there is a continuous interplay between powerful instruction and powerful assessment as deepening knowledge occurs through effective lessons in which timely guidance is seamlessly woven into the learning processes used in classrooms. Research into the efficacy of formative assessment reveals two key features that are essential for it to genuinely support student learning.

One is that the evidence generated is “instructionally tractable” (Wiliam, 2007). In other words, the evidence is more than information about the presence of a gap between current and desired performance. The evidence must also provide information about what kinds of instructional activities are likely to result in improving performance. The second requirement is that the learner engages in actions to improve learning; this may be undertaking the remedial activities provided by the teacher, asking a peer for specific help, or reflecting on different ways to move her own learning forward—after all, the best designed feedback is useless if it is not acted upon. (Wiliam, 2014)

Sustained Inquiry for Deep Learning

The more common means of differentiating inquiry is to consider the degree of student autonomy – from structured inquiry to free inquiry. This can lead to the false assumptions that the more learning moves to free inquiry, the deeper the learning. This is simply not true. Whether the inquiry is structured, controlled, guided, or free, the keys to deep learning are the quality of the inquiry and the effective use in intellectual tools that empower learning to draw reasoned conclusions based on what they uncover. Rather than considering the degree of independence, educators should differentiate inquiry by its intent and complexity. Is the inquiry an exercise in retrieval; a response requiring a critical thoughtful response; or is an opportunity to develop a rich response to a complex challenge (Gini-Newman & Case, 2015).

Retrieval



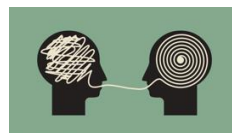
(Inquiring to seek Answers)

Critical Inquiry



(Inquiring to reach a sound or reasoned Answer)

Sustained Critical Inquiry



(Inquiring through a carefully sequenced set of related inquiries that lead to deep understanding and a rich and thoughtfully developed response to a complex challenge)

Re-Thinking the Instruction-Assessment Relationship

Beginning in the late 1990's educators were being encouraged to adopt a “backwards planning” approach to curriculum design. In this approach teachers would first identify desired results, then determine the appropriate evidence students would produce to show learning, and finally teachers would plan instruction to build the necessary understanding to successfully complete the assigned task (Wiggins & McTighe, 1998). The work done around backwards planning, particularly Grant Wiggins and Jay McTighe’s “Understanding by Design” has shaped generations of teachers in how they plan and deliver curriculum. Despite the considerable impact of the work, for most teachers the fact remains that curriculum planning is done through a teacher’s perspective, not the student’s. Generally, lessons are delivered in a linear manner with teachers building students’ content knowledge before providing an assessment to measure their degree of success in learning. Through this linear approach to learning, assessment become a series of periodic checks often referred to as “formative tasks” rather than an instructional approach that seamlessly weaves through the learning journey to create learning opportunities.

We propose an iterative approach to learning that extends the backward planning to engage the learner’s perspective and create the seamless interplay between effective assessment and instruction. Achieving the powerful interplay between assessment and instruction can best be accomplished when teachers build upon the organization of key conceptual understandings and essential questions that underpin backwards planning through careful consideration and use of five essential elements of:

- Over-arching provocations and challenges
- Learning Launches
- Productive Reflection
- Cascading challenges
- Learning through productive setbacks

Over-Arching Provocations and Challenges

Framing learning around rich over-arching provocations and engaging challenges is an important element of inspiring wonder and stimulating the intellect. Attention, is an essential element of effective learning. In his book, *How We Learn*, Stanislas Deheane explains:

With conscious attention, the discharges of the sensory and conceptual neurons that code for an object are massively amplified and prolonged, and their messages propagate into the prefrontal cortex, where whole populations of neurons ignite and fire for a long time, well beyond the original duration of the image... This is why every student should learn to pay attention – and also why teachers should pay more attention to attention! If students don't attend to the right information, it is quite unlikely that they will learn anything. (Deheane, 2020)

Too often the most interesting questions and the rich task through which students demonstrate their learning happen towards the end of a body of learning, thereby forgoing the opportunity to capture student attention at the outset of the learning. Flipped on end, provocations and challenges become invitations to learn rather than merely demonstrations of learning, serving as both assessment and instructional opportunities. Rich provocations present students with genuinely debatable questions for which the answers are not immediately obvious or there are no existing “correct” answers or solutions but there are a range of sound or plausible responses. When paired with tasks that are authentic in both product or performance as well as the intended audience, the use of provocations becomes a powerful organizing component for rich learning.

Sample over-arching provocation and challenge:

Over-arching Provocation: Are we living healthy lives?

