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Design and Development of Virtual Teaching Practicum Models: Embracing Change During COVID 19

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ABSTRACT

The unprecedented introduction of COVID-19 in Spring 2020 has created an academic earthquake in higher education. There was an instant halt to academic programs, student support, the learning environment, instructional methods, and delivery at all levels. Teacher educational programs were no exception. These programs consist of both coursework and a culminating practicum. There was an instant need to conceptualize a model that would assist with transitioning pre-service teachers from a traditional teaching practicum to a virtual teaching practicum. This model would ensure the demand was met from the Ministry of Education for qualified teachers despite the global pandemic. Hence, a team of researchers at the University of The Bahamas designed and developed two virtual teaching practicum models. They were the foundational platform

for transitioning pre-service teachers from traditional to virtual teaching practicums. Implications for theory and practice are also discussed.

Keywords: Teaching practicums, virtual teaching, virtual teaching practicums, The Bahamas

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Introduction

Teacher education has been met with challenges and demands of the complexities of twenty-first century teaching and learning (la Velle, 2020). A global pandemic further complicated the intricacies of this profession. In March 2020, the World Health Organization (WHO) announced the outbreak of the 2019 novel coronavirus (COVID-19) as a global pandemic (WHO, 2020). Medical experts argued that the "trajectory of this human disease is currently unpredictable and effective countermeasures" (O'Brien et al., 2020, p. 685) must be put in place to control the contagion of this potentially deadly disease. Teacher educators, in their delivery of teaching practices and internships, have "grappled with the myriad problems caused by this disruption" (Mutton, 2020, p. 439) of traditional face-to-face learning. Several researchers across the world, particularly during the onset of the global pandemic, have expressed the challenges faced trying to readjust, rethink, and re-envisage teaching practicums for pre-service teachers (Atkins & Danley, 2020; Choate et al., 2021; Delamarter & Ewart, 2020; Durand & Treviño, 2020; Gewartz, 2020).

Similarly, in The Bahamas, the School of Education (SEDUC) at the University of The Bahamas (UB) expressed its equal share of challenges during this time. The notion to continue the teaching practicum from a virtual perspective required a team of teacher educators to develop a strategic plan of action for the pre-service teachers. Exacerbated by the COVID-19 global pandemic and meeting its goal to produce effective pre-service teachers, the SEDUC described the plethora of intricate demands of the teaching practicum. To this end, the overarching objective of this paper was to introduce two models designed and developed by the SEDUC at the UB. This was the result of the unanticipated occurrence of the COVID-19 pandemic and the immediate transition of all educational programs and practicums from face-to-face to virtual.

This paper is critical not only to the educational setting in The Bahamas, but also globally. It is both a foundational platform and a

blueprint for transitioning teacher education practicums from traditional face-to-face to a blended or completely virtual model. This paper also addresses the gap in the literature as it relates to limited models that can be applied to a blended or completely virtual teaching practicum. Furthermore, it provides practical implications for teacher education programs.

Background and Problem

COVID-19 and the Educational System

The unprecedented introduction of COVID-19 has impacted the educational system globally. Factors such as course delivery, curriculum design and development, practicums, or internships were all either immediately halted or resulted in tertiary institutions creatively changing their delivery method to a virtual setting. A multiplicity of protocols was introduced to ensure the safety of faculty, staff, students, and by extension, their families. As a result, both parents and teachers had to become highly tolerant and understanding of the need for the protocol measures taken (MacDonald & Hill, 2021). Adjustments had to be made quickly to meet educational needs. This experience was overwhelming and unsustainable for parents, particularly those with workforce responsibilities. Teachers experienced the loss of community and responsiveness to social and educational cues that they normally received from their students through direct observation and incidental communication and conversations (MacDonald & Hill, 2021). Due to campus closures, students at all levels of the education system remained at home while continuing their education virtually. With limited access to resources, such as reliable internet service and appropriate technological devices, many students found it challenging to remain enrolled in programs of study.

Impact on Quality of Instruction and Curriculum

The immediate transition to online learning became a reality for educational institutions worldwide (Haslam, 2021). For the pre-service teachers who were able to continue attending university online, the traditional overall university experience was significantly changed as opportunities such as socialization of campus life, internships, and study abroad opportunities were missed. These all contribute to a well-rounded and employable graduate (Shoenfelt et al., 2013). A new skill set was necessary to participate and be successful in an online environment (Louise 2020). For many universities, the quality of instruction became a

major issue as face-to-face classes were suddenly transformed into online classes (Farmer & Ramsdale, 2016). As curriculum and assessment changed to match the online environment, student participation, motivation, and success were at risk (Haslam et al, 2021). For successful online learning, it became critical that student engagement be addressed (CzerKawski, 2016). In instances of the cancellation of practical courses and final practicums, the validity of online assessment became a major concern (Gikandi et al., 2011).

Teacher preparation in an online environment requires diverse communication skills (CzerKawski, 2016). Full participation in online courses involves reading, written content, and being able to manipulate and utilize video content. The submission of assignments and receiving feedback demands knowledge of online platforms (Tanyel & Griffin, 2014). The same skills are required by faculty who teach the online courses (Martin et al., 2019). However, in the traditional teacher preparation program, emphasis is placed on preparing pre-service teachers for the face-to-face classroom setting, although there are technology courses within the program. Likewise, cooperating teachers, teaching practicum supervisors, and moderators are all trained and accustomed to teaching practicum in the traditional classroom setting. Due to COVID-19, there was an immediate transition to a virtual learning platform and thus the need for pre-service teachers' practicums to be transitioned to a virtual environment. Despite a lack of resources, academic and institutional plans, and limited training, the decision was made to develop a virtual teacher training model. As a result, teachers would be equipped to teach in blended and completely virtual learning environments.

The Impact of COVID-19 on The Bahamas Educational System

In March 2020, normal operations changed in The Bahamas and worldwide due to the impact of COVID-19. Like other countries, The Bahamas was forced to shift gears and create a different normal. At the UB, the challenge was to prepare pre-service and in-service teachers for online teaching. While they had noteworthy technology skills, the teachers lacked the theoretical and conceptual foundational knowledge about online teaching and learning in K-12 schools.

As the national authority for teacher certification in The Bahamas, the SEDUC's incoming administration engaged in forward planning to maintain its ability to meet the national mandate. They were mindful of the Ministry of Education's (MOE) professional staffing needs for the

upcoming academic year that would be impacted by the annual turnover of teachers retiring from the system. The SEDUC realized that there may be a teacher shortage if they did not equip the pre-service teachers with the skills needed to participate in the final teaching practicum. Due to COVID-19, pre-service teachers would not be authorized to teach on campus face-to-face. Concerned about the ability to replenish the system with the new teachers for the upcoming hiring cycle, the school's administrative team developed a series of strategies to support its work. By implementing these strategies, the SEDUC would be able to meet the national hiring demands.

Faculty members felt this could work for the following reasons: (a) The MOE, the main stakeholder and partner, invited the SEDUC administrative team to participate in their professional development virtual conference in August 2020 (Campbell, 2020). At the conference, the team was provided with informational and material resources outlining MOE's expectations for online teaching nationally; (b) UB has had more than 15 years of utilizing learning management systems to offer courses using the asynchronous, blended, and hybrid approaches; (c) The integration of technology is a key component in the teacher education program at the UB. After 20 years of success and development in this area, education students have demonstrated proficiency in many aspects of the integration of technology in the classroom; (d) The faculty was committed to providing the needed training and support for teaching practice preparedness; and (e) Teacher education alumni were assembled to provide training and coaching support services. Furthermore, this would be necessary, given that there were no virtual teaching competency requirements embedded in the University's teacher preparation program (University of The Bahamas, 2020).

From attendance at the MOE's online learning professional development conference for trained teachers, the researchers surmised that final teaching practicum candidates needed to know the following: (a) What does the literature say about best theoretical and conceptual frameworks that are effective for the K-12 teaching and learning environments? (b) What best online education strategies have proven to be effective? (c) What accommodations are needed to ensure that students with special education needs are successful in the inclusive online classroom? (d) What support systems are needed to ensure consistent growth and confidence over time?

Guiding Theoretical and Conceptual Frameworks

As a result of COVID-19, pre-service and in-service teachers needed to be well-versed in online teaching and learning, technologies, and pedagogies. This called for the application of theoretical and conceptual frameworks that maximized success for all in the online teaching and learning environment. Bryans-Bongey & Graziano (2016) addressed issues of quality of educational experiences in the online environment and proposed the application of the collaborative constructivist learning theory and selected conceptual frameworks. On this premise, this theory and conceptual framework served as the underpinning for the design and development of the virtual teaching practicum model for the SEDUC. Collaboration here is described by Woolfolk (2017) as a philosophy about how to relate to others and how to learn to work, whereas constructivism emphasizes "the active role of the learner in building understanding and making sense of information" (Vaughn et al., 2013, p. 20). Vaughn and colleagues (2013) further expounded on the importance of students engaging collaboratively with schools and actively participating in the development of their own learning. Therefore, constructivism is defined as "the building or construction of new knowledge where learners use their senses to gather and organize information, then create new layers of knowledge by assimilating what is known" (Mahoney, 2004).

With the application of the constructivist approach, the focus elements of the online learning are psychosocial learning environment of an online course, and selection and implementation of instructional strategies. Walker and Fraser (2005) stated that the psychosocial learning environment in an online class is represented by the communication and social context established within the class and its members. The associated success factors mentioned are "connectedness and support through teacher and classmate relationships, students' expectations for their learning, student autonomy, relevant learning activities, and academic motivation" (Bryans-Bongey & Graziano, 2016, p. 90). To be a successful educator in the online learning environment, it is important that the six categories of the psychosocial learning environment be addressed to encourage and promote student success (Kosloski & Carver, 2016). These categories are teacher support, student interaction, personal relevance, authentic learning, active learning, and student autonomy (Walker & Fraser, 2005).

According to Davidson-Shivers et al, 2018, an effective online environment must include the following: (a) an orientation to learning that

includes an introduction and directions on how to navigate the learning system, (b) instruction on the content, (c) a measurement that learning has taken place, and (d) a summary and closing to enhance and enrich learning. Researchers have stated that the achievement of these elements is necessary to establish and maintain effective constructivist online learning. Bryans-Bongey & Graziano (2016) presented problem-based learning, guided instruction, simulations and games, case studies, and capstone experiences as multifaceted assignments. These can all be applied online to promote constructivism. The researchers further explained that while constructivist and traditional strategies are similar, there are significant differences in the implementation, delivery model, and technology applications. This calls for the adaptation of traditional strategies, the construction of personal meaning, mastering the art of applying best psychosocial learning approaches and strategies, and being intentional about promoting best practices in online constructivist learning approaches.

In keeping with this theory, Bryans-Bongey & Graziano (2016) promoted three conceptual frameworks as best practices models for facilitating online teaching and learning: (1) community of inquiry (COI); (2) technological pedagogical content knowledge (TPACK); and (3) substitution, augmentation, modification, and redefinition (SAMR).

Community Of Inquiry (COI) Model

The COI theoretical framework developed by Garrison (2011) is the premier framework for the online teaching environment promoting engagement and retention (Bryans-Bongey & Graziano, 2016). The COI framework takes its roots from the collaborative and constructivist theory of John Dewey. It identifies the connection between teacher presence, social presence, and cognitive presence. In the framework, these three come together to create an effective learning environment (Akyol & Garrison, 2011). (One such example in which they come together is the Learning Management System (LMS).

The teacher presence speaks to the role of the teacher in collecting content and designing a method of delivery suitable to the learner. The teacher is also responsible for communication and interaction within the environment. Elements of the teacher presence include “design and organization, facilitating discourse, and direct instruction in collaboration with students” (Bryans-Bongey et al., 2016, p.71). Examples of this are the creation of content videos, digital assessments, interactive PowerPoint

presentations, virtual office hours, Whatsapp group creation, and the uploading of all preceding content to an LMS.

The social presence speaks to the students' involvement in their own learning and whether the environment gives students a feeling of safety and nurturing that allows them to feel free to completely engage and interact in the course. It also gives them an anchor or sense of belonging in the abstract environment. Social presence can be created through "netiquette" rules that speak to accepted behavior in the environment, icebreakers for introductions, WhatsApp groups, discussion boards, and other forums for communication.

The cognitive presence speaks to the progression of the course or the layout of the elements within the environment. The student must first be stimulated which should lead to an exploration of the content to answer questions. Finally, the student should be directed to apply the information gathered to produce something. This can be seen through the logical progression or order of modules, sections, or units in an LMS. The module should begin with an introductory activity, a biography, or an anchor chart. It should be followed by content in various forms and typically closes with an assessment in the form of a quiz, product creation, final paper, or video (Bryans-Bongey et al., 2016, p.65).

Technological, Pedagogical and Content Knowledge (TPACK)

The TPACK conceptual framework developed by Mishra and Koehler (2006) has a specific focus on K-12 schools based upon the constructivist theory with application to best practices in technology integration. In its simplest form, TPACK (initially TPCK) is the comfortable marriage between technological, pedagogical, and content knowledge. For a teacher to successfully navigate the current teaching environment, the teacher must have a healthy knowledge of all three areas and a keen understanding of how they work together (Mishra and Koehler, 2007). It is paramount that the teacher understands how to flexibly integrate different technologies to deliver content that is correct and pedagogically sound. The "flexibility" is what allows the TPACK model to be conducive to inclusive education. Not only is the teacher versed in the limitations or diversity of the students, but also in the limitations and diversity of the technology. It is this knowledge that helps the teacher deliver the content successfully in an online environment. TPACK suggests the discontinuance of the one-size fits all technological solution. Further, the teacher must also be open to the dynamic nature of the

marriage and the constant evolution of the union. This knowledge can be gained through proper teacher education for pre-service teachers and through well composed professional development sessions for in-service teachers. For example, a physical education teacher and food and nutrition teacher may find the use of a video quiz tool helpful in getting students to mimic actions or practice particular movements like kicking a ball or folding whipped cream. However, an English language teacher may not get the same results using a video quiz tool to teach the students how to identify context clues.

Substitution Augmentation Modification and Re-definition (SAMR)

The SAMR conceptual framework developed by Puentedura (2014) is also based upon the constructivist theory. It focuses on restructuring and recreating face-to-face standard protocols for an online environment. In the SAMR framework, technology is integrated at four distinct levels using Bloom's taxonomy as a guide or standard for the progression of the integration.

- At the *substitution* level, the teacher simply uses a technological version of a physical task; for example, using canva.com to create a poster instead of chart paper, crayons, and pictures.
- At the *augmentation* level, the entire class gets involved in applying the technological tool to task completion. For example, in a face-to-face environment, jigsaw students would move from one expert group to the next physically. Using the SAMR model students can move to their groups whether face-to-face or online by simply joining various rooms in an online conferencing tool. Students can share screens, google information, and read articles together.
- At the *modification* level, the content remains the same; however, the students become more involved in the direction and exploration of the content. They use technology to help each other understand the content through collaborative efforts. For example, students can use shared documents, group calls, and other networking tools to collaborate on projects, study, perform experiments, and so on.
- At the *re-definition* level, the students can apply what they gained from the teacher and students in the class and start to expand into specific or detailed analysis of the content. They can use technology to synthesize and evaluate various aspects of the content of which they were not previously aware. At this level, the

students can also engage in distributing this knowledge to learners outside the classroom using various technological tools. For example, hospitality and tourism students can create a public website that shows tourists interested in visiting The Bahamas in an ecologically friendly and sustainable manner, explaining where to go and what to do to minimize their carbon footprint in The Bahamas. The website would serve as the product for the unit on sustainable tourism.

Bryans-Bongey & Graziano (2016) also emphasized quality accommodations for students with special learning needs in the online classroom and the importance of building effective collaborative parent-teacher networks. Universal design for learning principles, also related to assistive and adaptive technologies, have equal importance and consideration when planning online instruction. The authors also highlighted best planning and teaching strategies based on the constructivist approach to teaching and learning. This involved a combination of project-based activities that foster inquiry, problem-solving, collaboration, and feedback that extends beyond teachers.

Design and Development of a Virtual Training Model for The School of Education, University of The Bahamas

In this training model, the collaborative-constructivist learning theory as described by Bryans-Bongey & Graziano (2016) was endorsed. In keeping with this theory, the training plan includes advanced knowledge and skills about the community of inquiry (COl); technological pedagogical content knowledge (TPACK); and substitution, augmentation, modification, and redefinition (SAMR) models.

The researchers devised a training plan to address the following 10 focus areas: (a) theoretical and conceptual knowledge acquisition; (b) lesson and forecast planning; (c) mastery of technical tools used by the MOE virtual teams; (d) team-work competencies; (e) formation and utilization of a UB alumnus digital support team; (f) copyright laws; (g) competencies navigating the MOE's learning management system; (h) a teaching practice assessment and evaluation electronic system; (i) creation of a digital teaching practice portfolio; and (j) a changed mindset.

The researchers designed two professional development programs:

- On-Line Teaching in K-12: From Theory to Practice Professional Development Series—Fall 2020.

- Virtual Teaching Practice Three Phase Transition Model Professional Development Series—Spring 2021.

The two robust, accelerated models were based on theoretical and conceptual foundations reported by Bryans-Bongey and Graziano (2016). Candidates would also be required to apply theoretical knowledge and practical skills such as integrating technology, objective writing, and classroom management. Additionally, they would have access to training about various learning management systems and technology tools specific to online teaching and learning. The knowledge checks planned consisted of written examinations, demonstrations, team presentations, and peer and faculty evaluations. Candidates would be required to work in teams to present differentiated lesson plans to accommodate learners in the online environment, which included classroom management and parental involvement plans. The training was planned for a three-month period for each cohort. Additional orientation and training were also scheduled for teaching practice moderators and teacher education faculty. The purpose of the sessions was to train moderators how to implement the newly developed diagnostic and assessment instruments, to provide an overview of the training program, and to make training resources available. Teacher education faculty, staff throughout the university, and MOE's teachers and officers agreed to conduct the training.

Training Structure for Cohort 1. **On-Line Teaching in K-12: From Theory to Practice Professional Development Series—Fall 2020**

The training sessions consisted of five integrated strands: (1) Teaching Practice Orientation With a Focus on Teamwork Roles and Responsibilities, (2) The Virtual Training Model—Synchronous (Face-to-Face) and Asynchronous Online Learning, (3) Theoretical and Conceptual Framework, (4) Technology Orientation and Training, and (5) Upgrading Professional Practices. Reflection sessions were also planned throughout the teaching practicum exercise. Therefore, after the completion of these sessions, candidates would participate in unstructured small group and individualized coaching sessions with content teaching practicum supervisors and various teacher practicum alumni as needed. These reflection sessions were needed to support the pre-service teachers throughout the field component. The training for both cohorts is illustrated in Table 1.

Integrated Strand One: Teaching Practice Orientation With a Focus on Teamwork Roles and Responsibilities

The orientation plans included the professional development overview and purpose, an overview of online teaching readiness, virtual school attachment protocols and procedures, responsibilities for units, digitized lesson plans, detailed lesson notes and handouts, teaching practice e-portfolio, available student support services, and an overview of the MOE's team teaching focus for online teaching for Fall Semester 2020.

To develop the mindset for this focus, information relevant to the team-teaching model was prepared to share with teaching practicum candidates: Team Teaching Dynamics—An Overview, Models (K-6 and Secondary Schools), Benefits of Team-Teaching: Roles and Responsibilities, Teaching and the Learning Process, Timetabling, Technology Tools Skills Acquisition & Sharing, and Digital Learning Kits—Products and Development. The team-teaching roles that teaching practicum students would acquire include live facilitator, program designer, researcher, chat facilitator, assessor, question and answer facilitator, serving on an editing team for lesson planning, and PowerPoint/content video designer/creator. According to the information shared during MOE's conference held in August 2020, the team-teaching structure comprised four areas: team planning, content development, marking and grading, and virtual office hours. The orientation session was important to give candidates a glimpse into the overall requirements.

Table 1

Training Structure for Cohort 1 and 2. On-Line Teaching in K-12: From Theory to Practice Professional Development Series—Fall 2020 – Spring 2021. Five Integrated Strands

Integrated Strands				
Strand One Teaching Practice Orientation With a Focus on Teamwork	**Strand Two The Virtual Training Model—Synchron**	**Strand Three Theoretical and Conceptual Framewor**	**Strand Four Technology Upgrading & Training**	**Strand Five Upgrading Professional Practices — Enhancing Quality**

Roles and Responsibilities	**ous (Face-to-Face) and Asynchronous Online Learning**	**k – 13 Master Classes**		**Assurance Measures**
Professional development overview and purpose, An overview of online teaching readiness, Virtual school attachment protocols and procedures, Responsibilities for units, digitized lesson plans, detailed lesson notes and handouts, Teaching practice e-portfolio,	Application of synchronous/live (teaching face-to-face online via a meeting platform) Blended learning and face-to-face (on campus) (Added for Cohort 2) Asynchronous online models for both K-6 and secondary grades Creation of digital learning materials	Overview The Online Teacher Online Constructivism and Technology Integration. Online Student Online Special Education Teachers TRACK Standards for Effective Technology Integration Open and Free Educational Resources	LMS and meeting platforms, (Microsoft Teams, Google Classroom, Zoom) Assessment & worksheets (Live Worksheets, Quizzizz, Videos, Kahoot, Office 365, Google Slides) Lesson Plans/ Forecasts (One Note, Forms)	Lesson planning and evaluation Teaching practicum evaluation Acquisition of knowledge and practices of current online trends Office 365 OneNote application electronic portfolio On the lesson plans, emphasis on differentiated

Available student support services,	Engaging & interactive approaches Demonstration lessons	for K-12 Copyright		strategies and accommodations for students with special needs

Strand One Teaching Practice Orientation With a Focus on Teamwork Roles and Responsibilities	**Strand Two The Virtual Training Model—Synchronous (Face-to-Face) and Asynchronous Online Learning**	**Strand Three Theoretical and Conceptual Framework – 13 Master Classes**	**Strand Four Technology Upgrading & Training**	**Strand Five Upgrading Professional Practices — Enhancing Quality Assurance Measures**
Team teaching dynamics Overview of the MOE's team teaching focus for online teaching for Fall Semester 2020		Virtual School-Home Communications (Bryans-Bongey & Graziano, 2016).	Create Videos (PowerPoint, Loom, i-Movie, YouTube , Windows Movie Maker, Flipgrid, Class Dojo)	Fully automated digitized evaluation instrument for all instructional settings/models

	Interactivity for managing the lesson (PowerPoint Presentation, Virtual field trips, Discovery scavenger hunt) Parent conferencing and group dynamics (Zoom, WhatsApp, The use of TedEd, Snagit, and Adobe Spark for content lesson presentations)

Integrated Strand Two: The Virtual Training Model—Synchronous (Face-to-Face) and Asynchronous Online Learning

The MOE required all teachers throughout New Providence, The Bahamas, to apply the synchronous/live (teaching face-to-face online via a meeting platform) and asynchronous online models for both K-6 and secondary grades. Demonstration sessions were planned for candidates to become familiar with strategies to facilitate the teaching of interactive, differentiated lessons in the virtual environment. Candidates were also scheduled to participate in asynchronous demonstration lessons.

In keeping with MOE's and the SEDUC's requirements for online teaching, arrangements were made for candidates to create digital learning kits for each lesson to be taught. The digital kits were to include content

videos, interactive PowerPoint presentations, differentiated virtual activities including digital worksheets, content specific games, links to online activities, digitized student and teacher notes, and detailed lesson plans.

Familiarization training in the use of technology approaches to promote interactivity and engagement in lessons during virtual teaching within and outside the conferencing tool was arranged. These included but were not limited to the following: reactions, chat room, whiteboard/annotation, remote control/screen sharing, polling, breakout rooms, interactive PowerPoint, poll everywhere, Edpuzzles and challenge/competitive modes of quizzizz, quizlet, kahoots, padlet, and Educaplay.

Integrated Strand Three: Theoretical and Conceptual Framework.

The conceptual and theoretical framework focus consisted of thirteen master classes. The topics planned were (1) Overview of Theoretical Frameworks; (2) The Online Teacher: Skills & Qualities to be Successful; (3) Online Constructivism: Frameworks and Standards for Effective Technology Integration; (4) Online Student Teaching to Implementation; (5) Helping Special Education Teachers Transition to K-12 Online Learning; (6) TRACK As Mediated Practice; (7) Capturing the Online Learner: Frameworks and Standards for Effective Technology Integration; (8) Open and Free Educational Resources for K-12 Online and Face-to-Face Classrooms/ Copyright; (9) Flipped Learning—Making the Connections and Finding the Balance; (10) Teacher-Centered Online Content; (11) Student-Centered Digital Learning Through Project-Based Learning; (12) Tools and Strategies for Assessment in an Online Environment; and (13) Virtual School-Home Communications (Bryans-Bongey & Graziano, 2016).

Integrated Strand Four: Technology Upgrading & Training

The purpose of this integrated strand was to provide candidates with the opportunity to upgrade their skills to align with technology tools used by MOE's teachers and virtual school leaders. Throughout the professional development training, participants would receive hands-on training with the following:

- Learning management systems and meeting platforms (One-On-One Educational Services Limited, Microsoft Teams, Google Classroom, Zoom)

- Assessment & worksheets (Live Worksheets, Quizzizz, Videos, Kahoot, Office 365, Google Slides)
- Lesson plans/Forecasts (One Note, Forms)
- Lesson content video creation (PowerPoint, Loom, i-Movie, YouTube videos, Windows Movie Maker, Flipgrid, Class Dojo)
- Interactivity for managing the lesson (PowerPoint Presentation, Virtual field trips, Discovery scavenger hunt, Bit Mogi)
- Parent conferencing and group dynamics (Zoom, WhatsApp, Canva, Flipping Book Publisher

Candidates would also be required to incorporate the use of TedEd, Snagit, and Adobe Spark to create content lesson presentations.