Over-arching Challenge:

Develop a “Healthy Living Plan” that provides useful advice on diet, stress and active living for a member of your extended family or neighborhood

Learning Launches

Learning, by definition, is closing the gap between what is known and what comes to be understood through engaging with new experiences. Deheane notes:

To learn, our brain must first form a hypothetical mental model of the outside world, which it then projects onto its environment and puts to a test by comparing its predictions to what it receives from the senses. This algorithm implies an active, engaged and attentive posture. Motivation is essential: we learn well only if we have a clear goal and we fully commit to reaching it.

(Deheane, 2020)

Learning launches invite students to offer an initial hypothesis and to revisit their initial thinking as their learning progresses. They are distinct from “hooks” or “minds on” activities in that they initiate thinking around a provocative idea or issue and yield important diagnostic insights. Learning launches also simultaneously serve as an instructional strategy. Initiating learning through effective “Learning Launches” allows students to offer an initial thought or response to an interesting challenge. As student learning progresses they are regularly invited to affirm their initial thinking, revise based on new learning and new insights or to extend their thinking as their understanding deepens. By doing so students learn how to self-monitor and assess their work and how to make meaningful connections. Learning launches can take many forms including a dashboard, a ranking ladder, a pie chart, an invitation to sketch an initial idea, a first attempt at choreographing a dance, or an initial selection of artifacts for an exhibit or poems for a student published anthology.

An important benefit from the use of learning launches is in the way they cultivate students’ ability to think prospectively. They naturally integrate the goal setting process into the learning process so that students have a clear sense of their learning goal in a meaningful context and they are encouraged to think reflectively about a manageable set of iterative opportunities as they revisit the quality of their thinking and responses. (www.flourishco.org)

Sample learning launch:

Is your family living a very healthy, somewhat healthy or not very healthy lifestyle?

←—————→
Very healthy somewhat healthy unhealthy

Productive Reflection

By initiating learning through a learning launch that invites students to offer an initial response to a rich provocation and an inspiring challenge, students are provided the opportunity to take risks and to revise their thinking as their learning progresses. It also affords teachers the opportunity to provide timely guidance that can assist students in making helpful revisions to their responses. The use of Thoughtbooks, Vertical Spaces and Guides to Success can assist in ensuring students receive the timely guidance necessary for their learning to grow and deepen.

Despite what the name suggests, a *Thoughtbook* (Gini-Newman & Gini-Newman, 2017) is actually a process rather than simply a physical resource. It describes a continuous and iterative process during which students are invited to provide an initial response to a problematic question or task and then are encouraged through on-going opportunities to either affirm, refine or extend their response as their learning broadens and deepens. A Thoughtbook can take many forms and be used in a variety of ways. What is at the core of the concept of the Thoughtbook is that it supports student learning through an iterative process of responding, learning and reflecting.

The use of vertical spaces, whether whiteboards, chart paper or individual white board slates can also support the iterative learning made possible through just in time guidance. Inviting students to share their initial thinking on a vertical space, teachers can efficiently gather diagnostic information about the range of views of students. However, unlike a *Thoughtbook*, vertical spaces only capture a snapshot of a student learning in time. To be iterative, capturing and holding those snapshot in a *Thoughtbook* helps ensure that students capture shifts in their thinking making the use of vertical spaces is an effective and efficient way for teachers to monitor the impact of new learning on student perspectives and understandings.

Guides to Success, like Thoughtbooks, capture a student's thinking about the quality of their learning during the learning process. Although rubrics have become ubiquitous in classrooms, they remain largely scoring tools which too often provide limited support for student learning. A Guide to Success provides an alternative to traditional rubrics that put the focus on learning through meaningful guidance **and student self-reflection**. Guides to Success set out the required elements of a task and clear targets for excellence. They are powerful tools for teachers or students as they provide timely and focused guidance that encourage each student to make the revisions necessary to improve the quality of their work. Revising their work is an essential part of meaningful learning for students. Without errors and the opportunity to act in response to errors, no actual learning occurs.