Integrated Strand Five: Upgrading Professional Practices—Enhancing Quality Assurance Measures

The researchers selected quality assurance measures with a view to upgrading the SEDUC's professional practices in the areas of lesson planning and evaluation, teaching practicum evaluation, and the acquisition of knowledge and practices of current online trends. Normally, teaching practicum students use hard-copy binders for teaching practicum documentation. COVID-19 provided an opportunity for the SEDUC to create and transition to an electronic portfolio utilizing the Office 365 OneNote application. The e-portfolio has been utilized by the SEDUC faculty for field experience documentation since 2014. However, to facilitate this enhanced practicum approach, the SEDUC's technology coordinator and researchers created a template that incorporated online teaching and learning standards for the first time. Lesson plans required emphasis on selecting and documenting differentiated strategies for all learners. Additionally, candidates would be required to indicate accommodations for students with special needs in alignment with stated behaviors. They would also be required to provide a seven-point evaluation for lessons taught. In addition, they would be assessed by supervisors utilizing the newly designed and fully automated evaluation instrument for all teaching models. This initiative would also mark the premier of an integrated digitized instrument, envisioned by the SEDUC's new administration team.

Culminating Project: Creating Teams—Applying the Principles, Presentations, and Evaluations

At the end of the professional development training, candidates were required to participate in team presentations according to major content areas and were evaluated by peers and SEDUC's faculty (see Figure 1). Afterwards, participants were scheduled for virtual teaching practicum for nine weeks. During this period, participants were encouraged to share their teaching experiences. They were asked to provide information about successes, challenges, and needs pertaining to virtual teaching practice. Moreover, they shared recommendations for improvements in the areas of teaching practice supervision and administration.

Training Structure for Cohort 2. Virtual Teaching Practice Three Phase Transition Model Professional Development Series—Spring 2021

During the Spring Semester 2021, the MOE announced that schools in New Providence, The Bahamas, would remain online and continue to utilize meeting platforms for teaching synchronous face-to-face lessons supported by asynchronous teaching. MOE also stated that schools would transition to a blended model with the expectation of going fully face-to-face by the end of the academic year. In response to the MOE's plan, the researchers revised the previous professional development virtual teaching practicum (VTP) training model. The new focus of the training was a *Virtual Teaching Practice Three-Phase Transition Model (VTP-TPTM)* approach. This meant that participants were required to transition from teaching fully online to blended learning and, finally, fully in person face-to-face. Overall, the training consisted of the five integrated strands indicated for the previous cohort, with the exception of strand two. This strand is renamed the Virtual Training — Three-Phase Transition Model: (1) Synchronous (Face-to-Face) and Asynchronous/Online (2) Blended Learning and (3) Fully in Person Face-to-Face Learning. The model is revised in keeping with the MOE's agenda for the gradual transition to face-to-face teaching (see Table 2).

Table 2

Theoretical and Conceptual Framework–13 Master Classes For Virtual Teaching Practice Developed for The School of Education Nassau, Bahamas

Class No.	Class Title
*1	Overview of Theoretical Frameworks.

*2	The Online Teacher: Skills & Qualities to be Successful.
3	Online Constructivism: Frameworks and Standards for Effective Technology Integration;
*4	Online Student Teaching to Implementation;
5	Helping Special Education Teachers Transition to K-12 Online Learning;
6	TRACK As Mediated Practice;
*7	Capturing the Online Learner: Frameworks and Standards for Effective Technology Integration;
*8	Open and Free Educational Resources for K-12 Online and Face-to-Face Classrooms/Copyright;
*9	Flipped Learning—Making the Connections and Finding the Balance;
10	Teacher-Centered Online Content;
11	Student-Centered Digital Learning Through Project-Based Learning;
*12	Tools and Strategies for Assessment in an Online Environment;
*13	Virtual School-Home Communications (Bryans-Bongey & Graziano, 2016).

Note: Master Classes for Cohort I Fall 2020 (13)
*Master Classes for Cohort II Spring 2021 (8)
(Bryans-Bongey & Graziano, 2016)

The MOE required all teachers during this period to apply the synchronous/live (teaching face-to-face online via a meeting platform) and asynchronous model as well as the blended online approaches for K-6 and secondary grades. Demonstration sessions were planned to familiarize candidates with strategies to facilitate the various transitional phases.

Integrated Strand Three: Theoretical and Conceptual Framework for Cohort II.

The focus of the conceptual and theoretical framework comprises eight of the thirteen master classes listed for the first cohort. Asynchronous & synchronous online approaches to blended and face-to-face modalities were added as a major focus for Cohort II (see Table 2).

Discussion

The purpose of both models was to prepare pre-service teachers for the demands of virtual teaching as it would be implemented in New Providence, Bahamas. In the first model, candidates were equipped with the necessary skills and tools for teaching fully online via a meeting platform. The second model focused not only on online teaching but also blended and face to face instruction. The adaptation to the second model was needed as the MOE had announced its intent to transition from virtual to blended, and eventually face to face on campus teaching. Students had not been prepared in this way before; therefore, it was important that the expectations were clear, and the required tools were available. Researchers and practitioners are encouraged to communicate with their MOE, school district, or local educational authority to obtain a clearer understanding of what the expectations are for all constituents. Once this criterion is satisfied, then an appropriate model can be designed and implemented. As a result of these models, preservice teachers were better prepared to engage learners in the online environment. They were better prepared to differentiate instruction and assess students in the virtual setting.

These models are advantageous in that they added value to teacher preparation at the UB and significantly advanced the MOE's virtual school agenda. With hurricanes, teacher shortages, sickness, a late start of the school year due to incomplete school repairs, and other events that could prevent face-to-face instruction, the models provide a vehicle by which preservice teachers can be prepared to meet the demands of their current realities. Furthermore, they could decrease the loss of instructional time.

Implications for Theory and Practice

Implication for Theory

The design and development of these models contribute greatly to the gap literature as it relates to pre-service teachers and virtual teaching practicums. Although originally designed and developed as a result of COVID-19, they serve as a framework that can be applied not only because of natural catastrophes but due to technological advances within higher education at a global level. This model also serves as a digital footprint for other teacher education programs that are uncertain or unfamiliar with how to transition their traditional face-to-face teaching practicums to virtual teaching options. It provides guidelines, best practices, and strategies—all grounded in theory—to assist with the transition.

It is proposed that future research will explore the lived experiences of pre-service teachers and other stakeholders involved in these virtual teaching practicum models.

Implications for Practice

The design and development of these virtual teaching practicum models have myriad implications at distinct levels within the educational system. However, emphasis will be placed on (a) The MOE, (b) Teacher Education Programs, and (c) The Pre-service Teacher.

The Ministry of Education

The design and development of the virtual training models have implications for practice at the MOE level. Consideration should be given to continuous professional development of cooperating teachers and supervisors in online teaching and learning. This would improve their role as virtual teaching practicum supervisors.

Curriculum update is essential to ensure that the theories, practices, and procedures are aligned and reflect best practices for teaching in virtual environments. Consideration should be given to virtual components for the successful implementation of online teaching and learning.

Adequate online resources and electronic devices are essential for effective and successful virtual teaching environments. In this regard, it is critical that provisions are made for the educational system to be equipped with electronic devices, free access to online learning resources, electronic hot spots (provision for students and educators who do not have WIFI within their homes), and mobile schools (with WIFI access). This will enable buses to be set up in locations throughout the islands to ensure that students with no electricity or WIFI can still have access to virtual learning. Community parks are viable options to provide access. Additionally, the MOE should work in conjunction with schools and the SEDUC to ensure that pre-service teachers have early school placement and LMS training for teaching practicums. These are significant components to their success.

To ensure that the educational system is on the cutting edge, it is very important that electronic resources be upgraded to meet the demand of virtual teaching and learning. Consideration should also be given to professional procedures and practices to ensure their appropriateness for the virtual environment.

Teacher Education Program

In the teacher education program, there are practical implications that should be considered. Faculty with responsibility for preparing preservice teachers for their practicums (i.e., professional seminars and methodology teachers and teaching practicum supervisors), should engage in continuous professional development in online teaching and learning (refer to training models on Table 2).

With the inclusion and promotion of a virtual learning environment, it is critical that there be curriculum updates as it relates to teacher education. The overarching objective is to ensure that the teacher education curriculum is one that includes best practices in online teaching and learning in K-12 schools. Therefore, the principles and practices of the theoretical and conceptual framework of the virtual training model need to be encapsulated in a training program for teacher educators and other stakeholders

The Pre-service Teacher

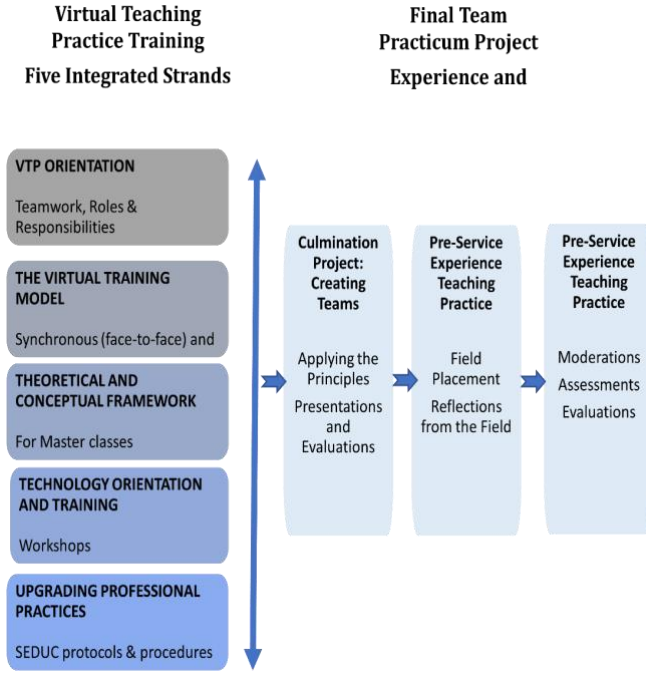
While it is critical for students to be successful in their teacher education program, it is equally important that pre-service teachers be self-directed learners able to take responsibility for their learning and development in a virtual setting. Pre-service teachers need to be trained to manage the demands of the online learning environment. Training is needed to build confidence in the delivery of instruction. Therefore, it is important that prior to practicum approval they demonstrate online teaching knowledge and skills acquisition and preparedness for online teaching and learning (Gurley, 2018) They should be empowered with adequate pedagogical capabilities, and appropriate emotional and social networks designed to enhance teaching success (Teng, 2017). Pre-service teachers are skilled in using various technological devices to enhance integration in instruction. However, a key component of a high-quality teacher education program is requiring that pre-service teachers acquire an experienced and knowledgeable mentor teacher (Ronfeldt et al., 2018). This allows theory to be linked to practice. Therefore, further consideration should be given for preservice teachers to be paired with online teacher mentors and coaches to improve their pedagogical knowledge and skills.

Conclusion

There has been much debate in higher education regarding online teaching and learning. However, due to COVID-19, higher education was mandated to transition to a virtual teaching and learning environment. On this premise, teacher education programs that are equipped with both a theoretical and culminating practicum experience were required to transition immediately to a virtual learning environment. Faculty within the SEDUC at the UB were inspired to develop virtual training models that addressed the needs of pre-service practicum in both a completely online and a blended learning environment. This model, grounded in theoretical and conceptual frameworks, served as a tool for transitioning pre-service teachers, from the traditional teaching practicum to a virtual teaching model. Due to the archipelagic nature of The Bahamas, educational policy makers would benefit from embracing technological advances to enhance access to quality education for all. Therefore, it is imperative that the partnership between the SEDUC and MOE be strengthened regarding online teaching and learning to accommodate the training of in-service and pre-service teachers in advancing national education goals.

Figure 1

A Model of Virtual Teaching



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Advancing adult learning using andragogic instructional practices

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ABSTRACT

Community-college professors possess knowledge in distinct disciplines and have varied experiences that they encompass in their college classrooms. Additionally, creating effective environments for teaching and learning require these assets from instructors to fulfill their curriculum needs. Teaching is a multidimensional and complex activity that requires the instructor to utilize various tools to effectively engage college learners. Often, instructors rely on their past educational experiences that were based on pedagogy (child-focused teaching) to deliver intricate material to adult learners. In this case, a dichotomy of subject delivery may arbitrarily be sustained in the classroom where the effectiveness of pedagogy limits the development of critical-thinking skill sets. Andragogy is an adult learning theory that informs teaching methodology developed to focus more on learner-based practices that grow from the content of lessons. It has been effective in engaging the characteristics of community college learners (Knowles, 1980b) in developing skill sets vital to various disciplines. The aim of this article is to encourage discussions on college campuses of how using andragogy advances adult learning by exploring andragogy usage in Radiologic

Technology (RT) and Early-Childhood Education (ECE) classrooms at an urban community college. Moreover, it is hoped that this article will provide undergraduate educators with instructional approaches that advance adult learning outcomes.

Key words: Andragogy, field experience, problem-based learning, simulated-based learning, team-based learning

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Professors must seek ways to motivate and challenge students to be critical thinkers and reflective (Sanchez & Lewis, 2014). For doctors to make informed decisions regarding a person's health, it is customary for them to send a patient to get various diagnostic exams including an X-ray. The technologists who perform these services must be proficient in administering these health exams. Early-childhood educators must also be pivotal in using analytical skills and thoughtful academic exercises with developmental experiences to produce successful learning outcomes for their students. These professionals rely on critical—thinking skills to adjust parameters relevant to their career. Employers seek to hire qualified candidates with the expectation that these individuals will have the knowledge, skills, and competencies necessary to work efficiently in various fields of work. Thus, it is crucial that those teaching learners aspiring to become radiologic technologists or early-childhood education (ECE) practitioners be effective at facilitating learning.

For the past several years, one author of this article has observed and received feedback from clinical health—care professionals regarding deficits in radiography students' critical thinking and communication skills. In addition, the second author of this article has made the same observation of ECE program students. Current research reveals some possible explanations for these observations, including students' social and environmental barriers, cultural influences, and personal experiences (Marr & Nicoll, 2013). These factors influence student progress in academic, career, and clinical goals (Marr & Nicoll, 2013). While many academic institutions in various disciplines have successfully graduated competent candidates in foundational subjects, the aspect of ensuring entry-level candidates' comprehensive preparation and equipping them with skills to confront real-life challenges in their disciplines has its deficiencies regarding communication and teamwork (Hart Research,

2015). Moreover, the goal of our teacher-education unit with respect to ECE program graduates is to not only engage students in the foundation of education principles and ECE academic content, but to help them develop the critical—thinking skills and communication skills necessary to become effective, multicultural educators. Radiologic science and early—childhood educators can modify their teaching styles by incorporating andragogy in their instructional practice in the classroom to motivate and engage learners in becoming better critical thinkers and communicators.

The aim of this article is to encourage discussions on college campuses of how using andragogy advances adult learning by exploring andragogy usage in Radiologic Technology (RT) and Early-Childhood Education (ECE) classrooms at an urban community college. Approaches of teaching adults will be explored with the goal of advancing radiologic technology and ECE students' competence in critical thinking, communication, and effective teamwork. Moreover, descriptions of how andragogy appears in both the radiologic technology and ECE classrooms will be discussed to improve the technical and patient interaction skills of the radiologic technology (RT) student and to improve the teaching skills of ECE students. Additionally, it is hoped that this article will provide undergraduate educators with instructional approaches that advance adult learning outcomes.

Literature Review

Instructional Approaches

The Instructor's Role – The instructor's role in the adult learning context is that of facilitator of learning or even a proactive mediator (Currie, 2000). The learner gained the most in the learning process when an instructor collaborated with the learner by recognizing and supporting the learner's knowledge and encouraging the learner in their growth process (Currie, 2000).

Diversity of Learners – It is important to be thoughtful or perceptive of learner differences while not generalizing with respect to stereotypes of race, age, or culture (Imel, 2001; Lange et al., 2011). Thus, respecting diversity among adult learners in the classroom or learning environment is crucial (Freedman et al., 2012; Knowles et al., 2012). Specifically, valuing adult learner diversity and creating a learning environment in which learners are free to explore, share, and continue to grow is key (Knowles et al., 2012).

Constructivist Methods – Applying constructivist theories to the practice of adult learning is recommended strongly in the education literature (McCall et al., 2018). A constructivist approach as described by many articles, is to emphasize teaching critical thinking skills using discovery methods, questions, probing, and problem-based learning strategies (Allen, 2008; Elmborg, 2010; Stern & Kaur, 2010). The aim of this approach is to empower learners to be self-governing, autonomous, lifetime learners (McCall et al., 2018).

Scaffolding in instruction is another constructivist practice (McCall et al., 2018). Scaffolding involves breaking down complex tasks or skills into small parts that can be completed alone (McCall et al., 2018). "This makes the task less stressful and more manageable, and helps adult learners see their progress" (McCall et al., 2018, p. 38; Gust, 2006; Kenner & Weinerman, 2011; Rapchak & Behary, 2013; Rapchak et al., 2015). Moreover, scaffolding offers multiple chances for learning for adult learners (McCall et al., 2018).

The Nature of Learning Experiences – A review of the literature with respect to adult learning advocates for learning experiences that are well-structured, practical, and collaborative for the learners to achieve the best learning outcomes (McCall et al., 2018). Sharing with learners the steps that will be covered during a class session or creating supplementary instructional resources like handouts, videos, etc., are examples of structure (McCall et al., 2018). These resources can help learners connect the topics discussed in class to tasks or specific assignments (Lange et al., 2011).

Identifying students' prior experiences and connecting them with new instructional topics can make learning practical (McCall et al., 2018). Using pre-assessments to determine learner information literacy strengths and needs, perceived confidence levels, and previous uses of information sources is a useful method (Dahlen, 2012).

Furthermore, collaborative learning activities are key (Mc Call et al., 2018). Adult learners can profit from exchanging their experiences with each other while connecting them to new learning (McCall et al., 2018). Opportunities for peer-to-peer learning, in-depth learner discussions, and other types of experiences where adult learners can share their knowledge with their peers and the instructor enable the learning process (McCall et al., 2018).

Andragogy – Adult Learning Theory

Andragogy is the ability to facilitate adult learning (Davenport, 1987). Alexander Kapp, a German educator, first used the term (andragogy) in 1833 to classify learning strategies that focus on adults (Knowles, 1975a). Malcolm Knowles is widely known for his work on andragogy, popularizing the term that more concisely describes the art and science of adult learning. Now, andragogy is classified as an alternative to pedagogy and "refers to learner-focused education for people of all ages" (Usman, 2015). Knowles (1980b) proposed that self-actualization should be the goal of adult education and the learning process should constitute the emotional, psychological, and intellectual aspects of a person. Thus, the educator's role can be viewed as assisting adults to develop to their full potential.

Knowles (1973) stated that there are five assumptions that define the characteristics of adult learning that are different from the assumptions regarding child learners. They are:

1. **Self-Concept—**As an individual matures, their self-concept moves from one of being a dependent personality toward one of being a self-directed human being.
2. **Adult Learner Experience—**Adults accumulate a growing pool of experience that becomes an increasing resource for learning.
3. **Readiness to Learn—**Adults' readiness to learn becomes increasingly oriented to the developmental tasks of their social roles.
4. **Orientation to Learning—**As a person matures, their time perspective changes from one of postponed application of knowledge to an immediacy of application. As a result, their orientation towards learning shifts from one of subject-centeredness to one of problem-centeredness.
5. **Motivation to Learn—**As a person matures, the motivation to learn is internal. This is from their self-driven goal of achieving a higher social, economic, and/or academic platform.

To be effective, educators must consider the major supposition that underpins andragogy—that adult learners, through their own backgrounds and rich life experiences, are driven by a desire to become self-directed, independent, and autonomous in their learning goals. The college educator may tailor distinct lesson plans and activities based in these concepts. Knowles (1980b) suggests that adult educators do the following:

- Set a cooperative climate for learning in the classroom (improves communication).

- Assess the learner's specific needs and interests (motivation).
- Develop learning goals based on the learners' needs, interests, and skill levels.
- Design sequential activities to achieve the learning objectives (scaffolding) (Vygotsky, 1994).
- Work collaboratively with the learner to select methods, materials, and resources for instruction (learning orientation).
- Evaluate the quality of the learning experience and adjust as needed, while evaluating the need for further learning (assessment, learning outcomes).

Andragogy is anchored in the characteristics of adult learning, a process that is based on the learner's familiarity with the material being taught. It builds upon pedagogic methods described in Bloom's taxonomy (1974). However, it pivots more on student-centered learning rather than a teacher-centered approach. Lessons are geared more to students' own experiences and correlation to subject matter rather than by ideas and examples from an author or instructor. Furthermore, adult learners link new knowledge to a wide range of personal experiences, which serve as valuable resources in the classroom. "The learners in andragogy exhibit eagerness to learn and further develop in all respects with innate motivation" (Usman, 2015: p. 3).

Reflecting upon the concept of pedagogy, which developed between the 7th and 12th centuries in the elementary schools of Europe, the term stems from two Greek words: "*paid*," which means "*child*" and "*agogu*s" that means "*leader of*" (Usman, 2015). Knowles (1973) defined it as the art and science of teaching children. Pedagogy has been used since the Ancient Greek times and has been applied as the standard method and practice of education ever since. When referring to teaching, *pedagogy* is used often as a synonym (Usman, 2015). Pedagogy "embodies teacher-focused education. In the pedagogic model, teachers assume responsibility for making decisions about what will be learned, how it will be learned, and when it will be learned" (Usman, 2015: p. 2).

Knowles (1980b) suggested that andragogy and pedagogy should not be viewed as dichotomous models, but rather two ends of an educational spectrum. The learning theories are compared in the chart (below) to illustrate the differences among pedagogy and andragogy (Knowles, 1980b):

Pedagogy	Andragogy
Passive training methods are used, such as lecture and demonstration.	Active training methods involving learner-generated content
Instructor controls timing and pace.	Learners influence timing and pace, monitored by instructor.
Success is possible even without major contributions to the class.	Participant involvement is vital to success.
Ideas and examples come from the instructor.	Ideas and examples come from the participants.
Learners are inexperienced and/or uninformed.	Learners have experience to contribute real-life problems relevant to the lesson.

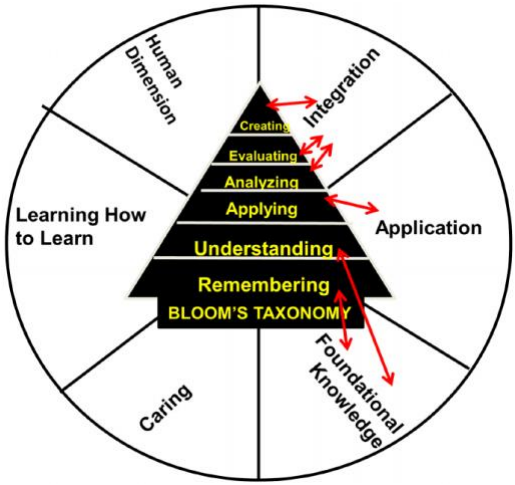
Andragogy builds upon pedagogy and has been utilized in professional education for several years (Fink, 2013). It has been established as improving communication in pharmacological students (McDonough, 2006) and teamwork with nursing students (Crook, 1985).

Adult Learning Applications Linking RT and ECE Classrooms

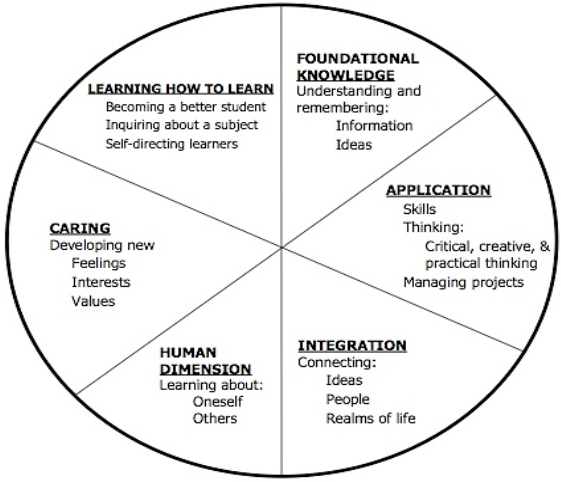
Simulated-based learning (Kong, 2015) promotes learning as an active process in which students reflect on their prior knowledge and construct their own views of the world through the physical and social interactions experienced (Kolb, 2005). Assessing key concepts in situation-based activities, helps the instructor navigate the dynamics of their students' cognitive skills and acquisition of integrated learning (Kong, 2015).

Dee Fink (1998) formulated a taxonomy addressing this paradigm in adult education that forms a coherent design, which supports significant learning. It can support competence in communication and effective teamwork in healthcare education and early—childhood education. His taxonomy builds on the premise of using learning goals to connect learning activities and assessment. His theory uses factors that consider the number of students, their level of education, the frequency of class

meetings, and the physical elements of the learning environment. Fink posits that these factors impact motivation and the dynamics of class activities. He created a pie chart that illustrates the flow of significant learning for adults, which builds upon the theories of Bloom's taxonomy.