Sample Guide to Success:

Guide to Success: Guide to Healthy Living			
Task requirements Checklist (What do I need to do?)	Assessment Criteria (excellence) What do I need to do to do it well?	Self-Reflection What's going well? What's my next best step?	Teacher Guidance What's going well? What revisions might be considered?
<input type="checkbox"/> Cover with title and at least one visual <input type="checkbox"/> Summary of what is important for the individual to be healthy that addresses: Diet, happiness, and being active <input type="checkbox"/> At least three recommendations for what should be included in the diet or avoided <input type="checkbox"/> At least 3 recommendations for how stress can be managed <input type="checkbox"/> At least three recommendations for being physically active	<ul style="list-style-type: none"> Cover is visually attractive and informative Summary is brief and contains only relevant and important information All information relates to the person for whom the guide is intended All recommendations are helpful and possible considering for whom they are intended 	What is going well (affirmed)? • • • What needs more work (revise)? • • • Where I would like to go next (aspire): • • •	What is going well (affirmed)? • • • Revisions to consider: • • •

Cascading Challenges

Sustaining critical inquiry through cascading challenges is a powerful means through which teachers can choreograph the learning experiences required by their students to achieve success in meeting the demands of the curriculum. This involves framing the learning around clear provocations or challenges and then mapping out a carefully sequenced set of related or “focus inquiries” that scaffold student thinking and ensure the necessary concepts, background and competences are developed that will ensure student success (Gini-Newman & Case, 2015).

Developing a set of “Cascading Challenges” is an approach to designing and

implementing curriculum that frames learning around invitations to think critically and is based on the following foundational premises:

- through sustained inquiry, during which students engage with a rich and meaningful challenge through a series of related smaller inquiries, students deepen their understanding over time;
- teachers are transparent so that students are both aware of the broad learning goals and also see the relationship between daily lessons and targets they are trying to hit;
- daily lessons help students build both conceptual and procedural knowledge through lessons that are designed to engage students in “thinking to learn and learning to think”;

- learning occurs through a "fail forward" approach in which setbacks are embraced as an opportunity for further learning; Students don't fail; they just don't get it ... *yet*.

Moving Learning Forward Through "Productive Setbacks "

When learning becomes a seamless interplay between instruction and assessment students are able to reframe mistakes as learning opportunities setbacks that allow them to propel learning forward. Through an iterative learning process, students are invited to offer an initial response to a provocation and are encouraged to reflect forward as their learning progresses. In this manner students are able to confidently take risks knowing that any setback although they don't fully understand, or can't do everything, *yet* they will have time move their learning forward they encounter will be an opportunity for further learning and refinement to their response to the challenge.

Final Thoughts

Reframing education around the concept of assessment and instruction as a double-helix of learning creates an opportunity to truly realize what it means to claim "the primary purpose of assessment is to support student learning." When assessment becomes integrated into the daily structures of learning and woven into the fabric of instruction rather than existing separate and apart from instruction, students become reflective thinkers and empowered as independent learners. Assessment and instruction as the double-helix of learning provides educators with a practical pathway to operationalizing many of the core goals that often exist as mission and vision statements but fail to live in classrooms in ways that truly transform learning.

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NEW CRITICAL ISSUES, CONCERNS AND DIRECTIONS IN MODERN PEDAGOGY

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Introduction

Online learning has been with us in various forms for several decades. We have seen instructional television, synchronous and asynchronous models, and observed the use of various technologies (fax machine) and delivery services (Media Site) utilized. Most recently, during the COVID-19 crisis, instructors have had to rely on ZOOM, Google apps and various other hybrid methodologies to deliver instruction. This paper will address some of the existing trends, new trends, and promising trends in modern education. The current state of online learning is cursorily reviewed, the importance of LMS knowledge and skills reviewed, and some promising trends and directions in modern education are offered, and also criticized. While many instructors have made an almost seamless transition, other disciplines have encountered difficulties (for example science labs, Physical education courses, music, dance, theatre, art etc.) .It is not known what impact that COVID-19 will have on the long-term learning of students in some of these performance based or lab-based courses.

Trends

It seems imperative that all teachers and learners have at least a rudimentary grasp on various LMS (Learning Management Systems) and the various alternative methodologies for providing assistance and consultation. Knowledge about Learning Management systems will be imperative because these learning management systems will be providing a plethora of information and communication aspects in the future. Some of the future trends that LMS's may be providing are:

- A Disaster continuity/contingency plan -When COVID-19 struck, communication regarding social distancing became imperative as well as communication when face to face classes went online. No one could have predicted the events of 9/11 nor the events of the recent mob attack on the U.S. capital in Washington, D.C. However, wise prudent administrators have begun to recognize the need to prepare and to uti-

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lize a home page or Blackboard or Canvas for communication what is being done and what is transpiring.