(Fink, 1998)



Fink's Taxonomy of Significant Learning (1998)

Fink's Taxonomy in the Classroom

Fink's work is not hierarchical but interactive, which means that each level of learning can stimulate the other. It goes beyond cognitive processing and includes a human element of caring and continuous

learning. Fink (2013b) formulated a backward—design process, for the facilitator to follow that focuses on situational factors that instructors face in challenging course material and learning goals. The characteristic of the learner is also considered as well as the characteristic of the teacher. The facilitator is instructed to design a course prioritizing learning goals and important situational factors faced by the instructor such as number of students, type of students, equipment availability, and classroom environment. From this assessment, Fink suggests that a course designer should analyze these situational factors, and then formulate learning goals, feedback, and assessment procedures that assists in selecting the best teaching/learning activities for their audience. We can apply the andragogy principles of Fink's taxonomy in a variety of ways if aligned within the scope of course outcomes. The chart (below) is an example of the applying Fink's taxonomy in an RT or ECE classroom.

Application Activity	**Learning Outcome**	**Learning Assessments**	**Learning Activity**
Foundational Knowledge Learners will understand and remember key concepts.	● Learners will be able to apply key concepts and terms associated with theories in radiologic sciences or EC	● Formative (no grades) and summative exams.	● Interactive learning in the classroom through applicable questions to students (active and passive).
Application Learners will perform/"do" important tasks.	● Learners will be able to recall and apply key acquired skills relevant to theory and situation.	● Written assignments assessing learner progression. ● Simulated lab assignments or TBL exercises	● Situation-based worksheets and reflective statements. ● One-minute paper where students write an in-class summative

		to assess learners' acquired skills.	context of implementing key concepts (Barkley, 2009)
Integration Learners will identify/consider /describe the relationship between "X" and "Y".	● Learners will be able to discriminate and compare variants within the scope of the subject matter. (ex. differences and commonalities in parameters used for performing a task)	● Concept maps (conceptual diagrams) to assess each student's ability to find relationships between items like interpersonal dialogue, and the principles of verbal vs. non-verbal communication.	● Analysis making connections and conclusions on situation-centered cases. Instructor can assign groups with scenarios involving diverse situations and the variants needed to identify a solution.
Application Activity	**Learning Outcome**	**Learning Assessments**	**Learning Activity**
Integration Learners will identify/consider /describe the relationship	● Learners will be able to discriminate and compare variants within the scope of the	● Concept maps (conceptual diagrams) to assess each	● Analysis making connections and conclusions on situation-

between "X" and "Y".	subject matter. (ex. differences and commonalities in parameters used for performing a task)	student's ability to find relationships between items like interpersonal dialogue, and the principles of verbal vs. non-verbal communication.	centered cases. Instructor can assign groups with scenarios involving diverse situations and the variants needed to identify a solution.
Human Dimension Learners will better understand themselves and others, and interact positively.	• Learners will be able to better understand their personal comfort level in their work environment. • Learners will be able to develop interpersonal skills that will foster a team-based approach in resolving challenging situational factors.	• Learning journals/ paper that will indicate, "I have learned … and I feel that this will have an impact in my discipline by..." (Scenarios presented that focus on the affective domain.) • Field-based	• Students' reflections expressing their values towards cultural, social and age-related issues involving the subject matter. • Weekly lab assignments in which students are rotated as team-leaders in performing lab activities.

		communication assessment that focuses on real-life scenarios. • Written/oral communication exams that incorporate key concepts, theories and terminology.	The objective for the team-leader is to coordinate the workflow, document, and complete the lab project.
Caring Learners will care about issues related to their chosen career by connecting principles with their personal values to foster altruism in the clinical environment.	• Learners will be able to notice the value of compassion and empathy needed as a professional.	• Assignments that reflect on the needs of society or culture relevant to a topic in the lesson plan.	• Personal reflections through a learning journal • Learner viewing of videos reflecting on the effect of subject on society or culture. Active discussions will follow to reflect their values.

Learning how to learn Learners will develop self-directed learning skills that will foster personal growth.	Learners will be able to synthesize outcomes in a variety of settings. It will define their reasoning skills.	• Problem-based examinations. • Research paper that addresses advanced modalities and significance of pursuing professional growth.	• Field work in the discipline with interactions and interviews of individuals in the field. • One-minute paper: Where do you want to be in 3, 5 and 10 years after graduation?

Effective teaching requires adaptive clinical skills, especially in communication by applying them to real-life applications. Using problem-based models focused on tasks that adults can perform, rather than on memorization of content, can be applied as a team-oriented or individual project. Adults are problem-solvers by nature and learn best when the subject is of immediate use and effective instruction involves the learner in solving real-life problems (Abela, 2009). Barkley (2009) suggested using an engagement technique, such as situation-based problems, that help learners make inferences on the learned principles that nurture a deeper level of understanding. These concepts are believed to nurture independent thinking in active learning (Barkley, 2009).

With this technique, students will not only identify theories, but make connections in how they relate to the main topics associated with theory (radiologic sciences) that are essential in developing analytical thinking skills (Barkley, 2009). A reflective clinical journal, where students document challenging cases observed or completed is an ideal learning exercise to discuss early in a lecture. Asking students reflective questions develops independent analysis of the student's cognition and participation of the presented material in the module (Barkley, 2009). The instructor may analyze these reflective assignments, assess the entry, and give feedback to each student's response to the clinical situation asking a

variety of questions from patient care, anatomy, exposure factors, positioning, pathology and communication.

Radiologic Technology (RT) Programs

Pedagogical instruction has been the main tenet of teaching in many radiologic technology programs. The educator's role of designing course material connecting to the learners' interests, experiences and skill levels is an important aspect for clarifying both fundamental and vague material. As an individual becomes more familiar with course content, they seek increasing autonomy and inspiration to grow in their adaptation to learning. As commonly practiced, students are given instructions and directed to recall and apply distinct information from a reservoir of relevant subject matter. While this is the primary objective of learning goals in a subject-centered framework, developing critical perception in learners should additionally be an essential part of the instructor's role. This is where RT faculty and clinical staff technologists can form a more symbiotic relationship in adapting teaching methods that center towards a learner's progress based on their personal experience in the clinical setting. Adapting self-reflective content into lesson activities where both theoretical and clinical aspects converge into a learning platform may foster students' critical—thinking skills.

Andragogy in the Radiologic Technology Classroom

In andragogy, Knowles describes the chief assumption of self-directedness where the individual takes the initiative of determining their needs. Addressing interpersonal as well as intrapersonal aspects of an individual's level of understanding requires the educator's awareness of how adults learn as individuals. Applying relationships that are familiar with the student will let the learner know why they are learning specific data relevant to their discipline. Peyton (1998) points out that most adult learners also require the motivation provided by teachers for effective learning to take place. This is paramount in the clinic where real-life situations join a learner's connection to theoretical principles (Abela, 2009).

For example, one author of this article has developed scenario-based activities that are incorporated in the RT students' capstone course. Students are given patient-centered and technical dilemmas to resolve as individuals, in collaborative projects, and classroom activities. For second-year radiologic technology students, lesson plans are designed to coincide

with the American Registry of Radiologic Technology's certification content that qualified students need to pass to gain employment as certified radiologic technologists. Categories are divided with respect to imaging parameters, applied sciences and patient care. Relevant material is scaffolded by starting off with foundational material, which then progresses into application of theory on challenging issues involved in the discipline. The following practices can benefit students in the classroom.

- Situation or problem-based modules: The instructor will create learning modules (case studies) that make specific references to the material covered in a lecture (Barkley, 2009). Analytical questioning in this module is based on real-life situations in the clinical field. An individual or a group of students must first identify the correct principles and then discuss the modifications that need to be applied in order to resolve the problem.
- Reflective Statements: The students will document reflective observations made in laboratory activities or clinical experiences with relevant topics ranging from pathology, equipment utilized, patient assessment, technical factor considerations or alternate applications that may be required (Brookfield, 1986). Documentation is based on the background of the selected field study and the learner's personal conclusions.
- Argumentative Statement: The instructor makes a statement about a specific issue (Barkley, 2009). It can be a topic on patient care, cultural issue, adaptive clinical protocols or a communicable disease, etc. Students are selected to agree or disagree with the statement and discuss their point of view on the topic based on their knowledge of the material. The instructor can pose a variety of statements with different variables to monitor active learning in the college classroom.
- Mind Mapping: An exercise where the learners actively engage in processing specific information into a schematic map of ideas associated with a topic (Barkley, 2009). A central theme is given based on the learning agenda. Learners draw diagrams representing words, ideas, issues, tasks, etc., around the central idea and the scenarios that branch from the topic. For example, the topic may be a young trauma patient with a host of medical issues. The trauma physician has ordered several exams to be completed on this patient. Students will start with the patient placed in the center of a board and then draw branches that are associated with standards ranging from patient care theory, therapeutic applications, diagnostic exam parameters, and

technical factors. This module helps students and groups think globally and creatively in analyzing, classifying, evaluating and listing, as well as structuring and visualizing important ideas.

An example of a worksheet utilized in a patient care classroom follows:

Patient Assessment Activity Worksheet

Case:

A 32-year-old female from South America arrives with a suspected fracture of her left humerus. The emergency department physician orders exams of the left humerus, left shoulder, and right elbow. Her primary language is Brazilian Portuguese and she speaks very little English. Her nurse states also that this patient has vertigo and has severe pain in her left arm.

Instructions: *Use the grid below to make your assessment of the situation and the manner that you as a technologist would proceed with the exams ordered.*

	Application	Response
1.	What communication principles can you use for this patient?	
2.	Are there any distinct patient care factors you must consider for this patient?	
3.	Indicate the projections to be considered for left shoulder and left humerus.	
4.	Are there any technical considerations that need to be applied?	

Self-Reflection (How can I improve my skills in communication?)**:**

_____
_____
_____
_____
_____
_____

Livingston (2019)

Foundations of the Early-Childhood Education Program

A primary goal for our college's ECE Program is to actively engage students in the learning process. To meet this goal, most of our ECE faculty incorporate instructional strategies that enhance student-centered methods and promote critical thinking (CT) as a theoretical foundation for class activities as "(CT)-based instruction, i.e., structuring a course by means of activities and strategies fostering CT, has been lauded for improving both CT skills and effective learning" (Toy and Ok, 2012: p. 39). The process of thinking critically requires that adult learners recognize and research the assumptions that serve as a basis for their views, beliefs, and actions (Brookfield, 1987a). "The purpose of CT tends to be to scrutinize two particular and interrelated sets of assumptions" (Brookfield, 1997b: p. 18). Writing assignments in courses have been improved to reflect the CT process in the pre-writing stages of essays.

Additionally, the progressivist and social reconstructionist philosophies of education have served as underpinnings to engage students in the teaching and learning process. The tenets of the progressivist philosophy are rooted in the philosophies of two major advocates, John Dewey and Eduard C. Lindeman. Dewey (1938) postulated, "All genuine education comes about through experience" (p. 13). Lindeman (1961), author of *The Meaning of Adult Education* who attempted to provide a framework for adult education in his book, argued that adult education aimed to train people to participate and to expose intelligent influence in small collective units like the home, the neighborhood, community, trade union, society, etc. The progressivist philosophy of education supports students' responsible participation in society as well as enables them to gain practical knowledge and develop problem-solving skills. In tandem, the social reconstructionist philosophy of education, which is also student-centered, helps students prepare for a society that is constantly changing. Through the lens of this philosophy, the purpose of education is to urge "schools, teachers, and students to focus their studies and energies on alleviating pervasive social inequities and, as the name implies, reconstruct society into a new and more just social order" (Sadker and Zittleman, 2010: p. 284). These two educational philosophies more accurately reflect the educational practice in our ECE classrooms.

Andragogy in the Early—Childhood Education Classroom

At least four instructional strategies have been employed in our ECE classrooms that reflect these two educational philosophies including small group work, team-based learning, role play, and service-learning.

The strategies have required use of a flipped classroom concept. Students use open educational resources (OER) to engage in academic content from the first day of class. Other content is provided, using technology resources, like videos, PowerPoints, pre-recorded video lectures, etc. Students are urged to review and analyze this content prior to coming to class so that the classroom can be devoted to application of the course content/knowledge to the work setting for which they are being prepared. It is customary for instructors to offer students vodcasts, pre-recorded video lectures, and/or podcasts to share the course content for usage external to the classroom in a flipped classroom approach (Jacobsen and Knetemann, 2017). Time in class can focus on other innovative material using group activities (Jacobsen and Knetemann, 2017). The benefits of flipped classrooms include the formation of firm social bonds between students and with their teachers, increased levels of student appreciation of the learning environment, enhanced willingness to work collectively in class to gain deeper insight of the course content, and increased class attendance, student cooperation, and involvement in classroom activities (Jacobsen and Knetemann, 2017).

An effective instructional strategy used in ECE classrooms is small—group learning (SGL). "SGL is a common technique in collegiate instruction and allows for several specific non-traditional learning contexts to develop within it, including problem-based, project-based, cooperative, collaborative, or inquiry-based learning" (Peltola, 2018: p. 323). A review of the literature reveals that students who learn jointly in small groups display greater academic achievement, motivation, and fulfillment than those who do not (Peltola, 2018). Vygotsky's "zone of proximal development" illuminates the positive effect of group learning (Peltola, 2018). Participating in small groups helps students learn more through the group interaction permitting them to reach a higher stage of knowledge than they could learning alone (Peltola, 2018). In many ECE classrooms, SGL is prevalent when activities are used that involve real-world problems that students analyze to help determine how they might confront the problem when they start teaching. SGL is also common in the students' self-directed learning in their SGL community, and when the small group researches a topic and presents its findings to their class colleagues and/or present findings outside the ECE learning community.

In tandem with SGL, the team-based learning (TBL) approach has been effective in ECE classrooms. The flipped-classroom model and active-learning philosophy are used to foster learning through recurring

exchanges (Huggins and Stamatel, 2015). In TBL, "students learn basic course content on their own through readings and/or videos or other media; then most of the class time is spent working on activities in stable, small groups" (Huggins and Stamatel, 2015: p. 228). Using this model, ECE classroom instructors can focus on designing effective team activities and facilitate discussions "within teams, between teams, and with the class as a whole," reducing the emphasis on conveying course content (Huggins and Stamatel, 2015: p. 228). The strength of TBL features are supported in diverse theoretical foundations (Hosseini, 2010). A few that the authors of this article believe support TBL in ECE classrooms are andragogy theory espoused by Knowles, cognitive theories espoused by Dewey, Piaget, and Vygotsky, and behavior—leaning theories like those of Skinner and Bandura (Hosseini, 2010).

The TBL approach has been effective in ECE classrooms because of its benefits to students including (1) fostering independent learning and personal accountability; (2) increased, and more robust, interactions between students and teachers; (3) critical and creative thinking skills are practiced; and (4) advancing affective skills like communication, discussion, and decision making (Huggins and Stamatel, 2015). In the ECE classrooms at our community college, OER and/or other course content is made available to students in advance of class, instruction is differentiated, specific team roles are given to students, research is conducted on topics, and presentations are developed in teams and presented in teams to class colleagues.

Adding to TBL, role-play in the classroom has been used as a means of helping visual learners to gain a better grasp of course content. Role play is used in multiple disciplines like law, business, history, engineering, and education (Pettinger et al., 2014). "As Fink (2003a) noted, role play simulations are rich learning experiences in which students are able to simultaneously achieve multiple kinds of significant learning," (Pettenger et al., 2014: p. 504). Students who participate in role play simulations get the chance to interact, reflect, and analyze information, problems, and situations (Pettenger et al., 2014). Role play in our ECE classrooms has included designing skits that illustrated academic content and identification of authentic problems in the ECE classroom that students might encounter when they begin teaching. This strategy has helped to clarify content and has engaged students more because they enjoyed participating.

The fourth instructional strategy used in many ECE classrooms is a service-learning component. An example reflected in the ECE classroom practice is in the Language Arts for Young Children course sections where students participate with the Reading Partners Project, which is nationally recognized for building children's literacy. Students tutor children a minimum of 10 hours during the semester to develop their reading and literacy development skills, and, in the process, gain experience working with children who have some of the greatest need in developing their foundational skills in literacy.

Conclusion

As professors who facilitate adult learning, one must recognize that pedagogy steers students' mastery of a specific subject content and might not build skills, abilities, and positive attitudes. It holds no measure of a learner's sequential practice in cognition, affective and psychomotor skills. In contrast, andragogy—an adult learning theory—informs teaching methodology developed to focus more on learner-based practices that grow from the content of lessons. It has been effective in engaging the characteristics of community college learners (Knowles, 1980b) in developing skill sets vital to various disciplines including RT and ECE.

Applying andragogical approaches can assist the facilitator in developing metacognition (awareness and understanding of one's own thought processes) in RT and ECE learners. This is a key component in developing the learner's effectivity in their academic and clinical progression. While there are various methods involved in andragogy that can be applied in the classroom, the very inherent nature of the adult students' self-reliance and motivation is the main issue that RT and ECE educators face as an obstacle. Dissuading students from guided-based practices and moving them towards an environment that provides field experience, supports self-directedness and contributes profoundly to the learner's success. Thus, adapting current adult educational methods in the classroom has multiple benefits in which RT and ECE classrooms share. It is up to the professor to understand the concepts of andragogy, consider their students' learning styles and academic background, and build effective courses that address these parameters.

This article explored how andragogy was used in RT and ECE classrooms at an urban community college. In RT classrooms, simulated-based learning, problem-based learning, reflective exercises, and mind mapping approaches were used. In ECE classrooms, small-group work,

team-based learning, role playing, and service-learning approaches were identified as approaches that optimize adult learning outcomes. For both RT and ECE classrooms, the goal was to advance the critical thinking and communication among adult learners.

The authors of this article encourage discussions on college campuses of how using andragogy advances adult learning. Moreover, it is hoped that the andragogical approaches identified in the article will serve as examples that can be used to expand the learning outcomes of adult learners.

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Decoding Japanese University Classroom Etiquette Through Purpose-Built Questionnaire as a Research Instrument

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ABSTRACT

Previous studies have provided insights into classroom etiquette through research focused on observing small student groups, with no significant exploration, through survey research, of classroom etiquette in a large sample. The present study addresses this gap through a questionnaire measuring students' self-perceptions of classroom etiquette. A review of empirical studies on classroom etiquette, misbehavior, and students' silent in-class behavior allowed the development of this classroom etiquette questionnaire. We then ran a series of factor analyses on 44 questionnaire items extracted from the literature in a sample of N=113 university students enrolled in the life science department of a private university in Gunma, Japan. The statistical results revealed only 22 items being relevant to the Japanese university classroom. These items fell into four underlying dimensions: Misbehaviors (rude or unwelcome behaviors), Disengagement (behaviors related to off-task activities), Apprehension (behaviors triggered by the anxiety of speaking up in class and worrying about other people's judgments), and Silent in-class behavior (the adoption of silent behavior to prevent class disruptions). Further analysis of the relationships between these four factors, using Spearman's rho correlations analysis, revealed a high degree of association between Apprehension and Silent in-class behavior and moderate, but significant, associations between Disengagement and Misbehavior, and between Disengagement and Apprehension. These relationships were further explored through in-depth interviews with ten university students of the same university. The significant findings showed that although the interviewees reported having a positive image of students who expressed

personal views during class, most of them preferred to remain silent. They felt afraid of making mistakes and appearing ignorant if they made inquiries or provided incorrect answers. Silent in-class behavior plays an essential role in classroom etiquette as it prevents disruptions or the exchange of conflicting opinions during class while preserving harmony in the classroom, and at the same time, is used as a face-saving action by students to prevent damage to their self-esteem. This study contributes to the body of research on classroom etiquette by supporting the findings of previous qualitative studies. It also contributes by furnishing an acceptably reliable instrument that provides an initial approximation of the spectrum of student behavior within Japanese university classroom parameters.

Keywords: Classroom etiquette, student classroom behaviors, Factor Analysis, correlation analysis

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Every year, foreign language instructors move to Japan to teach. Many teachers struggle in their endeavors, despite their years of experience in their home countries as they realize that students' classroom behavior expected in their own culture is not met in Japan. A pertinent example is that of Japanese students' *silent in-class behavior* (Sasaki, & Ortlieb, 2017) which is often taken by foreign teachers as rudeness, lack of interest, or unwillingness to participate in classroom activities. This type of classroom behavior may leave teachers feeling either ignored or disrespected. However, behavior that is perceived as problematic, inappropriate, or unruly by foreign teachers may not necessarily be perceived in the same way by local students (Sun & Shek, 2012). Such misinterpretations may not only affect foreign teacher's attitudes towards a class, but it may also affect students' academic performance since many instructors, especially from western countries, consider expressing, questioning, and exchanging ideas in class a part of students' evaluations (Albertson, 2020; Ferris & Tagg, 1996). In such educational contexts, students who come from an educational environment that encourages passive participation; remaining quiet but attentive to class, may be at a disadvantage to those from an educational environment that encourages active class participation and discussion, whilst those same students may be perceived as rude and disruptive in an educational context where passive participation is encouraged. It is important to make any teacher in doubt aware that students hold different concepts of classroom formalities and follow different role models of *good students*. These role models are shaped by *classroom etiquette*; formalities that educational institutions and faculty establish for students that shape their behaviors to act maturely and

respectfully in social interactions. Unfortunately, classroom etiquette is usually unwritten and taken for granted, especially in adult higher education, making the proper code of behavior in the university classroom both unclear and difficult to define. We, therefore, have two reasons to focus on defining classroom etiquette in the setting of a Japanese university.

The first and most obvious reason is to prevent intercultural conflict by promoting *intercultural facework competence* of foreign teachers. According to the Conflict-negotiation theory (Ting-Toomey & Kurogi, 1998), individuals, especially those from eastern cultures such as Japan and China, are concerned with preserving face — "an individual's claimed sense of positive image in the context of social interaction" (Oetzel & Ting-Toome, 2003, p. 600). The result being, individuals engage in *facework* to keep both one's face and that of another by cooperatively attempting to promote both one's own sense of self-esteem while simultaneously promoting that of another and, at the same time as, maintaining, autonomy, and solidarity in conversation (Spiers,1998). However, *face* can assume different meanings in differing cultures, consequently individuals may lose face when treated in a way that, from their identity claims, they are being either directly or indirectly challenged or possibly ignored. If facework fails and face-loss repeatedly happens between two parties, "it might lead to an escalatory conflict spiral or an impasse in the conflict resolution process" (Ting-Toomey, 2007, p. 3). In view of this and to prevent intercultural conflict, one of the assumptions of the Conflict-negotiation theory is to develop intercultural facework competence that integrates culturally sensitive knowledge, mindfulness, and communication skills as a tool to appropriately and effectively manage identity-based interaction scenes. According to Ting-Toomey (2007), individuals who manage to achieve intercultural facework competence are then equipped to evaluate behaviors in an intercultural conflict situation and reframe their interpretation of the same conflict situation from another's cultural standpoint.

The second important reason is the influence of classroom etiquette on students' development of critical skills in group discussions. Based on constructivist principles and the social-cultural theory, human beings' development is embedded in a social environment: developing higher cognitive functions through social interactions (Cole, John-Steiner, Scribner, & Souberman, 1978; Piaget,1968). Looked at this way, the development of individuals cannot be understood by limiting a study to

individuals themselves but requires the examination of the external social world within which those same individuals developed (Scherba de Valenzuela, 2002). The social environment is evidently crucial in promoting higher order thinking.

Previous work on cognitive engagement claims that a safe and comfortable social environment is crucial for students to interact with each other and engage in a given activity (Casimiro, 2016; Gao, Dai, Fan, & Kang, 2010). However, to reach high levels of reasoning, students need to engage in group discussions that include argumentation: questioning, objecting, and elaborating on opposing ideas. According to Polonioli and Bortolotti (2021), in polite conversations, people adjust their vocabulary and speech while being politically correct to avoid social sanctions or criticism from others. However, in so doing they commit to something they do not take to be strictly speaking true or use terms that are less precise than those they would have used otherwise, for example employing euphemisms. Such actions may compromise effective communication, preventing the speakers from being transparent about their views and sharing their true beliefs in an effort to avoid making insensitive remarks or receiving negative feedback. Drawing on personal teaching experiences in Japan, we maintain that classroom etiquette, as we see it now, while establishing boundaries within which students behave with civility to preserve a comfortable social environment, is likely to influence the degree of argumentation in group discussions, preventing students from expressing what they genuinely believe.

Based on the reasons stated above, it is our belief that classroom etiquette, in a Japanese higher education setting, is a factor that deserves further attention and discussion as it plays a key role in building intercultural facework competence among foreign teachers through promoting communication and interaction with students, while at the same time nurturing the critical thinking skills which have a direct impact on students' academic performance.