- Organization and the sharing of class materials and resources. The future LMS's Learning Management Systems will serve as a foundation for a course, followed by a syllabus and then followed by perhaps power points, then audio-visual materials, and access to the Library, YouTube and provide direct linkages to the instructor and student to student contact.
 - Attempts will be made for ongoing face to face introductions so as to maximize the human factor and for student-to-student support.
 - This will enhance communication- and allow students to learn from each other, consult about assignments and thus the instructor will remain a "guide on the side". Students will act as resources for each other- making suggestions, comments, corrections, with final grade assignment provided by the instructor as per the rubric provided by the instructor.
 - There may be supplementary resources provided in terms of literature reviews, and visuals via Google Maps and other audio-visual sources. Instructors will need to be able to access resources and student will need to be able to employ said resources, and future tutorials will assist with this. Each LMS will probably provide extensive assistance as more and more students go to online learning and each LMS will probably have built in tutorials.
- The LMS systems of the future will more expeditiously help the instructor to manage and grade assignment submissions. Clearly, much of this is already being done with some systems utilizing the Discussion Board and multiple types of assessment instruments- such as surveys, true-false exams, matching columns, fill in the blank and other short answer tests, quizzes and exams. Preliminary research by Shaughnessy (2019) and his colleagues have investigated the various factors that lead to success in online classes. As more research validates this preliminary work, instructors will be able to employ new theories and more expeditiously utilize the various forms of feedback to students available as student reactions to feedback become more crystallized.

The digital gradebook of the future will be able to provide almost immediate feedback to a student, and calculate the mean, median and mode of a class average-for the student to understand where they are in terms of class standing. The digital gradebook will be able to provide feedback as to which ques-

tions the student was mastering (low level knowledge and information questions) and which ones were not mastered (perhaps evaluative and summative questions). In certain classes, the digital gradebook will be able to do a formative evaluation of certain skills (algebra for example) and then provide a summary as to growth and development in a summative evaluation. Calendars will guide students in terms of time management and reminders will keep pupils on task. Prompts may help those inattentive students who are in “information overload” mode.

Instructors may use the newer LMS's to enhance interaction between students and students, between students and text and between students and the instructional materials (You Tube, Zoom) and between students and the instructor. Different disciplines may foster more interaction in one realm than another. For example, Political Science or History classes may require more interaction than a math class. Students may be encouraged to log on daily to see who has approved or disapproved, agreed or disagreed with their comments. Romero-Ivanova and her co-workers (2020) have explored current digital practices in this COVID 19 culture.

The learning management systems of the future may facilitate discourse between faculty and students and allow for greater clarity and clarification. There could be a section of “ frequently asked questions” with clarification provided, thus allowing instructors more time for research and scholarly activity. Those proponents of these LMS (Learning Management Systems) seem to be of the view that students can sometimes learn better from each other and from chat rooms and discussion boards than from the instructor. There will be heated debates and arguments regarding how students learn best in an online environment and perhaps more importantly, what they do not learn by not observing a skilled instructor at work in their craft.

A wealth of information will be provided in the future as LMS systems may come programmed with the capability or capacity to remind students as to certain deadlines or. Dates. Some of these “reminders” and announcements may be colorized or even verbalized by a Siri or Alexa talk alike. Perhaps even Siri or Alexa will go to university.

Along with all of the above- there may be other changes from past decades. Faculty may need to provide much more feedback to enhance engagement. Feedback will take varying forms- such as suggesting, criticizing, reminding and perhaps even mentoring. Students of the future may have to be explicitly told that comments are not criticism, and that feedback helps with their future growth and intellectual development.

Some classes may become more streamlined as diversity of students grows. Instruction may become more focused and pre-requisite classes may be mandatory and communication between instructors may become de regur.

Complexity vs Simplicity- Unfortunately, society will be confronted with a somewhat more complex educational system, with a more intricate LMS, while at the same time instructors are possibly being confronted with students seeking simplicity so that they can engage in their “social media” activities- whatever they may be in the next 10 years.

Clearly, we must continue to recognize students with special health, medical, emotional and psychological needs as well as learning needed. While some exceptionalities may be quite apparent (such as blindness) other special needs (learning disabilities for example may need more documentation- and more recent documentation, as the brain does grow and develop over time. Certain students may need or even require more support than others and more intense intervention when confronted with more complex classes and specific problems – such as computation and expressive writing.

Coping with crisis will also become perhaps more commonplace as students become enmeshed in political issues, climate change and other social and civic issues. Issues such as free speech, right to protest, and equity and citizenship will be discussed on many campuses, with concerns being raised and issues being debated and discussed.

Proctoring for some subjects will be done online and there are already a number of programs available for this- but at a cost. There will be different forms of proctoring and already there are several companies vying for educational funds for those students who have to prove their competence and also knowledge within a certain time frame.