Literature Review

Classroom etiquette refers to "accepted conventions for appropriate conduct within the classroom" (Gussman, Honaker, Kinsella, Rettberg, & Tompkins, 2004, p. 3) and "the way students behave inside the classroom" (Tamban & Lazaro, 2018, p. 1199). Similar to any social etiquette, or "the set of rules or customs that control accepted behavior in

particular social groups or social situations" (Cambridge Dictionary, 2021), Gail (1998) believes it is rooted in social class, ethnic, lifestyle, and age diversity, coupled with changing cultural norms. It is also subject to the methods employed at each educational institution to handle classroom incivilities. These factors make it challenging to develop a single definition of classroom etiquette applicable to every classroom. However, teachers expect some common behavior from students despite their social and cultural differences. We, therefore, reviewed studies that have explored classroom etiquette to come up with a list of acceptable and unacceptable behaviors in different educational contexts. We then further identified and explored those behaviors most relevant to the Japanese university context through the collection and analysis of quantitative and qualitative data.

In 2003, Beckman-Brito published the paper of a study on classroom etiquette in a multicultural classroom at a major university in the U.S. In the study, Beckman-Brito interviewed six international graduate students from Argentina, China, Japan, Korea, Ukraine, and Vietnam, who were enrolled in an English as a Second Language (ESL) course, about classroom etiquette in their home countries. The students evaluated ten particular behaviors based on how socially acceptable those actions were viewed in their home countries within the university context. Additionally, they answered open-ended questions and participated in one-to-one interviews in relation to the same topic. Beckman-Brito found that behaviors such as "consuming food or beverages in class" and "using the professor's first name" were considered inappropriate by all students. The Japanese, Chinese and Taiwanese participants rated "arriving seven minutes late to a class" as highly unacceptable. Most respondents considered asking questions during class as acceptable to moderately acceptable, with the exception of the Italian participant who had opposite opinions. Further, the Japanese, Taiwanese, and Vietnamese participants considered "offering comments" offensive, while the participants from Argentina, China, and Korea considered such action acceptable. According to Beckman-Brito (?), during the in-depth interviews, every participant recalled personal experiences and provided examples to back up their questionnaire answers. Beckman-Brito concluded that the participants' behaviors in the ESL classroom were, indeed, strongly influenced by their understandings, beliefs, and expectations of classroom etiquette acquired in their home country.

Years later, Sun and Shek (2012) investigated the perceptions of classroom misbehaviors among secondary school students in Hong Kong. They interviewed 18 students from three different schools who were enrolled in their junior year of study. Sun and Shek collected a total of 107 types of behaviors that were clustered into 19 major themes. Among the most frequently reported themes were "talking out of turn," "disrespecting teachers," "doing something in private," "verbal aggression," "sleeping," "playing," "clowning/making fun," "failure in submitting assignments," and "not paying attention." Among these themes, the most common were "talking out of turn" (i.e., asking nonsense questions, calling out, and having disruptive conversations) and "disrespecting teachers" (i.e., disobedience/ refusing to carry out instructions, rudeness/talking back, arguing with the teacher/ offending/ attacking teacher). Sun and Shek concluded that all these types of behaviors were considered unacceptable as they disturbed both teaching and learning and violated the values of respect, conformity, and obedience in the teacher-student relationship within the classroom.

Although studies by Beckman-Brito and Sun and Shek identified a number of disrupting class behaviors, they did not examine students' silent behavior in the classroom; an attitude that has been negatively associated with dependency, indifference, or reluctance in western societies. Sasaki and Ortlieb (2017) investigated Japanese students' silent in-class behavior in an Australian classroom. Sasaki and Ortlieb collected self-reported data garnered from semi-structured interviews with eight Japanese students, six female, and two male. Interestingly, the study showed that Japanese students used silence as a "tool" to preserve harmony in the classroom as they believed expressing opinions was offensive to both classmates and teachers. Students claimed, among other reasons, that they remained silent to "avoid receiving a negative evaluation from teachers and peers," "avoid showing off their abilities in front of other students," and "avoid interrupting the flow of the classroom dynamics". Sasaki and Ortlieb concluded that silence did not necessarily denote reluctance or incompetence but rather a way to keep good relationships with classmates and teachers. Moreover, Japanese students' inclination to remain silent was deeply rooted in their culture, background education, and identity.

While the studies above focused exclusively on exploring students' classroom misbehaviors, Tamba and Lazaro (2018) explored college students' classroom etiquette and the relationship between classroom etiquette, social behavior, and academic performance. In their study, 207

bachelor students in the Philippines rated the acceptability of 15 classroom behaviors. Among the acceptable behaviors were: "asking the professor questions during class," "offering personal comments/views during class," and "cleaning the rooms before and after the class session." Among the only slightly acceptable behaviors were: "eating/drinking during class," leaving class to use the restroom and arriving 15 minutes late. As for unacceptable behaviors, "cheating on the exam," "Not responding to the professor's/presenter's questions" topped the list. Moreover, Tamba and Lazaro found significant relationships among the three variables; classroom etiquette, social behavior, and academic performance. Students displaying a higher level of acceptability of etiquette and social behavior performed better academically than those who did otherwise. Consequently, the authors concluded their study by encouraging the implementation of 'proper' etiquette in the classroom as it may positively impact students' academic performance.

The studies outlined above provide the big picture of classroom etiquette by describing a number of both acceptable and unacceptable classroom behaviors. However, they have not operationalized classroom etiquette and defined the behaviors of what is meant by "a good student" within their cultural expectations. Although they have explored classroom etiquette qualitatively, via interviews with small groups of students, they have, as yet, not explored classroom etiquette with a larger sampling quantitatively via survey research. Therefore, it is still not known whether the list of behaviors provided in each previous study can be grouped into more specific dimensions or if indeed any relationships exist between them. Finally, previous studies have focused on ESL classrooms and multicultural classroom settings but not on the setting of the regular Japanese university classroom.

Methods

In an effort to fill gaps in the literature, we took a mixed-method approach in exploring classroom etiquette of the Japanese university classroom. Mixed methods research here refers to: an intellectual and practical synthesis based on qualitative and quantitative research; it is the third methodological or research paradigm (along with qualitative and quantitative research). While recognizing the importance of traditional quantitative and qualitative research, it also offers a powerful third paradigm choice that will often provide the most informative, complete, balanced, and useful research results (Johnson, Onwuegbuzie, & Turner,

2007). It is important to note that although the mixing of these methods may occur at different stages of the research process, in the current study, the mixing occurred in the data collection and analysis stages.

We first reviewed empirical studies on classroom etiquette, misbehavior, and students' silent in-class behavior to develop a questionnaire of classroom etiquette. We then used the questionnaire to explore university students' classroom behaviors before employing Exploratory Factor Analysis (EFA), along with reliability analysis, in an effort to identify and validate the dimensions contributing to classroom etiquette. Following on, we investigated any interrelationships between such dimensions to identify significant connections. We further explored the results of the survey data via in-depth interviews, with ten university students across all school years. Finally, we compared quantitative statistical results with qualitative findings and contrasted them with those reported by previous studies into the subject before drawing our own conclusions.

Instruments

Two instruments; here referred to as survey questionnaire and interview questionnaire, were developed to collect the data for the study.

Survey Questionnaire

A review of literature was conducted to collect all available items to develop the classroom etiquette questionnaire. The questionnaire construction was facilitated by the compilation of pre-tested items from a number of empirical studies in classroom etiquette, students' silent in-class behavior, and classroom misbehaviors (Beckham-Brito, 2003; Nakate, 2006; Sasaki and Ortlieb, 2017, Sun & Shek, 2012; Tamban & Lazaro, 2018). In total 51 items were adopted to create the initial version of the classroom etiquette questionnaire.

To ensure the construct validity of the questionnaire, the initial version was sent for revisions to a former associate professor in the faculty of Education and Languages of an open university in Malaysia and a doctoral student in the Education and Psychology department at an international university in Japan. This first round of revisions eliminated unnecessary and redundant items with the refined questionnaire containing 44 items.

The second version of the questionnaire was translated into Japanese to avoid misinterpretations or foreign language anxiety among

the target responders. The English and the Japanese versions of the questionnaire were reviewed separately by two associated Japanese professors: both experts in Language Education. The two reviewers ensured that both the translated and original versions of the questionnaire achieve semantic, idiomatic, and conceptual equivalence.

The 44 items comprising the final version of the questionnaire (APPENDIX 1) were included with the Japanese translation first, followed by its original English version. Items were phrased using a five-point Likert scale with one indicating "Never" and five indicating "Always." The questionnaire included a cover letter explaining the purpose of the study, specifying the inclusion age criterion (18 years or above). It also assured anonymity and confidentiality of the participants and asked survey respondents for consent to process their data.

Interview Questionnaire

A questionnaire for in-depth interviews was designed to further explore the results of the analysis of the survey. The questionnaire, initially written in English and then translated into Japanese, included a series of semi-structured questions regarding the participants' observations of students with good and bad attitudes in the classroom. It also inquired into the participants' views on classmates who asked questions or expressed their opinions and on those who remained silent during class. Moreover, it asked about the participants' experiences seeing students either sleeping, texting in class, or doing assignments for other classes and whether or not the respective professor reacted to such students' behaviors. Finally, it inquired into how they dealt with not understanding the class content and finally, their overall satisfaction with their lives as university students.

Data Collection

Survey

The final and approved version of the classroom etiquette questionnaire was turned into an online questionnaire using Google Forms. We distributed the link to the survey among students from a private university in Gunma, Japan, via the university's learning management system, "ACE." We further requested other faculty members of the same university to distribute the questionnaire link among students enrolled in their courses.

Participants

A total of 113 university students (59 female, 53Male, and 1 Prefer not to say) enrolled in the life sciences department of a private university in Gunma, Japan, completed the questionnaire. The participants range in age from 18 to 30 years old with a mean of 22 (S.D. = .59). It is important to highlight that all participants answered the questionnaire voluntarily.

Interviews

To further explore university students' perceptions of classroom etiquette, ten students, five female, and five male, from the university where the survey took place, were invited for in-depth interviews. The students were invited via a post on the university's learning management system, hereafter referred to as ACE, email, and in-person. The students who became participants were given a brief explanation of the study and explicitly reassured that joining or not joining the in-depth interviews would have no effect on grades nor in their relationships with any faculty members. Each was informed that they would be given a 500-yen gift card after completing the interview as compensation for their time.

Participants

Table 4.2 below shows a description of the ten participants. No real names were used for ethical and privacy reasons. Instead, pseudonyms were created using a single letter chosen from their real names preceded by the word "student" and a hyphen (-).

Table 4.2 *List of the Ten Participants of the In-depth Interviews*

Response ID		School year	Gender	Occupation
1	Student-F	First-year undergraduate	F	Full-time Local Student
2	Student-E	First-year undergraduate	M	Full-time Local Student
3	Student-N	Second-year undergraduate	F	Full-time Local Student
4	Student-M	Second-year undergraduate	F	Full-time Local Student
5	Student-Z	Second-year undergraduate	M	Full-time Local Student
6	Student-Y	Third-year	F	Full-time Local

		undergraduate		Student
7	Student-S	Third-year undergraduate	M	Full-time Local Student
8	Student-A	Fourth-year undergraduate	M	Full-time Local Student
9	Student- K	First-year graduate student	F	Full-time Local Student
10	Student- T	First-year graduate student	M	Full-time Local Student

The interviews were arranged individually with each participant via email. None of the participants' private email addresses were requested: instead, they were contacted initially through email addresses provided by their educational institution. Due to the Covid-19 pandemic that struck at the time of the study, nine out of the ten interviews were conducted virtually via a video-conferencing application.

All interviews were conducted in Japanese, the participants' mother tongue, to prevent foreign language anxiety and allow the interviewees to feel comfortable in expressing their opinions and emotions naturally. Prior to each interview, we requested all participants' permission to record the interview sessions for exclusive research purposes. Once gaining the approval the interviews started. The interviews were semi-structured and designed to prompt interviewees concerning issues on classroom etiquette, including misbehavior, disengagement, apprehension, silent class behavior, and their satisfaction with their student lives. Interviews lasted an average of 30 minutes and except for a few internet connection issues, experienced no major difficulties.

Data Analysis

Survey Data

Firstly, a series of exploratory factor analyses (EFA) was conducted to examine the associations between the questionnaire items and determine the underlying constructs. Secondly, Cronbach's Alpha was employed to ensure each construct consistently measured the themes under study. Finally, the correlations between factors, if any, were explored. All data analyses were performed using the Statistical Package for the Social Sciences, SPSS, version 26, 2019.

Interview Data

The data obtained from the in-depth interviews were analyzed using the Content Analysis method. The audio recordings of the interviews were sent to a transcription service provider to be first transcribed and then filed as Word documents. Subsequently, Qualitative analysis software (QDA Miner) was employed to code the transcriptions of each interview and cluster them into themes.

Results

Factor Analysis

Factor analysis (i). A factor analysis (F.A.), using principal component extraction and orthogonal factor rotation, was run on the questionnaire's 44 items. The KMO value (.74) and the Bartlett's test of sphericity with a p-value of <0.01 indicated that the F.A. could proceed. A principal components extraction with Varimax rotation produced 12 factors with eigenvalues greater than 1.0 but, only four factors were held after the examination of the scree plot. Items with no factor loadings or cross loadings were subsequently removed, and the content of the items reviewed, resulting in 22 items being retained.

Factor analysis (ii). Using principal components extraction on the 22 items, Varimax rotation forced the items into four factors. The most stable factor solution showed a KMO value of .78, and Bartlett's test was statistically significant (p <0.01). All communalities were higher than .47, and all factor loadings were above .56. The four-factor solution explained 61% of the total variance: the first factor explained 24% of the total variance, the second 13.4%, and the third and fourth factors explained an additional 11.9% and 11.6% respectively.

Dimensions

The names determined to represent the best type of concepts included in each of the four dimensions were: Misbehaviors, Disengagement, Apprehension, and Silent in-class behavior. Due to space constraints, the titles were shortened in Table 1 to F1MISB, F2DISE, F3APPH, and F4SCLAB.

Misbehaviors (F1MISB). The first dimension consisted of a total of eight items. Six positively loaded items related to undesirable classroom behaviors, namely; "I cheat on exams;" "I leave classes early without notifying the professors;" "I wear a hat during class;" "I talk over the telephone during class;" "I call the professor by his/her first name" and three negatively loaded items related to desirable behaviors*;* "I handle the

university's computers and other equipment carefully," "At university, I dispose of garbage in the correct containers (burnable and non-burnable)," "I keep the deadlines for my class reports".

Disengagement (F2DISE). The second dimension consisted of five positively loaded items related to behaviors that lead to loss of concentration or classwork detachment*;* "I use social media apps on my smartphone during class time for personal use not related to learning;" "I drink during class (e.g., water or tea);" "I do assignments for other classes during class;" "I fall asleep during class;" "I go to the restroom/toilet without notifying the professor".

Apprehension (F3APPH). The third factor consisted of four positively loaded items related to the anxiety of speaking up in class and worrying about other students' judgments*;* "I consult other students before speaking up during class;" "I feel nervous when a professor asks me a question during class;" "I hesitate to ask professors for clarification during class;" "I whisper to a classmate for clarification during class;" "I feel ashamed if I say something wrong in front of other students."

Silent in-class behavior (F4SCLAB). The fourth factor consisted of four positively loaded items related to students' adoption of silent behavior to prevent class disruptions and avoiding challenging professors and other students' opinions; "I remain silent during class so that I do not disturb the professor's lecture;" "I remain silent during class so that I can avoid losing the respect of others;" "I avoid challenging professors' opinions;" "I avoid challenging my classmates' opinions."

Reliability

Through deriving Cronbach's alpha-coefficients, based on the factor analysis results, the internal consistency of each factor of the classroom etiquette questionnaire was examined. An accepted rule of thumb is that the coefficient should read at least 0.70 for a scale to demonstrate internal consistency. The results we obtained showed each factor had an alpha of .70 or higher: F1MISB (Cronbach's alpha=.90), F2DISE (Cronbach's alpha=.85), F3APPH (Cronbach's alpha=.76) and F4SCLAB (Cronbach's alpha=.77) and that no deletion of any item would raise the Alpha of each scale. The high internal consistency of the four factors indicated that they were acceptably reliable.

Table 1. *Results of Factor Analysis (Principal Component Analysis Followed by Varimax with Kaiser Normalization)*

Items	Factor loadings			
	F1MISB	F2DISE	F3APPH	F4SCLAB
試験でカンニングをする I cheat on exams.	.903			
大学のパソコンや設備を丁寧に扱う I handle the university's computers and other equipment carefully.	-.793			
先生に断ることなく、授業を早く抜け出す I leave classes early without notifying the professors.	.786			
大学でゴミを正しく分別する（可燃ごみ・不燃ごみなど) At university, I dispose of garbage in the correct containers (burnable and non-burnable).	-.780			
授業中に帽子をかぶっている I wear a hat during class.	.755			
授業のレポートの締め切りを守る I keep the deadlines for my class reports.	-.730			
授業中に電話をする I talk over the telephone during class.	.688			
先生を下の名前で呼ぶ I call the professor by his/her first name.	.673			

授業中にスマートフォンのアプリを授業とは関係のない個人的な目的で使用する I use social media apps on my smartphone during class time for personal use not related to learning.	.810	
授業中にものを飲む（例：水やお茶など) I drink during class (e.g., water or tea).	.769	
授業中に他の授業の課題をする I do assignments for other classes during class.	.763	
授業中に居眠りをする I fall asleep during class.	.646	
先生に断ることなく、トイレに行く I go to the restroom/toilet without notifying the professor.	.619	
授業で発言する前に他の学生に相談する I consult other students before speaking up during class.		.677
授業中に先生に質問をされると緊張する I feel nervous when a professor asks me a question during class.		.675
授業中に先生に確認することをためらう I hesitate to ask professors for clarification during class.		.671
授業中にクラスメイトに小声で確認する I whisper to a classmate for clarification during class.		.655

他の学生の前で間違ったことを発言してしまったら、恥かしい気分になる I feel ashamed if I say something wrong in front of other students.		.643	
授業の流れを邪魔しないよう、授業中は発言しない I remain silent during class so that I do not disturb the professor's lecture.			.799
面目を失わないよう、授業中は発言しない I remain silent during class so that I can avoid losing the respect of others.			.728
先生の意見に反対することを避ける I avoid challenging professors' opinions.			.663
他のクラスメイトの意見に反対することを避ける I avoid challenging my classmates' opinions.			.568

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

Correlations at The Dimensional Level

A series of Spearman's rho correlations were conducted to determine the relationships, if any, between the four dimensions – Misbehaviors, Disengagement, Apprehension, and Silent in-class behavior – Table 3, below, shows the full range of the results.

Table 3. *Correlations Between Dimension Sub-scales.*

Correlations	F1MISB	F2DISE	F3APPH

Spearman's rho	F1MISB	Correlation Coefficient	1.000		
		Sig. (2-tailed)	.		
		N	113		
	F2DISE	Correlation Coefficient	**.383****	1.000	
		Sig. (2-tailed)	.000	.	
		N	113	113	
	F3APPH	Correlation Coefficient	-.088	**.277****	1.000
		Sig. (2-tailed)	.355	.003	.
		N	113	113	113
	F4SCLAB	Correlation Coefficient	**-.251****	.024	**.443****
		Sig. (2-tailed)	.007	.800	.000
		N	113	113	113

**. Correlation is significant at the 0.01 level (2-tailed).

The results revealed positive, moderate, and statistically significant correlations between Silent in-class behavior (F4SCLAB) and Apprehension (F3APPH) (*rs* = .443, p<.01). They also showed a negative, moderate, and statistically significant correlation between Silent in-class behavior (F4SCLAB) and Misbehaviors (F1MISB) (*rs* = -.251, p<.01).

There were also positive, moderate, correlations between Disengagement (F2DISE) and Misbehavior (F1MISB) (*rs* = .383, p<.01)

and between Disengagement (F2DISE) and Apprehension (F3APPH) (*rs* = .277, p<.01).

Interestingly, no significant relationships were found between Apprehension (F3APPH) and Misbehavior (MISB) (rs = -.088, n. s.), nor between Silent in-class behavior (F4SCLAB) and Disengagement (F2DISE) (rs = .024, n. s.). A visualization of the correlational results is shown in Figure 1.1 below.

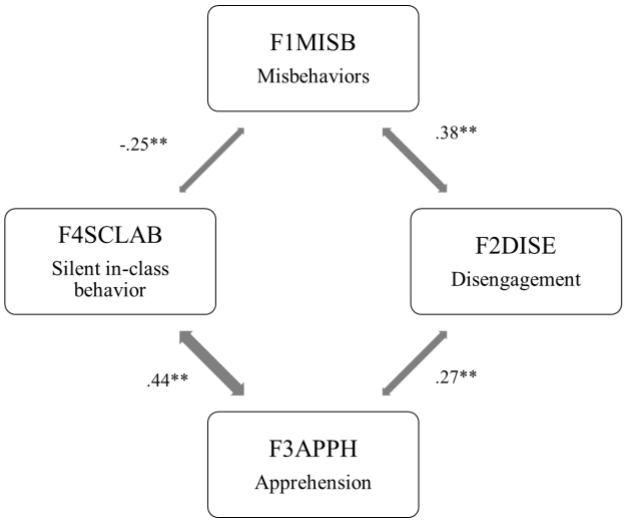

Figure 1.1. *Correlations Among the Four Dimensions*

Independent Sample t-test Results

An independent sample t-test was computed to determine whether a gender and age difference existed in the four behavioral markers —Misbehaviors, Disengagement, Apprehension, and Silent in-class behavior.

Differences in Gender

No statistically significant difference was found for Disengagement between male (M = 53, SD=9.3) and female students (M =59, SD=8.20); t (98.3) =1.87, p=0.64. Significant differences were found for Misbehavior, Apprehension, and Silent class behavior, however: Male students (M = 53 SD=10.8) attained higher scores than female students (M =59 SD=8.8) for Misbehavior, t (56.2) =2.5, p=0.01. In contrast, female students (M =59 SD=17.8) scored higher than male students (M = 53 SD=15.6) for Apprehension t (110) = -2.95, p = 0.004. In addition, female students (M =59 SD=14.0) attained higher scores than male students (M = 53

SD=12.0) for Silent class behavior, t (110) = -3.071, p = 0.003. These results are elaborated in the discussion section.

Differences in Age

No significant difference in age was found relative to Misbehavior, t (19.21) = -1.54, p = .139, nor Apprehension, t (107) = 1.43, p= 154. Nevertheless, a significant difference was found relative to Disengagement and Silent class behavior; 21 to 23-year-old students (M= 11.89, SD=3.46) scored higher in Disengagement than 18- to 20-year-old students (M=8.19, SD= 3.07), t (107) = -4.67, p = .000; while, 18 to 20-year-old students (M=13.39, SD = 3.33) scored higher in Silent class behavior than 21 to 23-year-old students (M=11.47, SD = 3.71), t (107) =2.23, p = 0.28. Simply put, younger students may stay more focused and quieter than older students during class. These results are further elaborated in the discussion section.

Participants' Perspectives of Good Students and Bad Students

As explained in the method section, we interviewed ten university students at a private university in Japan. To learn more about acceptable and unacceptable classroom behaviors, during the interviews, we first asked the participants to recall the most recent course they had taken before being interviewed. We then asked for descriptions of classmates displaying good and bad attitudes in class. After analyzing we created two personas based on all the participants' comments and descriptions. These personas, hereafter referred to as "good students" and "bad students", are described as follows:

Good Students

Good students greet the professor before class (Student-S). They sit in the front row in the classroom and listen attentively to the professor's lecture. Although they sit next to their friends, they do not chat (Student-A). They concentrate and nod their heads while listening to the lecture. They put only the necessary things on their desk for taking the class (Student-N). They do not use their smartphones (Student-N) nor place them on their desks; they keep them inside their bags (Student-E). They take notes properly and diligently while listening to the professor's talk (Student-F, student-T, & student-E). While doing so, they keep their backs straight (Student-M). If the professor asks a question, they answer it assertively (Student-Y) or have a dialogue with the professor by asking

questions (Student-K). Moreover, they make assumptions based on the professors' talk (Student-K), summarize the professor's main points written on the blackboard, and take note of their ideas or further information not written on the blackboard (Student-M). Finally, they share opinions with professors or ask any questions they might have at the end of the class (Student-S).

Bad Students

Bad students sit in the back of the classroom, hide behind other students' backs to sleep, or use their smartphones during class (Student-S, Student-M). They stare at their smartphones or laptop computers without paying attention throughout the lecture (Student-N). They do not use their smartphones or laptop computers for studying but for playing mobile games (Student-A, Student-S, Student-T, student M, Student- E). Moreover, they do not keep a good posture while sitting; they slouch (Student-M) or put their elbows on their desks (Student-N). They also whisper or chat during lectures or presentations (Student-F) and do tasks unrelated to the class (Student-E, Student N). On top of that, they make no effort to speak to the professor, react to the professors' inquiries, or discuss the class's issues with professors (Student-K).

The Relationship Between Silent Class-Behavior and Apprehension.

According to the statistical results, there is a positive and significant relationship between Silent in-class behavior and Apprehension. Therefore, we first asked all participants their opinions of classmates who remained silent most of the time during class. We then asked the participants whether they considered themselves the type of student who actively expresses their opinions in class or the type of student who remains silent. Below are the main findings.

Participants' Perspectives of Silent Students.

Every participant had differing points of view. According to Student-M, many students did not speak much when they were among many people; she thought they felt embarrassed. Student-N and Student-A thought that students who remained quiet did not properly understand the lecture's contents. However, Student-Y claimed that remaining silent was neither bad nor good: she thought that it was just "the way" some students "took the class". Likewise, Student-S thought that it was "okay" if students remained quiet as long as they understood the content of the class. Student-M stated that she wanted to make silent students speak up in

situations where they were expected to, such as in a discussion or a debate, but she did not feel that they have to do that during lectures that require no discussion. Similarly, Student-T said that she wanted silent students to speak up even if only to share a simple comment or answer. Finally, Student-E considered that students who remained silent without answering the professors' questions were not actively involved in the class.