Rubrics will continue to be with us, and some will become more increasingly complex as we begin to realize the complexity of learning and delve deeper into what we need to assess and what we want to assess and how we want to perform that assessment- and under what time frame. Rubrics will continue to remain contentious as we begin to realize that rubrics are not magic and that rubrics cannot perform remediation, nor were they ever developed to remediate gaps in learning.

MOOC's may take an increasingly large role in education world-wide. There have been several books written about these Massive Open Online classes or courses that have shed light on their use and popularity across the world. A book edited by Bonk, Lee, Reeves and Reynolds has examined the realm of MOOCs and Open Education Around the World. They procured authors from the Philippines, Japan, Australia, Southeast Asia and other countries around the world. A special issue of the International Journal on E-Learning was edited by Lee, Bonk, Reynolds and Reeve (2015) and in this special issue, a number of relevant salient issues were reviewed by certain authors. There is obviously concern about quality and academic integrity, as well as issues such as Open Course Ware (OCW) and Open Educational Resources

(OER) . Articles in this special issue addressed attrition, assessment and accreditation, as well as design and research issues. While much has been written about MOOC's, there remains a dearth of in-depth quality research in both the short run and the long run. Bonk, Lee and Reynolds (2009) edited a special issue of a text entitled "A Special Passage Through Asia E-Learning" for the Association for the Advancement of Computing in Education. Calling upon experts from Japan, Taiwan, Singapore, India, Malaysia, the Philippines, and Turkey, Bonk and his co-workers edited a "state of the art" review of developments in that part of the world.

Open Access journals will present both an opportunity and a challenge for modern and higher education. Information, theories, ideas, literature reviews, case studies and other investigations will be increasingly available, but quality control remains an issue. Further journals are only as good as the Editor and Editorial team and the number of quality reviewers that an Editor has access to in terms of assisting in the editorial process and the peer review of papers. The "publish or perish" mantra will continue to be heard as faculty search for tenured positions and part timers and adjuncts begin to look for a position of security in a world of academia that may begin to drift from a long-range commitment to tenure to other options and money saving alternatives.

ZOOM and Microsoft Teams meetings may continue- in order to bring colleagues together and gradually students and faculty alike will become increasingly familiar with these technologies and be able to conduct effective efficient meetings which will enhance the growth and development of students alike. Professional development will be conducted in this manner and conferences and conventions maybe held online over the course of perhaps two weekends. There will still be major conferences as people flock to major venues and communication will be made much more available, as people can video tape presentations with alacrity.

While the future looks bright in terms of modern education, there remain challenges, such as the one that the COVID-19 virus has put upon us. The world was simply not prepared for the "lockdowns" that resulted and the chaos that was imposed on the citizenry. Students that have floundered without direct instruction and supervision will need remediation, and modern education will have to increasingly focus on remediation via alternative means, as the "guide on the side" is increasingly being challenged with new technological advances to deliver education and do both formal and informal assessments.

Professional development will continue to be offered and will be increasingly necessary although many organizations are now offering assistance on a 24/7 basis. There will be accountability for such professional development as some type of monitoring will be mandated. Certificates of attendance may be

given but only after the individual has demonstrated some evidence of understanding or learning.

Modern education will continue to value the gifted, the talented and the creative and schools will screen and attempt to identify said individuals with the thought of mentoring and guiding these individuals and expedite their growth and development, not just socially and emotionally but intellectually.

Modern education will begin to realize and recognize the need for higher order thinking skills, while also ascertaining the need for critical thinking skills and the dichotomy between these two realms will become increasingly clear. An edited book by this author (Shaughnessy, 2012) has provided a road map of sorts of the issues confronting modern education in this realm today. While “higher order thinking skills” are seen to be important, there is precious little in terms of consistent curriculum in terms of fostering it or assessing it. There are on occasion, some conferences, some journals, but no concerted effort on an ongoing basis to incorporate it into the curriculum. Higher order thinking is a lot like the weather- people talk about it- but very few people do very much about it. And the same seems to be true for critical thinking- it is alluded too- but rarely investigated in depth as a topic.

Research in both the hard and soft sciences will continue, and people will continue to pursue quality research with integrity and fidelity while others will continue with sub-standard drivel, of interest to only a handful of interested parties. The debate/discussion between quantitative and qualitative research will continue- with attacks being perhaps more personal or more focused with the realization that numbers, science, statistics, and methodology are important factors in this realm.