Participants' Self-perspectives

Of the ten participants, six considered themselves the type of students who remains silent, the foremost reasons, based on content analysis, were feeling embarrassed to speak in front of a large group, being afraid of making mistakes, and considering it embarrassing to disclose a lack of understanding of class content.

According to Student-A, speaking up in front of many people was embarrassing. Moreover, he felt he did not have to be the one who spoke up, so he remained silent. Student-N commented that she was not the kind of person who expressed her opinions, and she did not like to stand out from the crowd. In addition, she thought it was embarrassing to reply "I don't understand" when she could not answer a question. Similarly, Student-F said she was "shy and not good at talking in public". She also mentioned that it was embarrassing to make mistakes in front of others. Likewise, Student-M claimed that although he was not embarrassed to speak up, he felt "afraid of making mistakes". Student-S said that he felt embarrassed to show that he did not understand the content of the class, so he often hesitated to ask questions of the professor. Similarly, Student-T commented that there were many things that she could not understand about the class, and, as a result, she had no intention of speaking up during class.

The comment below, made by a second-year female student, Student-Y, can be taken as indicative of most of the reasons stated above.

> *"Perhaps [students] do not answer, not because they are unmotivated but, because it is hard to speak up in front of others. They feel concerned about making mistakes when expressing their opinions in front of everyone. Even though there are people [in the group] who usually can't answer [the questions], they don't answer, not because of their lack of understanding but, because they are scared of speaking up and so, they don't answer."*

We further asked all participants what they did when they could not understand class content. Surprisingly, only two students, student-Y and

Student-E, reported asking the professor in person or via email after class. Conversely, eight interviewees stated that they first tried to clarify their queries by asking friends, classmates, or senior students. In addition to consulting fellow students, four participants said they searched for answers themselves using the internet and other secondary sources as it was a faster way to settle their doubts. However, if they still did not get a satisfactory answer, they consulted with their professors as a last resort. According to Students E, F, and K, the main reasons for not consulting professors in the first place were feeling embarrassed to ask the professor in person, feeling sorry for taking up the professor's time, and not finding a suitable time to speak to them as most professors were busy.

The Relation between Disengagement and Misbehavior

The statistical results also showed a positive and significant correlation between Disengagement and Misbehavior. We explored this relationship by asking all participants to share their thoughts on students who either sleep, text, or work on assignments for other classes during class. We then asked them to share any experiences they had, of seeing professors reacting to students exhibiting such behavior.

Regarding students who stare at their phones or play mobile games while taking a class, seven out of the ten interviewees found it disrespectful to professors. A first-year student, Student-E, commented, "It is terrible; after all, professors make an effort to come to school to teach us, and we should correspond to that feeling. It's not good if we do irrelevant things [in class]. We should be more grateful." As for doing assignments for other classes in class, Students N, M, and Y considered doing other things during class a waste of time and money. Moreover, they thought that the class must be unimportant for such students. They also considered the possibility that such students were not good at managing their time or schedule, and as a result, they worked on assignments of other classes during class.

In reference to seeing professors reacting to students sleeping in class, using their smartphones for private use, or doing assignments for other classes during class; Students T, Y, and E recalled experiencing occasions when their professors confiscated or asked students to refrain from using their smartphones in class. Similarly, Student-S and Student-F recalled instances when their professors got angry because some students were sleeping or chatting during class. Surprisingly, most interviewees considered it as something very unusual to see such reaction from

professors in the university. We, therefore, asked the participants why they thought very few professors reacted to such misbehaviors; Student-K thought that university classes are large and thus "there were just too many students for professors to care about". Student-A thought that "almost all professors were kind" to students. However, Student-M felt that university professors were "neither kind nor indifferent" but they expected students to be "self-responsible". Student-S considered professors "more liberal than kind" as they "just teach," and it is up to the student to take classes seriously or otherwise. Similarly, Student-N reported that "in university, [students] are free, free to do things or not". Student-T stated that, as a graduate student, it was natural for her to decide for herself and, in the same way, it was natural for professors not to speak out.

Discussion

This study aimed to develop and validate a classroom etiquette questionnaire. After reviewing the literature about classroom etiquette, classroom misbehaviors, and students' silent class behavior, a 44-item questionnaire was constructed and administered to students enrolled in a private university in Gunma, Japan. A total of 113 students responded to the questionnaire. Results from the principal components exploratory factor analysis, with Varimax rotation, suggested a four-factor solution consisting of 22 items. The reliability analyses showed that the Cronbach Alpha value of each factor was higher than 0.7, indicating their acceptable internal consistency. The four factors were then labeled: Misbehaviors (8 items), Disengagement (5 items), Apprehension (5 items), and Silent class-behavior (4 items). Spearman's rho correlations showed statistically significant correlations between Silent class behavior, Apprehension and Misbehavior, and Disengagement, Misbehavior, and Apprehension. The following is a discussion of the correlational results.

The Relationship Between Apprehension and Silent Class Behavior

The most remarkable finding was a high degree of association between Apprehension and Silent in-class behavior. The statistical results suggest that students' anxiety around speaking up in class and worrying about other students' judgments are closely associated with students' silent behavior adopted to prevent class disruptions or avoid challenging opinions of professors and other students. These results support evidence from previous observations of Sasaki and Ortlieb (2017) claiming Japanese students' use of silence is an instrument to preserve harmony and

respect for authorities in the classroom: as expressing their opinions could be offensive to classmates and teachers. This view is supported by Seiko (2001) who states that the use of silence in the classroom is rooted in a Japanese cultural norm called "Wa", meaning Harmony, and the importance of consensus decision-making" (p.32) in Japan's culture.

The analysis of the interview data revealed that Silent class behavior is expected in the university classroom. Students with good behavior towards the class listen to the professor's lecture, nod their heads while listening to the lecture, take notes diligently and share opinions or ask questions at the end of the class. Interestingly, with regard to asking questions at the end of the class, most of the interviewees did not prioritize asking professors: instead preferring to consult with friends, classmates, or fellow senior students or even research on the internet whenever they have questions. Some of the students gave as reasons for not speaking with professors in the first place: embarrassment to speak to the professor in person, feeling sorry for taking up the professor's time and having problems finding a suitable time to speak to professors. Our findings are consistent with those of Smith and Kato (2001) who reported, in a study on cultural differences between Australian and Japanese students, that Japanese students remain quiet and seldom ask questions during class, rather they consult with their peers after class. Although in this study we found three reasons why students hesitate to approach faculty to ask questions, further research on faculty approachability is needed to explore this issue as student-faculty interaction influences students' academic experience.

The interview data further revealed that the participants considered it acceptable to make comments during class. This outcome is contrary to that of Beckman-Brito (2003), who reported in a cross-cultural study of classroom etiquette with international university students, that the Japanese participants considered "offering personal/views during class" as unacceptable classroom behaviors along with other actions such as "cheating on an exam" and "eating and drinking during class". In the current study, the interviewees reported having a positive image of students who express personal views during class. Students who expressed their opinions in class were perceived as highly motivated and courageous people who clearly understood the class content and, therefore, felt confident in speaking up. These findings support previous observations of Seiko (2001) and Nakane (2006), claiming that silence, in the Japanese classroom context, is not regarded as negative behavior, such as is

rudeness or laziness, but as a strategy used by students to cope with difficult situations and avoid loss of face. According to Seiko (2001), Japanese students felt uneasy about stating their own opinions in class as they were unsure whether their answers were correct or if their ideas differed from those of others. Indeed, the current study found that students felt afraid of making mistakes and embarrassed at appearing ignorant if they made inquiries or provided incorrect answers. In all, silent class behavior should not be seen as an offensive action but more as a face-saving action employed by students to protect their self-image and reputation through avoiding the embarrassment of showing their ignorance in front of the class. These findings align with Edelmann's (1985) claims that embarrassment is innately tied to one's public image; therefore, individuals try to avoid it by following social expectations that define desirable behavior. In our study, this could be interpreted as follows: If a student answers the teacher's question correctly, he or she meets the social expectations through showing a clear understanding of the class content, which is a desired behavior. If on the other hand, the student answers incorrectly, he or she may feel that they are perceived as deficient by either the teacher or classmates or both, leaving the same student with a temporary loss of self-esteem. Consequently, the student may remain silent to save face if they are not highly motivated or courageous enough to attempt to answer the teacher's question.

Gender Differences

Interestingly, the independent sample t-test results showed that female students scored higher in Apprehension and Silent class behavior than males. Findings from the interview data back up these results. Six out of the ten participants claimed that they had often seen more men speaking up in class than women. These results reflect those of Bailey et al. (2020), who investigated the participation ratio between male and female students across 34 life science classes of a large private university in Utah, USA. According to Bailey, female students participated less than their male peers. In addition, male students were more likely to be classified as "talkers" as they participated verbally more than once during class. In the same vein, Ballen et al. (2017) found similar results in a study conducted in a global leader country in gender equality: Norway. Ballen et al. analyzed the participation rate in three introductory Biology classes, in a public university, and found that on average, female students in whole-class discussions participated less frequently than their male counterparts. If women still face academic challenges in relatively equal gendered

countries, such as the USA and Norway, what can we expect from Japan, where traditional gender roles and societal expectations of women to be modest and obedient still prevail? Yet, a further study focused on gender equality in the Japanese university classroom is therefore suggested. In the meantime, it is important to keep in mind that female students may be the ones who need extra encouragement to share their opinions and questions in or after the class.

Age Differences

The independent sample t-test results revealed a difference in age with younger students scoring higher in Silent class behavior than their older peers. A partial explanation may be that first-year students feel more anxious to speak up in class than students from subsequent school years, as they transfer certain classroom behaviors from a high school where the educational environment is usually stricter than that of the university. A common view among the interviewees is that professors at university are very different from high school teachers. While most university professors encourage students to take more responsibility for their learning, high school teachers, on the other hand, are stricter about their students' learning and grades. They, therefore, call on students who do not pay attention in class, tell off students who do off-task activities during class and forbid the use of smartphones in the classroom. Nevertheless, this assumption has to be taken with caution as our findings are limited to the experiences of a small number of interviewees.

The Relationship of Disengagement with Misbehavior and Apprehension

Two other interesting findings were the relationships that Disengagement has with two other factors, namely Misbehavior and Apprehension.

Regarding the Disengagement-Misbehavior relationship, behaviors that lead to loss of concentration or classwork detachment (e.g. using smartphones, falling asleep, and doing assignments for other classes) were considered to be disrespectful. However, most interviewees surprisingly reported that it was "very unusual" to witness professors reacting to such students' misbehaviors in class. Mihara (2018) explains that professors tolerate students who sleep during class as long as they do not disrupt the teaching and the learning of other students. Although we did not have the opportunity to interview professors to support Mihara's opinion, we found, through the interviews conducted, that most professors tend to

focus on delivering their classes and let students take responsibility for their own learning. In other words, students have the freedom of choice whether to take their learning seriously or otherwise.

The Disengagement-Apprehension association suggests that students getting distracted or engaging in activities unrelated to the class (e.g., using a smartphone for private use or doing assignments for other classes during class) are associated with feelings of anxiety. Consulting with other students before speaking up or feeling nervous if the professors ask a question are examples of this. According to May and Elder (2018), attempting to pay attention to lectures and engage in technologies simultaneously has a detrimental effect on learning due to inattention to the course learning. During the in-depth interviews, Student-M commented that she felt "left behind" and "anxious" when she drowsed in class. Therefore, anxiety likely comes from students' lack of comprehension or information recall due to their inattention to class content while engaging in off-task activities. Nevertheless, the relationships between these two variables need further investigation to back up these assumptions.

There are numerous intrinsic and extrinsic variables that drive students to disengage from classes. According to Chipchase et al. (2017), some intrinsic variables are psychological issues, low motivation, inadequate preparation, and unmet/unrealistic expectations. As for extrinsic factors, financial stress, institutional structures and processes, and factors related to academic staff and online teaching are among the most relevant. In the current study, the degree of difficulty of the lecture materials and the poor lecture organization were two factors that influenced disengagement. Five interviewees reported having difficulties understanding "the jargon" and "expert knowledge" taught in classes. Student-E, a first-year student, opines that professors teach specialized knowledge, assuming that students have already acquired the basic knowledge; however, many students take classes without understanding what the professor says because they lack such basic knowledge. Commenting on the organization of the class, three interviewees reported feeling bored when students only had to listen to the professors' talk and when professors only read from the textbooks, slides, or handouts throughout the class. Yet again, an additional study is needed to fully understand students' disengagement in the university classroom.

Conclusion

The present study reviewed empirical studies on classroom etiquette, misbehavior, and students' silent in-class behavior to develop a classroom etiquette questionnaire. Through a series of Factors analyses run on 44 questionnaire items extracted from the literature, we identified 22 items in a Japanese university classroom. These items fall into four underlying dimensions, namely Misbehaviors (referring to rude or unwelcome behaviors), Disengagement (referring to behaviors related to off-task activities), Apprehension (referring to behaviors triggered by the anxiety of speaking up in class and worrying about other people's judgments), and Silent in-class behavior (referring to the adoption of silent behavior to prevent class disruptions). Consequently, the classroom etiquette questionnaire is multi-dimensional with four related dimensions that indicate how well or badly students behave within Japan's accepted educational standards.

In all, silent in-class behavior, in the Japanese context, plays a crucial role in classroom etiquette as it prevents disruptions or the exchange of conflicting opinions during class while preserving harmony in the classroom. Through in-depth interviews, we found that "good students" remain quiet but attentive during class and leave their questions or comments for the end of the class. We also found that students remained silent as they felt afraid of making mistakes and considered it embarrassing to show ignorance in front of the class. Thus, silent in-class behavior should also be seen as a face-saving action employed by students to protect their self-image and reputation through avoiding the embarrassment of showing their ignorance in front of the class. We further found that young female students are the ones who remain silent and feel apprehensive the most; therefore, they may be the ones who need extra support and encouragement to speak up in, or after class.

Interestingly, interviewees claimed that most professors tolerate students' disengagement behavior in class, as most professors tend to focus on delivering their classes and let students take responsibility for their own learning and enjoy the freedom of choice whether to take their learning seriously or otherwise. Factors that contribute to students' disengagement include difficulty in understanding the jargon and expert knowledge presented and poor organization of the classes, especially in classes where students only listen to the professors' talk and where professors only read from the textbooks, slides, or handouts throughout the class.

Getting distracted and engaging in activities unrelated to the class is related to students' apprehension. With the limited data available we were forced to assume that these anxiety feelings likely come from students' lack of comprehension or information recalling, leading to feeling "left behind" due to their inattention to class content.

The results of this study contribute to the body of research on classroom etiquette by supporting the findings of previous qualitative studies. The study also contributes with an instrument that can be used to assess how frequently students engage in classroom etiquette-related behaviors. The classroom etiquette questionnaire has practical applications in that it provides an initial approximation of the spectrum of student behavior within Japanese university classroom parameters. Instructors could employ the questionnaire to explore their students' attitudes towards the class at the beginning of the term. It could also be used to understand the classroom dynamics and set up ground rules that encourage students to focus on accomplishing common goals while fostering a sense of a learning community. Other researchers could also use the questionnaire to explore whether or not there are any relationships with grade point average (GPA), grades, test scores, or any other method used to measure students' academic performance helping make suggestions on classroom etiquette implementation. Moreover, as we previously mentioned in the introduction section, the main findings of the study can be helpful for promoting intercultural facework competence of foreign teachers, especially among those who are new to teaching at universities in Japan, as it provides specific examples and explanations of students' classroom behaviors backed up with quantitative and qualitative data. By understanding what lies behind students' behaviors, for instance, silent in-class behavior, foreign teachers may empathize with Japanese students' feelings and use strategies to reduce students' anxieties while encouraging them to participate actively in group activities.

The generalizability of the results is subject to certain limitations, which calls for further research. The interview data was limited to ten students of Japanese nationality, who were brought up and educated in Japan, and enrolled in the life sciences department of a private university. The data did not include the opinions of students of foreign nationalities or of those who were previously educated in a different educational environment before joining a university in Japan. Future studies should consider such limitations as there may be differences in students' classroom behaviors depending on their previous educational experiences

and the environments of those experiences (e.g., private or public), department of study, and students' cultural and educational backgrounds. In addition, confirmatory factor analysis (CFA) is still needed to determine the degree to which the four dimensions will yield consistent results. With this in mind, a second study is in progress to collect data from a larger sample using the instrument developed in this study to back up the current statistical result.

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Teaching during the COVID-19 pandemic: Investigating the impact on teacher's sense of efficacy

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ABSTRACT
This study examines how teaching during the COVID-19 pandemic impacted teacher efficacy. The study employed the survey research design, using a sample of 59 Historically Black Colleges and Universities (HBCU) instructors/teachers. The study seeks to answer the research question: How did teaching during COVID-19 impact teachers' sense of efficacy as measured by the Teachers' Sense of Efficacy Scale (TSES) by Tschannen-Moran and Woolfolk? Data was collected through simple random sampling using the Teachers' Sense of Efficacy Scale (TSES) by Tschannen-Moran and Woolfolk, (2001) and was analyzed using crosstabulation analysis. The findings from this study differ from the findings of previous studies as it shows no difference between the efficacy of teachers who taught virtually and teachers who used the hybrid mode of teaching during the COVID-19 pandemic as they all had low beliefs about their efficacy for student engagement and instructional strategies.

Keywords: COVID-19, Teacher Efficacy, Distance Learning, Hybrid Learning, HBCU

School closures due to viral outbreaks are not a new thing. School closure has been used in the past as a mitigation strategy to reduce the transmission of viruses during outbreaks (Simon et al., 2009). It is a non-pharmaceutical intervention strategy that has received so much attention from the media, the research community, the public, and also policymakers (Stern et al., 2010). While school closures reflect different strategies and also help in slowing down transmission, it has also been associated with social, educational, and economic costs (Cauchemez et al., 2014). The emergency closure of schools during pandemics or outbreaks of infectious diseases has often been used in the past as a Public Health intervention to limit the spread of infections (Brooks et al., 2020). According to Bayham and Fenichel, (2020, P. e271), "School closures are some of the highest-profile social (physical) distancing measures used to slow the spread of an infectious disease... The benefit of closing schools during an epidemic is to reduce transmission and new cases". By mid-April 2020, schools had been closed in over 192 countries due to the COVID-19 pandemic affecting about 1.6 billion students (Donohue & Miller, 2020). This forced most schools to offer remote/distance learning (Tsolou et al., 2021). With the "COVID-19 push", many teachers had to adopt online, virtual, and hybrid modes of instruction which they were previously unfamiliar with (Coyne, Ballard & Blader, 2020; König et al., 2020; Ma et al., 2021).

The transition from traditional face-to-face teaching to distance/remote learning according to existing literature has had an impact on Teacher Efficacy. For example, a study carried out by Swanson and Swanson (2022), focused on investigating teachers' sense of efficacy of Language teachers during the COVID-19 distance learning found that COVID-19 distance learning impacted efficacy. Another study conducted by Pressley (2021), to examine Teacher Efficacy in elementary school teachers during the COVID-19 distance learning showed lower teacher sense of efficacy scores for elementary teachers who taught virtually due to the COVID-19 pandemic compared to the teacher sense of efficacy scores. Another study that looked at teachers' sense of efficacy during the COVID-19 pandemic for both elementary and secondary school teachers showed lower efficacy scores in both instructional strategy and student engagement. The study also revealed that teachers who taught virtually had lower efficacy scores compared to teachers who taught using the hybrid mode of teaching (Pressley & Ha, 2021). This study contributes

similarly to literature on teaching during the COVID-19 distance learning by investigating the impact of teaching during COVID-19 on teachers' sense of efficacy of Historically Black Colleges and Universities (HBCUs) teachers. While there have been studies conducted to examine teacher efficacy during the COVID-19 distance learning in various educational institutions, there are no studies that have been conducted to investigate how the adoption of technology in teaching and learning during the COVID-19 pandemic impacted Teacher's Sense of Efficacy in an HBCU institution. This study, therefore, plans to fill this existing gap thus serving as a bridge in literature. To explore the impact of COVID-19 distance learning on teacher's sense of efficacy, the research question under investigation is: How did teaching during COVID-19 impact teacher's sense of efficacy as measured by the Teachers' Sense of Efficacy Scale (TSES) by Tschannen-Moran and Woolfolk, (2001)?

Literature Review

Teacher Efficacy and Technology

Pedagogy during the COVID-19 distance learning looks into how students are engaged online, how online classrooms are managed, and how different instructional strategies are employed for online instruction. As observed in existing literature, before the COVID-19 pandemic, many schools lacked virtual learning platforms/technologies, many faculty members lacked distance learning training and did not have the skills required for distance learning (Coyne, Ballard & Blader, 2020). A study carried out by Koehler et al. (2013, p. 60) stated that "Social and institutional contexts are often unsupportive of teachers' efforts to integrate technology use into their work. Teachers often have inadequate (or inappropriate) experience with using digital technologies for teaching and learning. Many teachers earned degrees at a time when educational technology was at a very different stage of development than it is today. Thus, it is not surprising that they did not consider themselves sufficiently prepared to use technology in the classroom and often did not appreciate its value or relevance to teaching and learning. Acquiring a new knowledge base and skill set can be challenging, particularly if it is a time-intensive activity that must fit into a busy schedule" (Koehler et al., 2013, p.60). With the "COVID-19 push", many institutions had to adopt online/virtual learning technologies really quickly and train their staff on how to use these technologies. These trainings were also time-sensitive due to the abrupt nature of the transition to distance learning and it had to

fit into their busy schedule. (Coyne, Ballard & Blader, 2020; König et al., 2020; Ma et al., 2021) .

The COVID-19 pandemic put teachers in a unique situation as teachers faced challenges in supporting student learning during the COVID-19 pandemic. Teachers also faced challenges in adapting to online instruction, these challenges varied depending on the teachers' technological abilities/digital skills, and access to technological infrastructures such as Zoom, Blackboard Collaborate, Microsoft Teams, Google Hangouts, etc. (Kim, 2020). Scherer et al. (2021) conducted an analysis to profile teachers' online readiness for COVID-19 online learning. The results from their study show that teacher readiness is a multifaceted construct especially when it comes to online learning as the background of teachers and their experience with online learning affects their readiness. Results from a study on the relationship between technological pedagogical content knowledge, school support, and technostress reveal that teachers' technological pedagogical content knowledge and school support predict their technostress levels (Özgür, 2020). Technology's integration into education is very important as it provides engaging teaching and learning experiences for both teachers and students (Thohir et al., 2020). A study that examined the relationship between Technological Pedagogical Content Knowledge and occupational anxiety for prospective teachers found that Technological Pedagogical Content Knowledge affected occupational anxiety by 62% (Uyanık et al., 2019). Another study conducted to assess COVID-19 distance learning, teachers' experiences of stress, and their strategies for coping found a positive association between COVID-19 distance learning with medium to high levels of stress among teachers with a majority of teachers experiencing technical barriers due to a lack of technological skills (Federkeil et al., 2020). It is therefore evident that teachers' technological skills have an influence on their stress levels during the transition to online/hybrid learning. König, Jäger-Biela, and Glutsch (2020) conducted a study to analyze the potential factors such as school computer technology, teacher technological pedagogical knowledge on teacher competence. Findings from their regression analysis found that information computer technology (ICT) tools especially teacher digital competence and opportunities to learn digital competence are key instruments to adapting to online teaching during the COVID-19 pandemic. Their study also found that teachers who already had the

technological infrastructures provided by their schools and were familiar with them were at an advantage when schools closed due to lockdowns.

Hybrid & Virtual Instruction during COVID-19

With the closure of schools due to the COVID-19 pandemic, schools were forced to offer remote/online learning and later hybrid learning (Tsolou et al., 2021). Both virtual and hybrid learning aim to provide pedagogical freedom through access to education beyond the boundaries of a classroom (Raes, 2022). While hybrid learning combines face-to-face instruction with online/virtual instruction, virtual/online learning is learning done on a web-based platform (Bennett, Knight, & Rowley, 2020). Hybrid and virtual learning have seen significant changes in the past couple of years. Hybrid learning benefits from the advantages of traditional face-to-face learning while also taking advantage of the flexibility of online learning (Singh, Steele, & Singh, 2021). With the COVID-19 pandemic the challenge for teachers and students with regard to virtual learning has included difficulties in how to use software for online learning, time management issues, the rapid transition to online learning, limited or no training on how to teach online (Singh et al., 2021). Virtual learning has been praised for its flexibility in the ease of administration and accessibility to learning materials (Mukhtar et al., 2020). Despite the benefits of virtual learning, it is not without challenges. A study conducted in 2021 revealed some barriers to virtual learning during COVID-19, these barriers included technological barriers and institutional barriers (Khobragade et al., 2021).