Summary And Conclusions

This paper has cursorily reviewed some of the new trends and directions in contemporary education in various parts of the world. Not all countries share the same issues. Some are more technologically advanced, some are more pedagogically astute, some rely on the Internet and some rely on face-to-face instruction. We live in challenging times and robust leadership coupled with ongoing training for both new and old faculty is imperative. All involved should be aware of quality as well as quantity issues, while at the same time recognizing the importance of instilling a love of learning and life-long learning in students. Communicating this will become increasingly important over the next few years.

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TEACHING AND LEARNING ONLINE DURING A PANDEMIC THE OVERNIGHT MOVE TO EDUCATIONAL CYBERSPACE: LESSONS LEARNED

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Introduction

During the early part of 2020, we experienced an unprecedented and massive move to online learning due to the COVID-19 threat. Never in history have we seen such a formidable move by so many and in so many countries. Not surprisingly, the role of technology exponentially increased in importance. The repercussions for educational institutions is still and will continue to be immeasurable.

This paper examines the experiences of a rural public school district in New Mexico in adapting and responding to the challenges presented by the circumstances surrounding the pandemic of 2020-21; a view from the trenches, so to speak.

Background

The school district in question is located in a town of approximately 40,000 and is made up of twelve elementary schools, including grades pre-kindergarten to fifth grades (ages 4 to about 11), with enrollments ranging from 150 to 450 students; three middle schools including grades sixth to eighth (ages 11 to about 14); each with an enrollment ranging from 500-700 students; one freshman academy, including only ninth grade students with an enrollment ranging from 600 to 700 students (ages 14 or 15). There is one high school including grades tenth through twelfth (ages 15 to 18). The total enrollment of the district is just over 8000 students. There is also an alternative school site, including grades three through twelve on a hybrid model, combining reduced physical attendance and online instruction, for parents and students for whom the conventional school setting is not effective.

In March of 2022, we, as a school district, went on Spring Break and did not return to school physically until late in the fall of 2020. As with the rest of the world - quite astonishingly, in fact - we went into “lock-down” mode, uncertain as to the seriousness of the COVID-19 virus. This was common to many school districts not only across the nation, but also around the world.

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This state of affairs had enormous repercussions on every aspect of our lives, one of which is education for our students, with which the article is concerned.

Literature Review

History recounts many examples in many locations around the world experiencing widespread epidemics and plagues, but never before has there been a world-wide challenge, such as the one we are still facing: a simultaneously, universal pandemic that has occurred during the course of this past year. The pandemic was unique in not only its universality, but the similar responses of citizens in most countries. Since we are all still in the midst of this pandemic, there is not a great deal of research yet available reflecting outcomes of various strategies and implementations of instructional/educational technology solutions. Therefore, this will be an anecdotal descriptive of the manner in which one rural school district in the state of New Mexico addressed the challenges presented by the pandemic.

Before the onset of the pandemic, the importance of expanding teacher professional development in terms of more effectively integrating technology into the educational process (Friedrich, L. & Trainin, G., 2016) was being widely acknowledged.

In fact, better equipping teachers with the necessary technology skills and knowledge is considered one of the priorities in teacher training programs in many countries around the world (Robinson & Aronica, 2015; Spector, 2010).

Despite efforts in recognizing the need for more comprehensive professional development for educators - whether pre-teachers or veteran teachers - the topic has not necessarily always been at the top of the priority list. Depending upon the location, the district demographics, government policies, along with a variety of other variables, there have often been quite divergent perspectives and priorities. While in recent years (with the exception of the pandemic period), well-integrated instructional technology was valued, it was often viewed as “icing on the cake;” i.e., increasingly important, but not necessarily essential.

This perception of technology in education changed dramatically, however, a year ago, and virtually overnight, when countries shut down, and entire populations were instructed to stay at home, including teachers and students (with a very few exceptions, such as medical essential services). For the first time in history, educators, students, and families had no choice *but* to use technology to connect, if they were to continue teaching and learning.

The rural public school district, which is the focus of this study, was in a similar place as thousands of other school districts across the United States. Having been a “Google” school for several years prior, teachers and students

were generally familiar with online learning environments and were beginning to work collaboratively online more frequently than in the past.

There were, however, a number of challenges that had to be resolved before truly effective technology integration could take place.

Challenges Identified and Resolved

Some of the challenges - in addition to the new ones presented by the pandemic - had long been in place. The rural district in question has a high poverty rate. Many families not only did not have Internet service, but also had little or no access to technology at home.

In addition, the district had a limited number of devices available for student use. Typically, elementary school sites had one or two computer labs available, shared in tight back-to-back scheduling throughout the day. Secondary schools sites had *some* computer labs, also with similarly tight back-to-back scheduling, shared by all teachers. Secondary school sites also had, however, some mobile laptop carts shared among grade levels and/or departments. Every computer at every school site was constantly in use, and teachers were doing the best they could to take advantage of the available technologies.

The general consensus among both teachers and students was, because of the lack of readily available devices, as well as the lack of access at home for students, the overwhelming challenges in using technology outweighed the potential benefits. This was during initial stages of using Google Apps for Education (as they were called at the time), and students needed to save their digital work to a mapped drive and/or portable storage devices. The school district made both available (server storage and flash drives), but, not surprisingly, the small flash drives were often lost, forgotten, as well as being easily damaged. There were also often Internet interruptions presenting connectivity problems. In addition, a great deal of time was consumed by having to collect and sign out laptop carts, as well as time needed in the classroom for students to get their device, start it up, and log in, before they could even do whatever they needed to do. Essentially, the circumstances were not conducive to effective integration of technologies, discouraging to both teachers and students.

District leadership had long been planning for better solutions, including the expanding of available technologies and access for all. Unfortunately, lack of funding, procurement restrictions, along with other issues precluded action.

However - and most fortunately, in retrospect - at the beginning of school year 2019-20, the school district was finally able to roll out a 1:1 implementation for the district, providing a Chromebook for each student, along with improvements to the district's technology infrastructure to accommodate expanded connectivity.

This timely action began to transform teaching and learning in the school district, particularly when, in March of 2020, the pandemic hit, and education was suddenly shifted online virtually overnight.

Overnight Shift to Online Learning

The pandemic occurred immediately prior to the district's week-long Spring Break, and, just prior, when staff and students were scheduled to go on their break, all were notified they were required to remain at home in "lock-down" mode. Soon after, word was received from the governor of New Mexico that everything - including schools - would remain closed. Thus, staff and students left just before Spring Break, and many did not return in person until almost a year later.

This has been an unprecedented event for all, not only in the United States, but also around the world. Needless to say, the impact has touched all aspects of lives, and it will likely be much later that the full impact can be measured.

Educators are a special breed, however, and they immediately went to work. District leadership went into overdrive and set about making plans for the current state of affairs, i.e., continuing to teach and learn in a remote manner, as well as for the future; at least what was known about the future. Constant communications went on throughout the district. As interim solutions for continuing education took shape, everyone continued brainstorming, formulating alternatives, examining creative stopgap measures, and so forth. After the dust had settled a bit, the district superintendent noted, "Give educators a problem, and they'll put their heads together and come up with great solutions fast!"

The district's student information system had built-in digital communications capabilities and so were able to stay directly in touch with staff, students, and families, whether digitally via email or conventional telephone. Individual states interacted with one another, sharing information, and came up with education guidelines and frameworks, according to prescriptive federal guidelines, which helped with local district planning.

It was incredibly fortuitous that the school district had launched into their 1:1 implementation earlier in the school year, providing each student with their own district-assigned Chromebook. Had this district device deployment been delayed - which had been a real consideration at the time - the outcomes would have been vastly different.

All departments quickly developed their plans to roll out an education plan as soon as Spring Break was over. Concrete problems and issues were identified, and the leadership teams set to work. There was constant and continuous communication between departments to ensure smooth alignment and effective crosswalk information-sharing. Not only this school district, but all school

districts across the state of New Mexico remained in close touch with the New Mexico Public Education Department, who was in constant communication with state governmental officials. Information updates were frequent and consistent, shared readily with all stakeholders.

The specifics of all the activities and actions taken are far too complex and comprehensive to describe here, but in terms of technology integration, it is worth sharing some of the dramatic changes that took place.

As mentioned earlier, the district has a high poverty level, so those families with no Internet-access were quickly identified, and measures taken to provide the needed resources. Fortunately, both emergency federal and state funding became available so that quick action could take place. All of the 18 school sites had wifi available, so the district Technology Department had only to install some basic equipment to boost signal strength. In addition, school buses, parked and secured in certain locations, were equipped with network equipment to provide easy wifi access for anyone driving up to a school building and/or one of the buses, which served as temporary wifi stations, to be able to access the Internet.

Although in general, the technology literacy skills of this district's educators had been consistently increasing over recent years, teachers were far from ready to launch immediately to teaching online; teaching exclusively in the new venues of online learning environments only.

In addition, there were other needs identified not previously considered a necessity with the move to total virtual learning. Educators requested new tools and resources such as video recording/editing capability and online interactive, collaborative tools, and others, with some needs yet to be identified. Not only this, but the district began to hear from parents and guardians, particularly those from low-income areas, especially those younger children, who had received the student Chromebook but knew little about it, neither the parent/guardian nor the younger student.