Research shows that students who enroll in blended/hybrid courses have better academic outcomes than students enrolled in traditional face-to-face courses or online courses (Namyssova et al., 2019; Vonti & Grahadila, 2021). A study conducted PreCOVID-19 that explored student engagement in higher education showed that students who took more online courses in qualitative reasoning engaged less in collaborative learning. This study has an implication for teachers by encouraging teachers to use instructional strategies that encourage student engagement (Dumford & Miller, 2018). Findings from a study that examined teacher efficacy for online teaching during COVID-19 for secondary school teachers revealed that teachers with prior experience in teaching online or teachers who had undergone professional development for online learning had higher teacher efficacy scores (Dolighan & Owen, 2021). Another factor that, according to research, impacted teachers' self-efficacy during

the COVID-19 pandemic was their self-perceived instructional competence (Pellerone, 2021). Research also suggests that a correlation exists between institutional/administrative support, institutional integrity and accountability, academic emphasis, and teacher efficacy (Woolfolk, Rosoff, & Hoy, 1990; Gillespie, 2022).

Methods

The study utilized the survey research design. The survey instrument used for this study is the Teachers 'Sense of Efficacy Scale. The Teachers 'Sense of Efficacy Scale (TSES) was designed by Tschannen-Moran and Woolfolk (2001). The TSES was designed to measure teachers' beliefs about their instructional effectiveness/efficacy. There are two types of TSES forms, the long form which is a 22-item instrument scale used to measure teachers' belief of their instructional efficacy, and the short form which consists of 12 items also used to measure teachers' belief of their instructional efficacy. The subscales of TSES include (a) Efficacy for instructional Strategies, (b) Efficacy for student engagement and c) Efficacy for classroom management. The TSES is a five-point Likert scale which was coded strongly agree=0, agree=1, neither agree nor disagree=2 disagree=3 and strongly disagree =4 where higher scores indicated greater efficacy belief. The TSES long-form shows validity and reliability in measuring teacher efficacy. Karbasi and Samani (2016) conducted a study to examine the validity and reliability of the TSES on an Iranian sample, from their findings, the Alpha coefficient for instruction self-efficacy, community involvement self-efficacy, positive school climate self-efficacy, and decision-making self-efficacy ranged from 0.77 to 0.85 and the Alpha coefficient for Test-retest reliability ranged between 0.77 to 0.83 making the TSES a reliable and valid instrument. Another study carried out to test the validity of the TSES on an Indian sample showed a reliability coefficient of 0.9446 and an intrinsic validity of 0.9719, proving the TSES to be a highly valid and reliable instrument (De Paul, 2012). In a study that explored the validity of the TSES in five countries: Korea, Singapore, Canada, Cyprus, and the United States. The TSES was once again proven to be a reliable and valid instrument for measuring Teacher Self-Efficacy beliefs in all five countries (Klassen et al., 2008). Both the Long and Short forms of the TSES have acceptable validity and reliability. Tefo (2012) used the TSES short form to measure teacher efficacy in Botswana. The study used Cronbach's Alpha and the Spearman-Brown Prophecy to test the

reliability of the TSES. The Cronbach's Alpha test results showed 0.782 for student engagement, 0.741 for classroom management, 0.802 for instructional strategies while the spearman brown prophecy test revealed 0.890 for instructional strategies, 0.851 for student engagement, and 0.878 for classroom management. Since both the long and short forms of the TSES have acceptable validity and reliability, this study will use the short form of the TSES which is made up of twelve (12) items.

The researcher used the G* power 3.1.9.7 software package to determine the sample size needed for this study. G* Power is a software program used to compute power analysis for many different statistical tests (Erdfelder et al., 2009). It covers many different statistical tests of the t, F, and $\chi 2$ test families. In addition, it includes power analyses for z-tests and some exact tests. G*Power 3.1.9.7 provides improved effect size calculators and graphic options, supports both distribution-based and design-based input modes, and offers all types of power analyses in which users might be interested (Faul et al., 2007). Using the G* Power software, the researcher used a significance level of 0.05 (which indicates a 5% chance of rejecting the null hypothesis when it is true, therefore a 5% chance of getting a wrong conclusion), and a statistical power level of 0.80 (the desired is typically 0.80 which indicates 80% probability that a Type II error will not be committed) and an effect size of 0.15, to get the sample size. The F-test results show that a minimum sample size of 55 is needed to carry out this research. A participant size of 59 was considered for the analysis of this study. With the help of the random sampling technique, the 59 participants were randomly selected to avoid from a population of teachers/instructors at Southern University A &M College Baton Rouge, an HBCU institution. With the help of SPSS 20.0, the collected data was analyzed using crosstabulation analysis.

Demographic Characteristics of Respondents

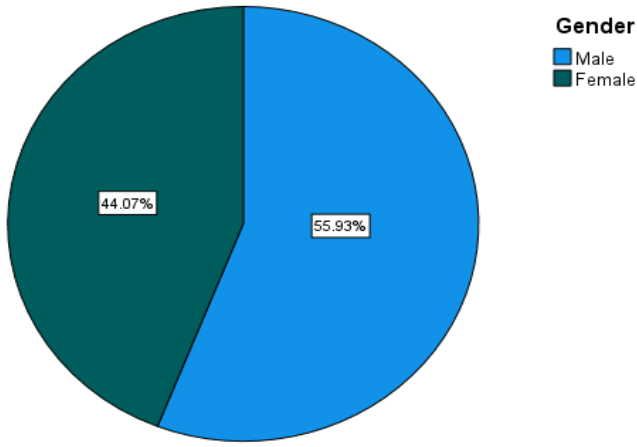

Figure 1: Gender of Research Participants
Source: Field data, 2021

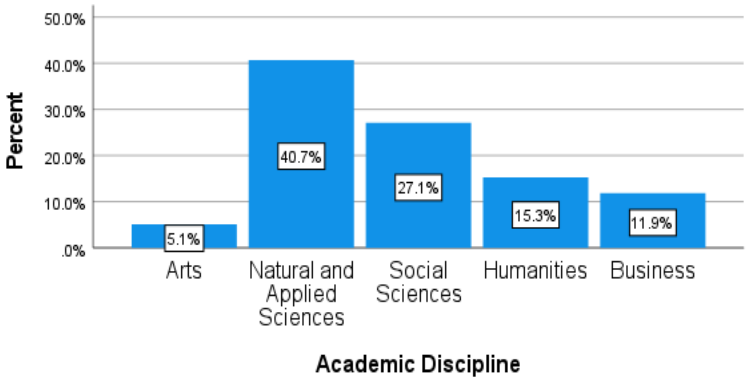

Figure 2: Academic Discipline Research Participants Teach-In.
Source: Field data, 2021

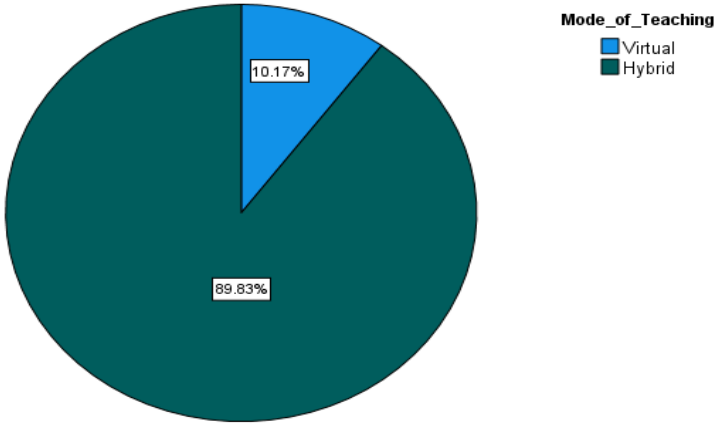

Figure 3: Mode of instruction/Instruction Used by Research Participants
Source: Field Data, 2021

Results

The Impact of the COVID-19 Distance Learning on Instructional Efficacy/Effectiveness.

TSES Item	**Virtual Mode of Learning/Teaching**					**Hybrid Mode of Learning/Teaching**				
	SA	*A*	*N A/D*	*D*	*SD*	*SA*	*A*	*N A/D*	*D*	*SD*
1. Could do very little to control disruptive behavior in the classroom	-	-	-		100 %	5.7 %	17%	28.3 %	32%	17 %
2. It was difficult to Motivate students who show low interest in schoolwork	-	100 %	-	-	-	3.8 %	30.2 %	28.3 %	28.3 %	9.4 %
3. Could do very little to get students to believe they could do well in schoolwork	-	100 %	-	-	-	5.7 %	17%	45.3 %	22.6 %	9.4 %

4. Could do very little to help students value learning	-	83 %	16.7 %	-	-	7.5 %	13.2 %	41.5 %	22.6 %	15.1 %
5. Found it hard to craft good questions for students	-	-	100 %	-	-	5.7 %	18.9 %	32.1 %	32.1 %	11.3 %
6. Could do very little to get my students to follow classroom rules	-	-	-	100 %	-	1.9 %	18.9 %	30.2 %	34%	15.1 %
7. Could do very little to calm a student who is disruptive or noisy in class	-	-	-	83.3 %	16.7 %	3.8 %	17%	26.4 %	39.6 %	13.2 %
8. Could do very little to establish a classroom management system with my students	-	-	83.3 %	16.7 %	-	5.7 %	24.5 %	28.3 %	30.2 %	11.3 %
9. Found it difficult to use a variety of assessment strategies	-	-	66.7 %	33.3 %	-	17%	45.3 %	3.8 %	20.8 %	13.2 %
10. It was difficult to provide alternative explanations or examples when students were confused	-	-	83.3 %	16.7 %	-	3.8 %	24.5 %	35.8 %	24.5 %	11.3 %
11. It was hard to assist students who were not doing well outside of usual class time.	-	100 %	-	-	-	11.3 %	41.5 %	28.3 %	13.2 %	5.7 %
12. It was very hard to implement alternative teaching strategies in the classroom.	-	-	100 %	-	-	20.8 %	49.1 %	5.7 %	15.1 %	9.4 %

Note: Where SA= Strongly Agree, A=Agree, N A/D= Neither Agree nor Disagree, D=Disagree, SD= Strongly Disagree. **Source:** Field data, 2021

Discussion

Efficacy for Classroom Management

Classroom management is a very important part of teaching and especially for teachers who are new to the profession, managing students' behavior is difficult (Sieberer-Nagler, 2016). According to Sieberer-Nagler (2016), classroom management determines the classroom climate while the classroom climate influences student behavior and growth. It is also important to note that a positive classroom climate promotes positive relationships as it feels safe and supportive of student learning (Schnitzler, Holzberger, & Seidel, 2020). The findings from Items 1 (controlling disruptive behavior in the classroom), Item 6 (getting students to follow classroom rules), Item 7 (calming a student who is disruptive or noisy in class), and Item 8 (establishing a classroom management system with students) make up the classroom management subscale of the TSES. From the analysis of Item 1, the majority of the participants who taught using the hybrid mode of instruction disagree that they could do very little to control disruptive behavior in the classroom. From Item 6, which is getting students to follow classroom rules, it was observed that the majority of those who used the hybrid mode of instruction disagree that they could do very little to get their students to follow classroom rules. From Item 7, among those who used the hybrid mode of instruction, the majority disagree that they could do very little to establish a classroom management system with their students. From Item 8, the majority of those who used the hybrid mode of instruction disagree they could do very little to calm a student who is disruptive or noisy in their class. This finding reveals that the majority of participants who taught using the hybrid mode of instruction had high beliefs about their efficacy for classroom management.

From the analysis of Item 1 all participants who taught virtually disagree that they could do very little to control disruptive behavior in the classroom. From Item 6 all those who taught virtually disagree that they could do very little to get their students to follow the classroom. From Item 7, the majority of those who taught virtually disagree that they could do very little to establish a classroom management system with their students. From Item 8, the majority of those who taught virtually disagree that they could do very little to calm a student who is disruptive or noisy in their class. This finding reveals that the majority of participants who taught virtually had high beliefs about their efficacy for classroom management.

Efficacy for Student Engagement

Student engagement addresses problems in student learning, low academic achievements, and dropout rates (Wang and Degol, 2014). Student engagement is encouraged when the emotional, cognitive, and behavioral needs of students are satisfied by their teachers. When students have a sense of psychological freedom, they become more engaged (Cents-Boonstraet al., 2020) The findings from Item 2 (motivating students who show low interest in schoolwork Item 3 (getting students to believe they can do well in their schoolwork), Item 4 (helping students value learning), and Item 11 (assisting students who are not doing well outside of usual class time) make up the student engagement subscale of the TSES. From the analysis of Item 2, the majority of the participants who taught using the hybrid mode of instruction agree that they found it difficult to motivate students who show low interest in schoolwork. From Item 3, the majority of the participants who taught using the hybrid mode of instruction neither agree nor disagree that they could do very little to get students to believe they could do well in schoolwork. From Item 4, the majority of those who taught hybrid neither agree nor disagree that they could do very little to help students value learning. From Item 11, the majority of those who used the hybrid mode of instruction agree that they found it hard to assist students who were not doing well outside of usual class time. This finding reveals that the majority of participants who taught using the hybrid mode of instruction had low beliefs about their efficacy for student engagement.

From the analysis of Item 2 all participants who taught virtually agree that they found it difficult to motivate students who show low interest in schoolwork. From Item 3, all participants who taught virtually agreed that they could do very little to get students to believe they could do well in schoolwork. From Item 4, the majority of those who taught virtually agree that they could do very little to help students value learning. From Item 11, all who taught virtually agreed that they found it hard to assist students who were not doing well outside of usual class time. This finding reveals that the majority of participants who taught virtually had low beliefs about their efficacy for student engagement.

Efficacy for Instructional Strategies

Instructional strategies are the methods or techniques teachers use to deliver educational materials to students in ways to keep them engaged,

help them be strategic learners and critical thinkers, and help them become independent (David, 2007). The findings from Items 5 (crafting good questions for students), Item 9 (using a variety of assessment strategies), Item 10 (providing alternative explanations or examples when students are confused), and Item 12 (implementing alternative teaching strategies in the classroom) make up the instructional strategies' subscale of the TSES. From Item 5, a tie exists in the majority of those who used the hybrid mode of instruction between those who disagree and those who neither disagree nor agree that they found it hard to craft good questions for their students. From Item 9, the majority of those who used the hybrid mode of instruction agree that they found it difficult to use a variety of assessment strategies. From Item 10, the majority of those who used the hybrid mode of instruction neither agree nor disagree that they found it difficult to provide alternative explanations or examples when students were confused. From Item 12, the majority of those who used the hybrid mode of instruction agree that they found it hard to implement alternative teaching strategies in the classroom. This finding reveals that the majority of participants who used the hybrid mode of instruction had low beliefs about their efficacy for instructional strategies.

From Item 5, all those who taught virtually neither agree nor disagree that they found it hard to craft good questions for their students. From Item 9, the majority of those who taught virtually neither agree nor disagree they found it difficult to use a variety of assessment strategies. From Item 10, the majority of those who taught virtually neither agree nor disagree that they found it difficult to provide alternative explanations or examples when students were confused. From Item 12, all participants who taught virtually neither agree nor disagree that they found it hard to implement alternative teaching strategies in the classroom. This finding reveals that all participants who taught virtually were indifferent in their belief about their efficacy for instructional strategies.

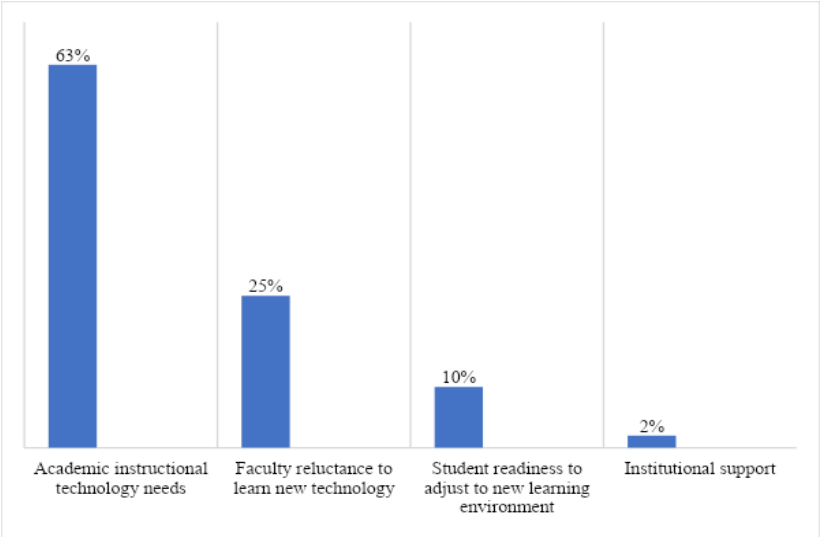

Figure 4: Challenges Teachers Faced in Teaching During COVID-19
Source: Field data, 2021

According to survey data, 10% of participants indicated student readiness to adjust to the new learning environment as a challenge to teach during the COVID-19 pandemic. According to a study carried out in 2021, students who had personal computers, internet connections, and a smartphone were more ready for online learning. The study also revealed that students who had high levels of readiness were more successful academically during the COVID-19 online learning (Taşkın & Erzurumlu, 2021). This finding suggests that providing students with the technology needed for online learning increases readiness.

Another challenge was faculty/teachers' reluctance to learn new technology. From the survey data, 25% of participants indicated that this was a challenge. This finding aligns with the finding of Keesee & Shepard (2011), that instructors at HBCUs are reluctant in adopting instructional technologies compared to their non-HBCU counterparts. In general, research suggests that HBCU institutions have been reluctant in offering distance learning as compared to non-HBCU institutions. In 2017, a study was conducted to examine online learning in HBCUs. The findings from the study revealed that online learning programs were more prevalent in non-HBCUs than in HBCU institutions (Martin, 2017). By 2010, only 10% of HBCU institutions offered online degrees (Flowers et al., 2012). Another study conducted in 2019 using data from the Department of

Education and the National Center for Educational Statistics revealed that ¾ of students who attended public and private PWI took online courses (Riggs & Jackson, 2019). Yet, while the number of online courses had increased compared to the findings from 2010, only 1/3 of 102 HBCUs offered online courses. Smith et al. (2020) argue that there are two reasons for this. First, the slow growth is due to money/finances and its mission. With regard to money, HBCUs are underfunded and understaffed. This limits their ability to offer online learning courses like PWI institutions (Mitchell, 2019). The second reason has to do with its mission. According to research, most students who attend HBCUs choose to attend due to cultural identity, legacy, cost, location, and alumni. Online education doesn't quite give the full HBCU experience (Smith et al., 2020; Williams, 2017). Another study however argues that the reluctance in adopting online technologies and the inconsistent use of these technologies by faculty members who are reluctant to move from basic technologies could be a reason for the slow growth of online education in HBCUs as their study revealed that in HBCU institutions that had had course management technologies, the adoption of the technologies was inconsistent (Keesee & Shepard, 2011). Their study also revealed that in HBCU institutions that had course management technologies adopted, the use of these technologies was inconsistent as many faculty members had not moved away from basic technology. While the above studies were conducted preCOVID-19, there are limited studies to investigate how the adoption of technology in teaching and learning during the COVID-19 pandemic impacted instruction in HBCU institutions. This study, therefore, plans to fill this existing gap thus serving as a bridge in literature.

Based on the survey data, 63% of participants agreed that academic instructional technology needs were one of the challenges while 2% of participants indicated institutional support as a challenge. Research shows that institutional support during the COVID-19 distance learning has a positive impact on work-life balance as well as reducing work-related burnout in instructors (Kumpikaite-Valiunien et al., 2021). Research also shows that institutional support increases efficacy and productivity (Falola et al., 2020). Institutional support could include providing teachers with professional development programs to prepare them for online learning, providing technological infrastructures necessary for online learning, and/or other types of administrative support (Gillespie, 2021).

Conclusion

The findings from this study differ from the findings of other studies as it shows no difference between the efficacy of teachers who taught virtually and teachers who used the hybrid mode of teaching during the COVID-19 pandemic as they all had low beliefs about their efficacy for student engagement and instructional strategies (Pressley & Ha, 2021). Even though literature suggests that students who enroll in hybrid courses have better academic outcomes than students enrolled in online/virtual courses (Namyssova et al., 2019; Vonti & Grahadila, 2021), the findings from this study does not reflect that, as teachers who taught using the hybrid mode of teaching had low beliefs about their ability to engage their students and low beliefs about their ability to use various instructional strategies just like teachers who taught virtually. And they both had high beliefs about their ability to manage their classrooms.

Teachers' belief about their instructional capabilities is important because it impacts teachers' creativity (Ma, 2022), exertion of effort by the teacher (Freeman, 2008), and instructional competence (Pellerone, 2021). Research shows that teacher efficacy has a positive influence on instructional behaviors such as emotional and pedagogical support. Meanwhile, instructional behaviors have an impact on students' cognitive development (Alibakhshi, Nikdel, & Labbafi, 2020). A study that investigated the effect of teacher efficacy on students found that students showed better outcomes when taught by teachers with high self-efficacy. From this study, it can be deduced that teacher efficacy has a positive relationship with student outcomes (Ross, Hogaboam-Gray & Hannay, 2001). Another study that investigated the effect of teacher self-efficacy enhancement on student achievement revealed that teacher self-efficacy had a significant impact on student achievement. (Durowoju & Onuka, 2015).

Research shows that institutional support has an impact on teachers (Makhaya & Ogange, 2019). Jakhaia (2018) carried out a study to examine the impact of a 25-hrs professional development program on teacher efficacy. Results from the study showed that teachers who attended the 25-hrs professional development program had higher self-efficacy in their ability to instruct. This suggests that exposing teachers to self-efficacy enhancement programs will have positive impacts on students' academic achievements which, according to research, has economic impacts on labor market productivity (Watts, 2020).

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Technologies for Education: From Gamification to AI-enabled Learning

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ABSTRACT

The landscape of teaching in higher education is dynamic and driven by the interplay among educators, students and curriculum. Educators play the primary role in presenting curriculum for students to absorb and leading classroom discussions. The onus of teaching is on educators who come with different pedagogical beliefs, teaching styles and prior experiences. The effectiveness of teaching is often determined by the teaching quality of individual instructors. This paper presents an overview of technologies which can help with improving teaching effectiveness. The adoption of technologies ensures consistency in delivery of curriculum and delegates some of the educator's role to technology in exchange for greater engagement and involvement from students.

Keywords: teaching, technology, technology for teaching, AI, gamification

Technology plays dual roles as both an enabler and a disruptor in this era of digitalization. It enables classroom learning to be flipped for students to play a more active role in learning, enables personalized learning paths for individualized learning, and promotes collaborative learning to achieve an active learning environment. Disruptive technologies are adopted in some schools of higher education in the form of Virtual Reality (VR) and Augmented Reality (AR) for transformative learning experience.

The adoption of technology into teaching can be traced back to the year 1924 when the first Learning Management System (LMS) called "Teaching Machine" was proposed by Sidney Pressey (S.L., 1927). The technology started with a basic window that can be used to administer questions for students to attempt. In 2002, an open-sourced LMS platform, Moodle (Moodle, 2002), was launched. Moodle became widely acceptable due to its open-sourced nature, and it coincided with the growth of the Internet in 2000. Course sites are set up to establish an online community for learners to access teaching materials and assignments. The development was driven by social constructionist epistemology (Weller, 2021) to achieve reflective inquiry among the web-based community set up by educators.

Experiences and teaching beliefs of educators shape the corresponding pedagogy of the course being delivered. The pedagogy adopted by educators is facilitated by appropriate technology. This paper aims at examining this perspective to inform educators on best practices for promoting a more engaged course delivery. The next section illustrates the main pedagogical approaches which will be mapped to the technology in the following section.

This paper examined the use of game-based platforms from a pedagogical perspective in the delivery of a university's undergraduate module on programming. This paper aims at providing insights on how different teaching technologies can be embedded in tertiary teaching. It contributes to our understanding of teaching technologies from a pedagogical perspective, adding values to how these technologies fare when compared to one other. This paper also discusses how AI-enabled learning can be integrated in teaching to enhance student's learning experience. The paper is organized as follows: second section describes technologies and pedagogies. Thirdsection illustrates how technologies can be adopted in class deliveries. It examines the use of gamification, immersive learning, Artificial Intelligence enabled learning. Finally, the conclusion of this paper is drawn in the last section.

Technologies and Pedagogies

Constructivist

Constructivism pedagogy has its root from psychology's constructivism (Papert, 1980; Piaget & Inhelder, 1967; Vygotsky, 1978). It is rooted in the concept of involving learners in the process of learning for the development of meaning, understanding and slowly moving

towards higher level of thinking (Amineh & Asl, 2015; NH & J., 2012). The construction of knowledge is derived from the influence of learners' prior knowledge and learners actively negotiate their understanding from the current learning context. When the prior and current learning are conflicting, their understanding is then slowly shaped by the new learning experience (Amineh & Asl, 2015; Hoover, 1996). Educator's role is in designing the process to allow this sort of conflicting negotiation to take place for new knowledge to stick. A typical constructivist learning process provides opportunities for learners to think, question, reflect and interact with ideas in the construction of meaning (Brooks & Brooks, 1999). The dilemma of constructivism is that the apparent structure for learning may be lacking as learners may not be able to communicate the process of how they arrive at certain answers (Iran-Nejad, 1995; Staver, 1989; Swamy, 1987). The structure of the learning process is crucial for foundation building modules. Novice learners require a more structured learning process starting with remembering prior to proceeding with the higher level of Bloom's Taxonomy (Jonassen, 1991). Constructivism classroom setting involves group exercises for learners to discuss and express their views on the given topics. The other criticism of constructivists is the tendency of learners falling into group think (Brau, 2022; Ruggie, 1998) when involved in group activity during the knowledge negotiation process. A renown model in constructivism is the 5E model (Engage, Explore, Explain, Elaborate and Evaluate) (Ergin, 2012; Paily, 2013) that entails the main learning process in constructivism. This model is later developed into the 7E variant (Engage, Elicit, Explore, Explain, Elaborate, Extend and Evaluate) (Shaheen & Kayani, 2015; Turgut et al., 2016).