There was much to be done.

During the earlier planning sessions, it was determined that the Google G-Suite Apps (formerly Google Apps For Education) would serve most of the needs moving forward, specifically, for online teaching and learning remotely. However, many teachers had not yet delved deeply into the use of these online, collaborative teaching and learning tools in their regular classrooms before the onset of the pandemic; especially teachers of elementary students where one-on-one work with students was deemed to be most important.

To provide immediate resolution for training needs, whether at a novice level or for technology skills/knowledge leveling opportunities, or for support for families and students, the district's Instructional Technology Coordinator immediately developed a professional development plan for ongoing, real-time

targeted virtual, online trainings via Google Meet and/or Zoom. The plan was based upon actual data and feedback via the survey tool, Google Forms.

The training topics included intense hour-long sessions scheduled at different times of the day - every day - on a rotating basis (so if a session was missed, a teacher could quickly sign in to another session covering the same material). The sessions were Mondays through Fridays and with built-in time slots serving as “open” online office hours for teachers to just connect, in a come-and-go fashion, to ask specific questions and/or discuss issues they were having. The online venue (mostly Zoom) proved invaluable with the screen-sharing capability, along with the other features, such as mark-up, chat, built-in content sharing, and more.

Just after the first few virtual, online training sessions had begun, calls began coming in from smaller, even more rural school districts, enquiring about what we were doing as a school district. The Instructional Technology Coordinator immediately forwarded the training schedule complete with Zoom (of Google Meet) links inviting them to freely “attend” any of the sessions to better prepare them for the massive online shift in education. The five or six districts joined in, some as many as three hundred physical miles away, did so enthusiastically, and firm bonds were established among the districts and all the teaching participating online.

These ongoing, online, collaborative sessions continued non-stop through the summer months and through October of School Year 2020-21. In addition to inviting other outlying districts to participate in these online learning opportunities, after the first few weeks, evening orientation online, virtual trainings were offered to families, to provide an overview of the software and the student Chromebooks to better serve families.

The parent/guardian evening sessions were consistently well attended with positive feedback provided. Often, an entire family would be gathered around the computer screen to learn how they could better support their child(ren). Also, the Instructional Technology Coordinator had arranged to have a Spanish translator on hand during these parent/guardian evening sessions for those non-English speakers, which proved to be a useful addition.

The daily, multiple virtual trainings sessions came to a close by the end of October 2020 as attendance slowed, and most staff had had an opportunity to attend and hone their technology literacy skills.

At the same time, there was still a need for support, so a second phase of online additional online, virtual trainings were made available, based upon the feedback from a subsequent survey sent out using Google Forms.

As the daily, multiple virtual training sessions came to a close by the end of October 2020, additional online virtual trainings were made available, based upon the feedback from a subsequent survey sent out using Google Forms.

These consisted of more infrequent training sessions of specific topics requested by staff along with frequent online sessions of “Open EdTech Help” where staff could come and go (virtually, via Zoom) to address specific problems or issues they were facing.

We are now in the final few months of the 2020-21 school year, and students have just begun to attend in person once more. We have maintained a virtual component, called Cohort C, for parents who prefer to have their child(ren) remain in remote learning online. Interestingly, though, the Cohort C represents a very small percentage.

Conclusions

Overall, the online training sessions were overwhelmingly successful. Based upon the feedback - both from surveys (Google Forms) as well as reported verbally (meetings and/or personal feedback) there was an overwhelmingly positive response.

The same held true for the parent/guardian evening sessions; reaching out to offer support - even though virtual via Zoom - seemed to offer the reassurance that the district was deeply concerned with the success of their child(ren) as well as in providing help and support for the families.

Another positive outcome was the highly positive response from other school districts that had been invited to “attend” the virtual online professional development sessions. Teachers became acquainted and formed bonds with colleagues from other districts that have been maintained.

This unique experience has served to improve all staff and student technology literacy skills and knowledge, and even though circumstances forced this exponential growth, all have continued to use these newly acquired skills to effect a positive impact on student learning. This has assured the school district leadership of the value of having provided these daily, easily accessible virtual professional development sessions.

Perhaps one of the most unusual and unexpected outcomes has been the fact that although we all became physically separated for many consecutive months, we also all drew closer together, becoming better acquainted with not only one another, but also with colleagues in other school districts around the state of New Mexico, to come up with solutions to effectively continuing the education process.

The entire experience has definitely provided fertile fuel for future planning

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