Collaborative

Collaborative learning is an umbrella term for a variety of educational approaches involving joint intellectual efforts by students or with educators together (Smith & MacGregor, 1992). It was proposed by Dillenbourg (Dillenbourg, 1999a, 1999b) in 1999, it shifted some part of the learning process to evaluate and monitor learners' works on team members. The learning has more emphasis on group work in the class or out of class time for learners to participate in the process of responding to each other's work. Learners collaborate as a group to develop understanding. Each individual contributes to the success of the group work. Collaborative learning enhances higher level critical thinking through collective thinking (Gokhale, 1995). The learning process

typically starts with introducing the task and setting aside time for learners to brainstorm and work on the exercise. It then closes the loop with learners presenting the conclusions. Team dynamic is a large variance in this model. To mitigate this large variance, educators can set up house rules, linking peer evaluation to graded outcomes, and assign specific roles for each team member. The benefit of collaborative models is that learners play a highly active role in the learning process. Improved communication and listening skills are often observed as the by-products of this pedagogy model. Practice of collaborative pedagogy includes debate-based learning (Malone & Michael, 2018) and game-based learning (Feigenbaum & Feigenbaum, 2013).

Inquiry-based

Inquiry-based pedagogy is similar to how professional scientists formulate hypotheses and verify them by conducting experiments (Keselman, 2003; Pedaste et al., 2012; Pedaste et al., 2015). The engagement of students arises from development of questions, learners go through the discovery process to connect logical derivation of answers. This pedagogy has well supported literature documenting its effectiveness across different disciplines (Gormally et al., 2009; Magnussen et al., 2000; Preston et al., 2015; Wu & Hsieh, 2006). It is considered as a type of constructivism to fine-tune a learner's knowledge through refinement of understanding in the search of answers. Lazonder & Ruth (2016) provided a meta-analysis on inquiry-based learning and extent of required guidance from educators. The work synthesizes 72 empirical studies concluding that guidance in inquiry-based learning is pivotal and is independent of the specificity of guidance. The major issue with inquiry-based learning is on assessment or measurements on the quality of inquiry (Quigley et al., 2011) and effective planning for inquiry-based learning. The learning process should incorporate opportunities for learners to interact with each other, formulating the main inquiry related to the topics, peer or self-directed inquiry, and reflection of how the questions have been addressed. Recent discussion on inquiry-based has shifted to online-based inquiry learning (Munzil & Perwira, 2021; Situmorang & Mursid, 2020).

The following section will discuss the technologies and provide the corresponding mapping to types of learning.

Technologies for Deliveries

The acceptance of different technologies takes a longer time for acceptance in education (Salmon, 2019). Education has gone through the phases of Education 1, 2, 3 and currently in the phase of Education 4.0. Education prepares the workforce in industry hence this evolution responds to and taps on industry movement closely. Salmon (2019) presented a historical walkthrough in education and timelines of the relationship between Education movements and Industrial movement. It was highlighted that Industrial revolution 1, 2 and 3 had been driving education and started before Education 1, 2, and 3. The current phase of Education 4 coincides with Industry 4 and is moving in parallel. The first revolution of education started with educator centric pedagogy where learners consume the learning resources passively in the lecture settings. Second education movement saw the shift in paradigm towards 'blended' mode of learning and some educators embed social media platforms in course delivery. Education 3 shifted rapidly towards emphasis of online learning; learners take greater charge of their learning to generate knowledge more independently while educators frame the context to enable greater autonomy for learners to look up for the required content.

Education 4.0 garnered a wider range of technologies for course deliveries and demanded greater learners' interaction throughout the learning process. The key features of Education 4 are the connected technologies, personalized learning journeys, fully digitalized learners' analytics to prepare them to be future ready. This topic could be discussed with Industry 4.0 and in a wider adaptive system of Globalization 4.0 for a fuller picture (Feldman, 2018; Schwab, 2018). Anealka (Hussin, 2018) presented ideas for teaching and a case for Education 4's implementation. Vichian (Puncreobutr, 2016) discussed the challenges facing Education 4. Vishal (Jain & Jain, 2021) examined the acceptance of educators in using the technologies with Unified Theory of Acceptance and Use of Technology (UTAUT) model under the Education 4 movement. Monica et. al. (Ciolacu et al., 2017) conducted analysis based on machine learning methods to predict students' learning outcomes based on learners' profiles.

The following sections discuss the cornerstone technologies that drive this education revolution.

Gamification

Gamification promotes the engagement of learners by designing learning activities for learners to go through a series of story lines, specifying rules of games, and rewards systems. A study on gamification

techniques was presented in (Ab Rahman et al., 2019) in which the game based approaches were evaluated according to the perceived ease of use and perceived usefulness. Almeida and Jorge (Almeida & Simoes, 2019) conducted a qualitative study on the adoption of serious games and gamification in Portuguese higher education institutions and revealed a low take up rate of 20%. Gamification is a generic approach to enhance learners' engagement with vibrant visual colors, audio to boost cognitive thinking. "Serious Games" is a term for designing goal-oriented tasks aimed at improving players' cognitive ability (Shi & Shih, 2015), it requires more planning and implementation and is not straightforward. The design of game goals in Serious Games can be short, mid, or long term (Swartout & van Lent, 2003).

Gamification platforms make use of different game elements to engage learners like badges, leaderboard, challenges, levels, points, online activity, incentives and XP. The most popular game platform used in course delivery is Kahoot!. Melissa (Pilakowski, 2015) published a matrix comparison of different game platforms including Kahoot!, Quizizz, Quizalize, Socrative and Riddle. One key question in the use of gamification is the diminishing effect on student's engagement. Wang (Wang, 2015) studied the diminishing effect of using Kahoot! in a different situation across two groups of students. Students' engagement level is still high despite a longer period of involvement. Both groups find that the use of Kahoot! helped them to be engaged during lessons as it provides a meaningful, interactive, and fun way of learning, besides the determination to get ahead in the game. Thus, it was proven that a longer period of gamification during lessons has no diminished effect on the students' engagement (Ab Rahman et al., 2019).

In Figure 1, the picture on the left depicts the user interface of Kahoot! for instructors to design questions, while the right picture shows the types of questions with time limit and points setting. It adopted shapes and colors to differentiate answers from multiple choice questions. Figure 2 shows the interface of Socrative for quiz creation, it encourages group competition and places it at the landing page under the option of "Space Race". Figure 3 shows another game-based learning platform, Wooclap. Wooclap has richer options for different types of questions, the interface comes with attractive and self-explanatory icons that allows for quick questions creation, making it a good choice for impromptu polling. Figure 4 illustrates Quizizz interface, it has unique features of rating the quality of quiz with quiz quality score. Teleporting questions greatly shorten the

preparation time, its bank of questions is accumulated automatically with the creation of new questions.

Table 1 summarizes the level of support the game-based platforms provide for different pedagogies, reward motivation to learners, and how easy it is to set up for educators. The number of asterisks denotes the level of involvement in the corresponding pedagogy, the rewards and ease of set up. Both Wooclap and Quizizz support a high level of constructivism. Socrative comes with a team-based collaboration feature to support collaborative learning. Rewards system is well incorporated in Kahoot! and Quizizz to encourage learners to collect badges for engaged learning. Quizizz scored the highest in ease of setup. Kahoot! and Socrative score lower and require more set up time .

Constructivist pedagogy promotes the negotiation of new knowledge for retentiveness. Platforms with different question types with collection of learners' answers provided channels for this negotiation to be matched or addressed in the case of mismatches. For example, Quizziz and Kahoot! automatically keep the previously created questions. Different pools of questions are created, and it can be reused by selecting from the public pool of questions (Kohnke 2021 & Lim 2021). Educators can view learners' response to questions and understand the differences to re-align the learning direction. Most of the platforms (Kahoot, Socrative, and Quizizz) provide good support on this, learners can be identified through the platforms for educators to know how learners grasp the relevant topic; the answers can be shown individually or collectively. Collective answers provide insights to the extent of knowledge mismatched to be addressed and the sequence for the instructor to address it can be prioritized accordingly. Socrative shows learners' answers individually.

Collaborative pedagogy emphasizes on group work, peer reviewing learner's work or brainstorming in groups for solution. Socrative emphasizes teamwork through "Space Race" for teams to compete for hitting the finishing line in the shortest time and showing the corresponding group achievements. The group formations need to be populated prior to the launch of team-based racing. Kahoot and Quizizz have some support for collaborative game-based learning, but most of the features are targeted on individualized learning. Wooclap does not provide such support at the point of writing. Different teams can be set up in Kahoot! (Davis 2021) to compete as a team. Similar feature can be found

in Quizizz (Rachmawati 2022) for the team to compete together, the total score of the team is computed at the end of the polling.

Inquiry-based pedagogy encourages learner's engagement through the development of different questions and different types of questions for learners to form logical derivation of answers. The corresponding column in Table 1 relates to the variety of questions enabled by the platforms to support inquiry-based learning. Wooclap has the most varied type of questions like multiple choice, polling, rating, open-ended, word cloud, matching answers, prioritization, sorting, fill in the blanks, brainstorming, judgment concordance test etc. Kahoot! supports the commonly used question types, similarly for Quizizz. Socrative keeps its neat and clear user interface and provides questions like multiple choice, true false, and short answers.

The fourth evaluation is on the rewards for learners. Kahoot! has wide adoption in education due to its stimulating music, scoring system, and the creation of a learning-based competition context among learners. The rewards of learners are shown after each question and the leader's board. Quizizz started slightly later and has similar support like Kahoot!. Learners get to redeem their wrong questions or re-practice using flash-cards in Quizizz, there is an accessibility option that can be turned on for more diverse learners. The scoring reward or champion listings in Socrative and Wooclap are less instantaneous and are delayed till the end of the sessions.

The last evaluation provides the rating on ease of setup for educators. Quizizz has the highest rating because of the feature to teleport questions in from question banks. This reduces initial set up time. The question's quality scoring from Quizizz also improves the quality of questions being set up to guide instructors along the way of questions creation. Wooclap's intuitive user interface allows for quick question creation, questions can be re-used and combined easily. Kahoot! platform displays other learning technologies. It has a less clean-cut interface to allow for quick quiz creation. The question bank feature is offered at fees-paying tier. Socrative merges a few functionalities into the same landing page that makes the initial navigation slightly more time consuming due to the similar placement of questions creation and deployment.

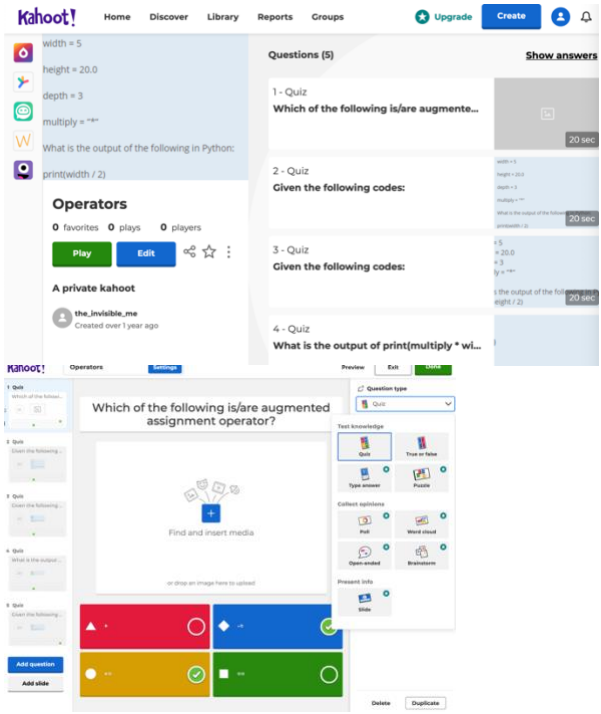

Figure 1. Kahoot interface

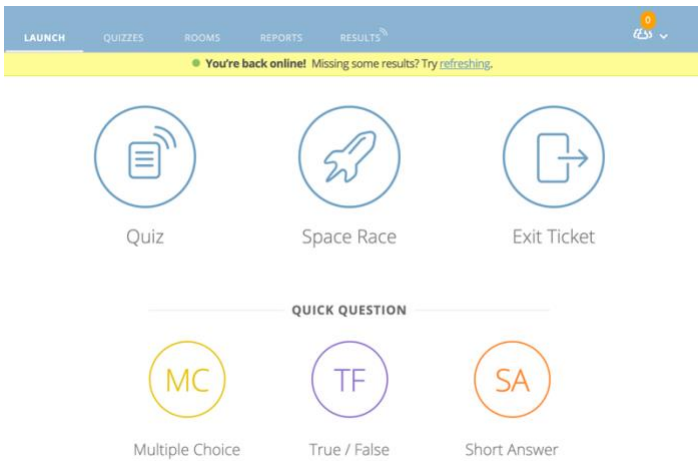

Figure 2 Socrative interface

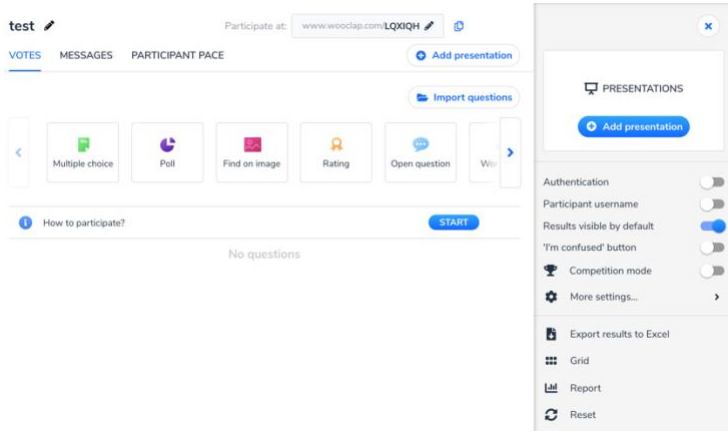

Figure 3 Wooclap interface

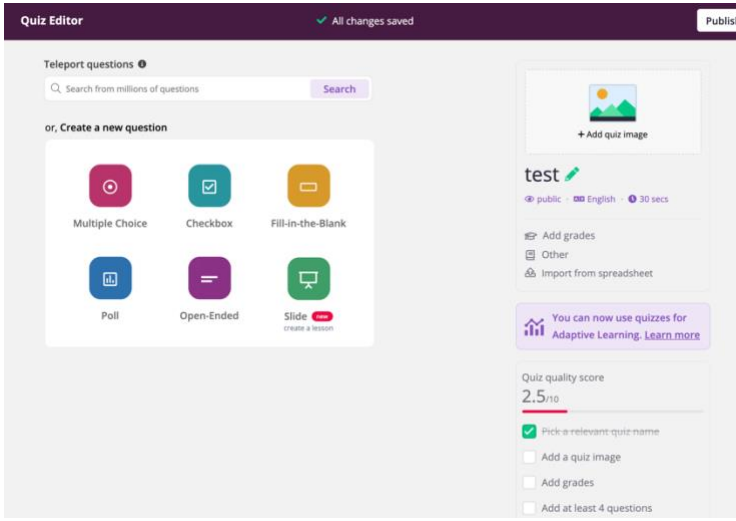

Figure 4 Quizizz interface

Table 1 Game based Platforms Comparison Table

	Constructivist	Collaborative	Inquiry-based	Rewards	Ease of Setup
Kahoot	*****	****	****	*****	***

Socrative	***	*****	**	***	***
Wooclap	*****	nil	*****	***	****
Quizizz	*****	****	***	*****	*****

Immersive Learning (Augmented Reality & Virtual Reality)

Augmented reality (AR) was pioneered by Boeing researcher Thomas Caudell and David Mizell to support an industrial process on providing wiring instructions in 1992 (Thomas & David, 1992). This sets off the use of augmented reality in industrial settings. AR immerses one into an "augmented" environment, overlays computer generated images on real-world environments. Real, existing environment or object is used to overlay it with augmented imagery. It can be accomplished by using a smartphone, taking a picture of yourself and modifying the environment you are in (Snapchat lenses). Pokémon Go makes use of AR technology to entice players to traverse the physical world following an "augmented" map in search for Pokémon characters. Virtual reality (VR) attempts to create an entirely virtual environment, replacing the reality to provide a totally immersive experience. The immersive environment of VR can take users to any imaginable settings. It generally requires a head-mounted display (HMD) or headset to be worn by the user to experience the immersion through a series of computer simulations. VR has a longer history than AR, the first HMD called Telesphere Mask was patented in 1960 by Heilig (Heilig, 1960). It subsequently flourished in the entertainment industry, business, medical and military training.

In the education setting, the use of AR and VR is common in medical and healthcare education (Herron, 2016; Hsieh & Lee, 2018; Hsieh & Lin, 2017; Pottle, 2019). Trainees learn through surgical simulation to simulate actual operation prior to actual operation. This greatly reduces the chances of making mistakes during surgery where

certain mistakes can cost human lives. Other cases include autism treatment, limb pain treatment, anatomy teaching, virtual anatomy and other nursing or medical education (Hsieh & Lee, 2018).

Hadi and Esmaell (Ardiny & Khanmirza, 2018) reviewed the use of AR and VR for teaching. The different types of HMDs were reviewed from both the hardware and software perspectives. The challenges to implement it for teaching includes high cost, lack of realism in simulation setting, health and physical impacts on students as well as hardware limitations. The work in Horváth (2018) designed an experiment that exposed learners to 3 different learning modes with the same content and explored the use of 3D presentation for teaching. It concluded that the use of 3D presentation as a kind of virtual reality reduces some load (40% lesser user operation, 72% lesser machine operation) as compared to the typical 2D exposures that typical learning platform provides. Maria et. al (Puggioni et al., 2020) proposed a ScoolAR framework for content creation for immersive learning experience. Jorge et.al. (Martín-Gutiérrez et al., 2017) compiled the series of technologies involved in AR and VR. The different scenarios of immersive experience for web conferences, AR and VR projects for education were included. Riva et.al. (Riva, 2006) classifies the virtual experience brought by virtual technology to different categories: cabin simulators, projected reality, augmented reality, telepresence, desktop virtual reality, and visually coupled systems.

The implementation of VR lessons requires hardware and software for viewing and lesson creation. It is suitable for domains involving objects, arts, linking objects, geography, science, or engineering. The hardware is one part of the cost, Google has provided a low-cost solution using Cardboard. The other main challenge in VR is the creation of 3D lessons. Table 2 consolidates a number of VR solutions suitable for deployment in higher education. For some works that have attempted to implement it, students' general feedback and how the lessons are integrated across the relevant technologies are listed. Nearpod comes with free and paid VR and AR lesson plans. EON Reality supports a variety of devices for users to enjoy the immersive, experiential experience. ClassVR offers a VR platform for lessons with hardware. Google Expedition for immersive virtual journeys allowing students to follow the pace of educators during the immersive experience.

Table 2 Platforms for VR

	Works	Course	Students Feedback	Integration
Nearpod	(Hakami, 2020) deployed Nearpod in Najran University, Saudi Arabia	School Administration	Increased engagement. Promote active learning. Questionnaires showed positive learning experience.	Integrate with students' device and video-conference learning system
EON Reality	(Al-Allaq et al., 2021) incorporated EON to construct VR of 6-axes robotic as a prototype for future engineering learning tool.	Engineering Course	No self-reporting from students' perspective. The work provided detailed writings on implementation	Involves EON studio, SDK, Dynamic Load, and Raptor. Connect to Vicon tracking system and CAD system.
ClassVR	(Kurniawati et al., 2019) deployed ClassVR to Special Needs Students (age from 6-20 years old). The lesson is designed for students to follow instructions on picking objects in the classroom.	Tasks-based learning.	No self-reporting on engagement. Students were observed to look happy and focused during the learning.	Integrate with the use of Google Cardboard and Unity 3D.
Google Expedition	(Brown & Green, 2016) explored the use of Google Expedition for a Greek language course.	A pre-course for Nursing course.	Students reported learning sticks better and increased curiosity in the domain.	VR Cardboard, Android phones with Google Expeditions installed.

Artificial Intelligence enabled learning

Popenici and Kerr (Popenici & Kerr, 2017) explored the phenomena of using AI in teaching in higher education, the challenges and the future directions. It was highlighted that universities should rethink their function and pedagogical models with a focus on imagination, creativity, and innovation. The team from University of Edinburgh (Bayne, 2015) developed the 'Teacherbot' for co-teaching for a large cohort with around 90,000 signed-ups from diverse backgrounds. The 'Teacherbot' was programmed by the teaching team to deploy an agent to roam Twitter accounts. From there bots are trained to understand queries from students. The response of bots was tweeted to students. Students were more open to interacting with the bots with formal and informal exchanges of texts.

Fahimirad et. al. (Fahimirad & Kotamjani, 2018) presented a conceptual review paper that investigated the emergence of using artificial intelligence in teaching and learning in education. It examined the educational consequences of emergent technologies on how institutions teach, and the way students learn. It (Fahimirad & Kotamjani, 2018) highlighted the following areas where AI can be embedded in educational context:

- Grading automation
- AI tutors as supplementary support for students
- Feedback for instructors and learners with AI tracking and monitoring.
- AI as facilitator to coach weak students
- The separation of roles (AI and education) provides a judgment-free environment for students to trial-and-error.

One earlier scholarship that bridges AI and teaching is illustrated in (Balacheff, 1993). It was posited that machines must be able to handle and produce relevant didactical information about the teaching process, in order to be able to interact and collaborate with the teacher. This remains an open problem for both researchers in mathematics education and computer scientists, but it is one of the conditions for tomorrow's cohabitation of artificial intelligence and real teaching. Kumar and Meeden (Kumar & Meeden, 1998) described a project that used AI robots to teach AI courses to strengthen the role AI plays in computer science curriculum. A Robot laboratory was built to teach AI concepts and hands-on behavior-based programming to build the robot from scratch for navigation tasks and sensor readings. Another educational project was described in (Burgsteiner et al., 2016) to teach AI at high school level. The

content was adapted and structured with respect to pupils' prior knowledge and educational background. The objective is to foster "AI Literacy" with the course.

Tuomi (Tuomi, 2018) published a report on the impact of AI on Learning, Teaching, and Education. AI was referred to as "the next electricity". The impacts on education settings have been relatively modest, but it will change rapidly in coming years. The report provided coverage on recent developments in learning, teaching and education with AI. It was depicted that AI was deployed for test generation and assessment to reduce teaching loads. Developments of AI for diagnosing students' attention, emotion and conversation are on-going. The major bottleneck is obtaining sufficiently large datasets for higher cognitive tasks like course development and management. Monica et. al (Ciolacu et al., 2018) deployed an AI assisted Higher Education Process with smart sensors and wearable devices for self-regulated learning. An Early Recognition System linked up students' earlier data for the prediction of final examination's scores. Students at-risk were identified at an early stage and provided support to the identified students. The failure rate in examinations was reduced by half.

Conclusion

Technology for education started from using technology as a platform for students to attempt questions. This work reviewed several technologies to support education from the perspective of gamification, immersive learning to Artificial Intelligence. From a gamification perspective, we reviewed a few gamification platforms based on the major pedagogies. There is a lack of ready tools that can gamify the longer term of course content to provide structural engagement. Commonly used gamification platforms were reviewed based on their relevance to different pedagogies, rewards and ease of setup. Immersive learning immerses learners into an "augmented" environment for a different learning experience. It has been commonly practiced in medical and healthcare education. The set up cost and complexity are higher as it involves both hardware and software. A few recent works on immersive learning were reviewed. The last section reviewed AI-enabled learning which outlines the possible integration of AI into grading, tutoring, tracking and monitoring students' performance. The adoption of technology in education does require higher set up costs in terms of resources and time. The benefits of consistent delivery, shorter subsequent set up time and

contextualized learning experience for learners deserve the initial investment.

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Online teaching and learning platforms in Higher Education from developing universities in South Africa (Africa): Socially just and decolonized pedagogies

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ABSTRACT

This article addresses whether dialogical, online teaching and learning platforms in higher education can be framed as socially just and decolonized pedagogies at all universities in South Africa (Africa). It is suggested that inclusive pedagogies like dialogue and care on online teaching and learning platforms such as Blackboard, if effectively used by lecturers, can contribute to students from diverse backgrounds feeling acknowledged and recognized as humans in general but Africans in particular. It is therefore the argument of this paper that socially just and decolonized pedagogies are particularly necessary in a post-colonial South African higher education system, where historically only certain individuals had input in the curriculum and the dialogical relationships of student and lecturer when it came to teaching and learning. In order for this to happen, lecturers ought to teach effectively in order to foster success in a decolonial classroom environment that is safe and friendly, with a curriculum where previously disadvantaged students can deliver dialogical input. In doing so, by implication, students grow wholly and communally as Africans, but are also provided the opportunity to

critically interact with lecturers in their online higher education learning process.

Keywords: inclusive pedagogies, developing universities (Africa and South Africa), higher education system, teaching and learning, decolonial space, social justice.

Many higher education institutions all over the world have been impacted by elements of the external environment, such as the Fourth Industrial Revolution (4IR), the COVID-19 pandemic, and the volatile and uncertain learning and teaching environment. All these factors have played a significant role worldwide in the tipping over of massive unequal systems which include systems of education, but online education in particular, for many on the African continent. Developing universities in South Africa use online platforms such as Blackboard and try to include students from an African, decolonized and critical and dialogical pedagogical point of view.

The following quote underscores the importance of the direction of what a developing African higher education needs to be, that is free from exploitation and underpinned by social justice. Shermann posits that,

> The African university is a product of the modern world, yet the environment which inherited it is largely traditional, pre-industrial, and agrarian. It is an environment caught in a change from external forces - centuries of economic exploitation, colonisation, intellectual and cultural dominance. The small modern sector resulting from these forces has expanded over time but compared with the traditional sector, it remains exceedingly small and does not integrate with it. A product of the Western world, the African university was born a stranger to its own environment, and its main links were with the institutions that were strangers to this environment and with the countries to which those universities belong. Thus the African university became heir to a dual setting - the traditional African environment in which it was to be rooted, and the modern Western sector from which it received its orientation. How was it to make an appropriate response? Its borrowed models were for an industrial society with an entirely

> different milieu and could offer no real guidelines (Sherman, 1990:371).

The researcher considers this point of view to help provide insights as to how faculties at South African developing universities can respond equally or more positively to the ever-changing external and internal learning and teaching world, so that teaching and learning spaces can be more diverse and inclusive of students and the *habitus* they bring to these spaces – as Africans who are continually seeking to be decolonized. These insights may even bring to the fore how lecturers may be able to socially and psychologically engage with students so that students are able to thrive at their studies.

Socially just pedagogy discourse

Paulo Freire draws on a strong theological frame of reference when he considers teaching and learning settings and the undergirded reality of what the dynamics would be in a socially just space as lecturers and students are in the process of 'becoming'. He aptly explains this as:

> honestly confronting the realities we faced, on carefully listening, on remembering what it means to be fully human, on using one's lived experiences to think critically about that reality and how it might be changed (Freire, 1972).

This critical conscience for Freire allows for those in power in the teaching and learning process to acknowledge and open one's eyes to the cultural and other injustices and worldviews imposed on others (Pietersen, 2022). Interestingly, this also speaks to the departure point of decolonial classroom environments.

A teaching and learning setting, including online platforms such as Blackboard, needs to fulfill a kind of modus operandi that is both a diverse and inclusive approach, and which allows for both lecturer and student's worldviews. In this working strategy, the 'culture circle' is used, in which teacher/facilitator and student create reflections and discussions about reality and collectively seek to unveil and identify the possibilities of learning. The 'culture circle' is a concept that speaks to the "critical consciousness of inequities and addresses their causes and insisting on transforming their social and their political circumstances" (Zulu, 2021:252).

For a higher education institution in South Africa to thrive in teaching and learning, it needs to prioritize 'action-reflection' processes. This would mean that teaching and learning processes need to be laid bare

on how students positively and actively participate in an online learning process, even on a virtual platform such as Blackboard (Pietersen, 2022:3), where the stories of students and who they are as persons from different backgrounds lend richness to the teaching and learning process (Longo, 2020:1–2). This kind of emphasis can be described in the words of Eisner and Eisner in the following way, and one cannot help but agree that "the enduring outcomes of education are found in…the joy of the ride, not merely arriving at the destination" (Eisner and Eisner, 1985).
This kind of 'joy ride' is not only refreshing but it also allows all stakeholders in the teaching and learning process to strengthen and modify and re-evaluate their pedagogical practices (Davids and Waghid, 2018:221). It is thus the conviction of this paper that such a holistic socially just pedagogy encourages a reflective process where both lecturers and students from universities from South Africa are able to value the cultural and historical sources of individuals, which can challenge the 'culture circles', as previously mentioned.

To put this explicitly within a framework of theological and caring pedagogies that is undergirded by the aim of decolonized teaching and learning strategies, which is important for South African universities, Mbembe (2015:19) asserts:

By pluriversity, many understand a process of knowledge production that is open to epistemic diversity. It is a process that does not necessarily abandon the notion of universal knowledge for humanity, but embraces it via a horizontal strategy of openness to dialogue among different epistemic traditions.

It is therefore a plurality of epistemologies that is able to accentuate an ethos in the online higher education climate where every student in the lecturer and student relationship is embraced (teaching and learning).

For South African universities, in order to necessitate a socially just and decolonial action and redress in the teaching and learning process, true transformation needs to take place. This involves asking the following questions:

> What would a humanising pedagogy look like when taking seriously the pedagogical task of rethinking the human without hiding the epistemic violence of colonial knowledge and practices of knowledge? What would a humanising pedagogy look like that acknowledges the contribution of Western knowledge but goes beyond and provides intellectual andpedagogical spaces of decolonial praxis—such as strategies of counter/storytelling,

> healing, and reclaiming of people's identities and spaces? What would a humanising pedagogy look like that ethically addresses the complex and sometimes contradictory histories of different peoples in (post)colonial settings, while it enables us to change our relationship to colonial/colonized modes of signification and relationality? (Zavala, 2017).

Constitutive meanings of a socially just pedagogy

Most universities in South Africa's teaching and learning process is based on a system that aims to produce students who are able to identify, analyze and solve everyday problems. Students must be able to think critically and creatively, both inside and outside of their discipline of study – in a decolonized way. By implication, they are then able to contribute to their teaching and learning process, and how the curriculum is formed. The researcher is convinced that this is more than being able to successfully develop as students, but that they are able to do this particularly as Africans.

The effective management of teaching and learning in the higher education space, and online platforms such as Blackboard, ought to consider the adoption of a caring and inclusive pedagogy (Pietersen, 2022). Consequently, this will allow students to demonstrate an understanding of the world in a free and decolonized way. Thus, the proper use of online spaces as applied in the teaching and learning process must be viewed as critical tools in the development and growth of students in general and amongst developing universities in South Africa and their students in particular.

Moreover, the lack of a strong emphasis on the importance of making connections and critical engagement between students and lecturers in developing universities plays a vital role in mediating students' expectations and learning experiences. It is the experience of many students in university faculty's that there exists "a lack of communication from lecturers, as well as frustrations with a general lack of interactive communication between students, lecturers and peers" (Higher Education and Training, 2020:8-9). Many students find it difficult to engage with lecturers on online platforms. This ultimately creates a culture of exclusion and feeds into the colonized way of conducting education.

Some students actually verbalized this sense of exclusion from their teaching and learning process. Their responses can be summarized

from a South African university Institutional Report called "Emergency Remote Teaching", when students were surveyed, noting things like:

> Lack of communication from lecturers: We don't get clear communication from the offset from lecturers, I still haven't received any emails from lecturers for 3 modules second semester, so I have no clue what the plans going forward is. Some of the lecturers barely responded to concerns and would not reply to our messages. We would wait 2-3 days for a reply from them and some were very helpful (Higher Education and Training, 2020:9).

The underpinnings of the aforementioned statement are of students feeling excluded from the online (Blackboard) teaching and learning process. However, deeper reflections, for the researcher, can be ascribed to the tenets of colonization as a lecturer's lack of response speaks to not seeing students as important and human impetus to the teaching and learning process. What is needed is 'humanising pedagogy' (Zembylas, 2018). The lecturer's lack of effective use of and development and training perhaps in South African university Learning Systems, in this case Blackboard, can be said to be an attitude on behalf of the lecturer that is not based on a communal African way of learning and therefore does not communicate a sense of care in the teaching and learning process in its entirety. Consequently, it adds to a shortfall in terms of creating and enabling an online environment that adds to colonial education spaces that are in "the struggle for global social justice that is inseparable from the struggle for cognitive justice, namely, the recognition of epistemic diversity" (Fricker, 2007).

To aim for this kind of enabling environment, lecturers, students, and researchers alike need to continually "promote global social justice, through interrogating the construction of cognitive injustice in all educational contexts, policies and theories", so that students in general but African students in particular are able to give voice to the voiceless and marginalized.

Socially just and decolonized pedagogical impetus in teaching and learning

The themes of dialogical and critical engagement, care and socially just pedagogies, can be summarized by the work of Freire (1972:61) who notes that:

> dialogue cannot be reduced to the act of one person "depositing" ideas in another, nor can it become a simple exchange of ideas to be "consumed" by the participants in a discussion.

Freire's theory underscores the fact that teachers/facilitators cannot simply see themselves as someone who imposes their views on those who are less knowledgeable or who are empty vessels waiting to 'consume' material uncritically. This would be the result of deliberately ignoring the voices of the student in the online teaching and learning platform (Blackboard), even if it means drawing stakeholders such as students out of their comfort zone (Pietersen, 2022:4).

Put differently, Freire et al. (2005) state:

> Without humility, one can hardly listen with respect to those one judges to be too far below one's own level of competence. It is indeed necessary, however, that this love be an "armed love", the fighting love of those convinced of the right and the duty to fight, to denounce, and to announce. It is this form of love that is indispensable to the progressive educator and that people must all learn. Tolerance is another virtue. Without it no serious pedagogical work is possible; without it no authentic democratic experience is viable; without it all progressive educational practice denies itself. Tolerance is not, however, the irresponsible position of those who play the game of make-believe. The act of tolerating requires a climate in which limits may be established, in which there are principles to be respected. That is why tolerance is not coexistence with the intolerable.

In addition to the teacher/facilitator having much responsibility to drive inclusion of all stakeholders in the process of any online teaching platform, they also need to be progressive in how they use and perform teaching and learning tasks on teaching and learning platforms. In other words, students, as well as lecturers, add value to the teaching and learning process of online platforms and their input must be considered of primary importance because a process of care and decolonization indirectly unfolds.

Teaching and learning make up a process of education. However, it is also measurable. According to Peters (1966), for proper education to take place on any platform, including online platforms such as Blackboard, they must be central if teachers/facilitators are to be impactful with a vision to transform education spaces. Peters (1966: 25,31,45), suggests:

> that ‘‘education’’ implies the transmission of what is worthwhile to those who become committed to it; (ii) that ‘‘education’’ must involve knowledge and understanding and some kind of cognitive perspective, which are not inert; (iii) that ‘‘education’’ at least rules out some procedures of transmission, on the grounds that they lack wittingness and voluntariness [on the part of the learner]

Noteworthy of Peters's view is that it is critical for a teacher/lecturer to also foreground the dialogical and deliberative pedagogies, and that teaching and learning and education in general is transmitted by teachers/lecturers but also translate into the discourse of social justice in education.

Moreover, Biesta (2013:11) highlights what the underlining antithesis to the teaching and learning process is as follows:

> The dialogical approach, both approaches ultimately rely on the possibility of truth and, more specifically, truth uncontaminated by power… this truth is learned from (and thus given by) the teacher; in the dialogical approach, this truth is discovered through a collective learning process. That the monological approach relies on the idea of truth uncontaminated by power has to do with the fact that emancipation is seen as a process of overcoming ideological distortions. Here, emancipation operates as a process of demystification. In the dialogical approach, emancipation is the process that restores true human existence – or, in Freirean language, true human 'praxis'.

Therefore, the relationship between student facilitator or lecturer and how they relate and collaborate in the aforementioned process needs to be carefully considered, especially if the powers of lecturers and students are different and it relates also to a decolonial pedagogical perspective. The attempt to achieve this can be summarized by Greene (1986:430) when she asserts "[teaching and learning is] joined to [a] justice or equity process". This process ought to prompt students as well as lecturers to question meanings and ideas, to imagine alternative possibilities and outcomes, to modify practical judgements, and to develop respect and critical engagement in their field of study. In this way, critical assignment and deliberation is unhindered communicative liberty that involves both rational opinion and willful allowance of information, which can almost always potentially lead to a transformation in people's preferences and perceptions of their learning (Dhungana, 2021).

Before going any further, it is important to justify why and how the research problem arises out of this study. In other words, what are the factors which contribute to the research problem? The researcher believes that developing universities in South Africa, and education faculties at large in Africa forms part of an unevenly distributed education and training system that has too many barriers to growth - from a decolonized point of view. It is also the researcher's conviction that quality education ought to be evenly distributed and should be available to all South African students, regardless of background or location in Africa. This, in turn, speaks to online higher education's need to be re-evaluated against the decolonized project. Therefore, education entities such as developing universities need to set equitable teaching and learning standards for every student coming through their halls, but they also have the responsibility to create teaching and learning outcomes that are achievable in students' 'becoming' as means to empower students to be part of their learning process, making space for pedagogies of care and inclusion. In addition, when setting the content and standards for teaching and learning using online platforms such as Blackboard (Pietersen, 2022:5), it should be kept in mind that all students need to be developed in reaching their full potential as persons, not just for academic brilliance but also as Africans of the global south.

Factors that sustain excellent dialogical outcomes for developing universities' teaching and learning plan, including the views of students in the online teaching and learning process need to be valued, particularly when it comes to indigenous knowledge as it forms part of their educational formation. If this is done well, students will feel that they were included to create depth and meaning. Thus, developing universities would have wholly developed students that are both globally and locally engaged and are not restricted by geographical borders, because education needs to be interrogated from a decolonized pedagogical framework. This problem can only be addressed by lecturers reviving the "eventalization of the intentional emancipation of education [online teaching and learning systems such as Blackboard]" (Foucault, 1991:41). The way this could play out can be explained by Foucault and can be ascribed to acknowledging critique:

> Critique doesn't have to be the premise of a deduction which concludes this then is what needs to be done. It should be an instrument for those who fight, those who resist and refuse what is. Its use should be in processes of conflict and confrontation, essays

> in refusal. It doesn't have to lay down the law for the law. It isn't a stage of programming. It is a challenge directed to what is (Foucault, 1991:12).

This discourse does not allow the possibility for any individual or group of students to be excluded from critical/dialogical, socially just and decolonialized educational perspectives that interest them and that determine their future. This means they need to critically engage in the teaching and learning process that is unfolding at an African university and not an institution that upholds Western epistemologies to the fast exclusion of Africanization of students on the African continent. After all, the rights of students to participate in deliberation and critical/dialogical, socially just, and decolonized engagement are legally institutionalized and should be measured against the effective use of teaching and learning tools, such as Blackboard. This means that each individual student has an equal opportunity to be heard during the deliberative and dialogical process of curriculum design and presentation of material on online platforms (Pietersen, 2022), which in turn means that the viewpoints of the minority are heard, and the domination of the majority is limited. However, in order for critical/dialogical, socially just, and decolonized engagement to be effective and truly beneficial, the constant monitoring of input by students from the perspective of the lecturer in using teaching and learning platforms, such as Blackboard, always needs to be evaluated.

Socially just and decolonized engagement in education

One crucial aspect that this paper offers into socially just and decolonized engagements in education, as well as affirming the process of deliberation and inclusion, is to juxtapose these pedagogical ideas and foreground the conversation between developing universities and Freire because both entities' "purpose of education is to serve and help develop a civilized and just society, through the development of well-read, thoughtful, scholarly individuals with a well-developed capacity for independent critical thought" (Gray and Collison, 2002). Purposed education considers consensus that grows out of critical/dialogical, socially just, and decolonized engagement in education in order for it to be effective in teaching and learning.

According to Habermas, this kind of consensus should not be a prerequisite for discussion, but rather it should reflect the democratic discourse of informed deliberation that is built on a socially just and decolonized responsiveness to the demands of an active citizenry, which is

what higher education in Africa ought to deliver on, including in the online teaching and learning space. Habermas (2006:413) also states:

> [critical/dialogical, socially just, and decolonized engagement in education] necessitates the deliberative paradigm as it offers as its main empirical point of reference a democratic process [in teaching and learning], which is supposed to generate legitimacy through a procedure of opinion and will formation that grants (a) publicity and transparency for the deliberative process, (b) inclusion and equal opportunity for participation, and (c) a justified presumption for reasonable outcomes

Thus, a discursive account of democratic citizenship that is just and decolonized seeks ongoing deliberation as means to identify the 'better' argument between majorities and minorities after the parties have temporarily reached a compromise for the sake of progress as they learn and participate together (Pietersen, 2022:6). Habermas's perception of democratic citizenship in online teaching and learning (education process) has important implications for a higher education institution on the African continent, but particularly with developing universities in South Africa who strive to be part of the Africanization discourse, that is impactful and that can add value to the world over.

Students today have been impacted by their external environment, such as the Fourth Industrial Revolution and COVID-19 pandemic, which has led to a volatile and uncertain learning and teaching environment, and it has shown to really demonstrate the kind of inequality that exists between Third World and First World countries. Developing universities in South Africa use of online platforms such as Blackboard and the inclusion of students from a dialogical pedagogical point of view may serve as a valuable conversation with Freire and others' input on the critical/dialogical, socially just, and decolonized engagement (Pietersen, 2022:6). Because they serve to re-evaluate the discussion points for this means to lecturers in an African institution and faculty who engage with students on a regular basis.

The COVID-19 pandemic has necessitated "emergency critical dialogical changes in teaching and learning but has also created rare opportunities to think differently about the assumptions and processes that have become the norm" (Higher Education and Training, 2020:10), for the interaction between lecturer and students on online platforms such as Blackboard. The necessitated move to "remote learning for the majority of the sector" (Akuffo and Budu, 2019:1), including African higher

institutions in general but developing universities in South Africa in particular, it allows for a differentiated approach that precipitates engagement of dialogical, critical, deliberative and an ethics of care in the online teaching and learning process. This informs a socially just and decolonized framework. For developing universities to acknowledge that these themes go together, they ought to acknowledge the purpose of this research in seeing the importance of identifying "how students are accessing and using different forms of learning materials, and to explore how students' experiences" of inclusion and exclusion during the aforementioned context (4IR and COVID-19) might be informed (Higher Education and Training, 2020), broadly speaking.

Lastly, lecturers need to think about including students more from a critical/dialogical, socially just, and decolonized perspective, around "policy and practice in more digitally advanced teaching and learning spaces" such as what Blackboard and other online platforms may offer because engagements from a decolonized and critical viewpoint are not negotiable (Pietersen, 2022:6), if we are in the business of creating higher standards of growth and more successful students and African graduates. Such a kind of transformation in the online higher education space is all-inclusive and can be summarized in the words of Young:

> Emerge on different sites in any region: the academic, the cultural, the ecological, the educational, the industrial, the local centre-periphery structure of the city and the rural hinterland, the marketplace, the media, the medical in all its different manifestations, the mainstream political, the rainforest, and the social sphere (Young, 2001:58).

It may be argued that including and considering all these spheres of society may be the reasons why there is disharmonious disjuncture already in the education system. However, this may not be used by protractors to claim that a critical/dialogical, socially just, and decolonized framework cannot enjoy full consideration in the online teaching and learning space in higher education in Africa and South Africa, which is the gap this paper has aimed to address

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The Effectiveness of Online Teaching Materials: A Case Study of a Private University in Bangladesh

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ABSTRACT

The paper examines the effectiveness of materials designed and distributed among course instructors to teach an intermediate writing course in an online platform during the pandemic. The study is examined in the context of a private university in Bangladesh, where the students enrolled are bi-lingual learners. The paper reviews literature in fields of technology-enhanced language learning (TELL), activity theory and scaffolding to understand the extent to which the teaching materials are effective. In addition, by analysing semi-structured interview responses from course instructors, the paper highlights numerous strengths, weaknesses and suggestions regarding the materials disbursed among the faculty members. The research findings suggest that the given materials were useful and helped to promote understanding of course content, but improvements can be made to assist student learning. Increased emphasis on learner autonomy can facilitate the learning process for students and motivate them to become independent learners. Based on the findings, the writer includes suggestions that might be beneficial for institutions beyond borders.

Keywords: learner autonomy, TELL, activity theory, scaffolding, online learning

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Starting from 2020, the COVID pandemic left a lasting impact on all sectors including education. It is during the pandemic that the use of technology came as a saving grace—educational institutions worldwide started to use online media to continue education. In the initial period, incorporating technology-enhanced language learning (TELL) in classrooms in Bangladesh was still a very new concept, which led to questions regarding effectiveness of online teaching and the type of materials with which students would interact the most. In this study, these questions, along with others, were researched against the context of private university-going students in Bangladesh, focusing on a certain institution. This study is a quantitative research which uses the Activity Theory and Scaffolding approach to comprehend whether the materials used online were effective enough and how learning can be further promoted across online classrooms. The findings demonstrated that the materials circulated among the students proved to be useful; students interacted better with objective units and understood materials better with elaborate in-class discussions. However, a certain level of learner autonomy is needed on the students' part for these classes to be successful. Hence, if online education is to become the norm, Bangladeshi institutions need to start emphasising on autonomous learning scenarios from early study levels. Although the conducted research is within the context of Bangladesh, its scope can be further extended to any L2 writing classroom in the tertiary sector

Literature Review

In the wake of the recent pandemic, the educational sector is one of the numerous affected sectors all around the world. An infectious disease like SARS-CoV-2 transmission means individuals could contract the virus easily through various methods (World Health Organization, 2020). Therefore, academic bodies had to seek viable solutions that would be applicable and sustainable amidst the pandemic. The most effectual strategy has been to adopt technological methods, meaning language teaching also began on a more wide-scale basis through medium of technology.

TELL is at the heart of our understanding of digital classes. As Clark (1918) informs, the use of "talking machines" to teach proper language articulation to pupils had already been a common phenomenon even back in 1918 (p. 116). The past century has seen rapid developments of TELL, and now a rise in technology-infused language lessons can be seen (e.g., Lenkaitis, 2020; Stefanick & VanOverbeke, 2020). During the pandemic, using technology to resume learning became the most rational option. Therefore, the government of Bangladesh announced continuation of education at all levels through remote learning (Sakib, 2020; UNICEF, 2020; Jasim, 2020).

As discussed earlier, there are numerous instances of positive impacts of implementing TELL for language learning. There is a gradual progress of using technology more constructively (Patel, 2017). Walker & White (2013) focus on language skills while implementing theory of TELL into practice. Chau & Lee (2014) report positive research findings in regards to vocabulary, grammar as well as writing. Patel (2017) reminds that there are multiple advantages of incorporating TELL in the classroom, including flexibility, motivation as well as learner autonomy. Coverdale-Jones (2000) describes both the advantages and disadvantages in terms of video conferencing. In reference to the former, she mentions that the positives include better communication, easier affordability and personal engagement. At the same time, she considers some of its drawbacks such as detachment of tutor from the tutee, lack of effectiveness due to poor audio or video issues, student difficulty to comprehend class content and instability of the internet connection.

However, previous studies have reported that the Internet can be equally beneficial for all learners (e.g., Everett & Terence, 1994; Lamy & Goodfellow, 1999; Warschauer, 2000). Online discussions motivate learners to interact and comment, resulting in building rapport without the worry of wrong pronunciations in the target language (Beauvois, 1992; Kivela, 1996). Recent evidence suggests that use of technology has become widespread and normalised (e.g. Van et al., 2021), since the incorporation of technology encourages language practice, provides instructional materials, reshapes teaching methods and initiates social interactions (Zhang & Zou, 2020). It is important for learners to understand how to use these materials that they receive in the course of their learning. The concepts of learner autonomy and scaffolding can assist this process.

One of the early definitions of autonomy exhibits that it is not a singular behaviour that can be described with ease, nor does it remain in a state of continuity (Little, 1990). Benson (2013) establishes his concept of "autonomous language learning." The term refers to learners having control over their own learning practices, even outside the boundaries of the classroom (p. 840). This concept cannot function on its own unless the student receives adequate and appropriate guidance. Therefore, new learning techniques and independent learning can drive students to learn English as L2 through technological media, especially for those students who may not be motivated enough and require external assistance (Yang & Chen, 2007). This transitions to the Vygotskian concept of Zone of Proximal Development (ZPD), which can be defined as the activity zone that allows learners to produce better outcomes with assistance which could not have been achieved alone (Pea, 2004). To advance in development, teachers present information that is higher than the learners' existing level, and appropriate cognitive strategies are induced as per that level of comprehension (Vygotsky, 1978). Afterwards, Cazden (1972) makes a solid connection between the terms of ZPD and scaffolding. Thus, it can be understood that the learning is achieved as an amalgamation of cognitive development and social practices (Walqui, 2006).

Activity theory and Scaffolding

The metaphor of scaffolding is used in connection with several research (e.g., Li & Zhang, 2022; Donato, 1994; Sam, 2012; van de Pol et al., 2010; Walqui, 2006). There is an ongoing research about how scaffolding can work in online spectrums (Din et al., 2021; Hung & Nguyen, 2022). All of them state characteristics of scaffolding at varying lengths. For the paper, the researcher will investigate the three pedagogical stages of scaffolding, mainly because they are closely related to the field of education. These include the following:

"Scaffolding 1	*Planned curriculum progression over time (e.g. a series of tasks over time, a project, a classroom ritual)*
Scaffolding 2	*The procedures used in a particular activity (an instantiation of Scaffolding 1)*

Scaffolding 3 *The collaborative process of interaction (the process of achieving Scaffolding 3)"* (Walqui, 2006).

The three steps mentioned above mainly focus on three aspects, which firstly includes focusing on structural support to allow skill enhancement and activity performance. This structural support can be placed under the broad term of contingency, roughly described as customized support for the learners (van de Pol et al., 2010). This support includes helping students to garner interest in the task, and to simplify the work for the convenience of learning. A model version of the work to be performed can be presented to students to further give them a clearer idea of what they are supposed to achieve (Donato, 1994).

Next, the activities discussed beforehand are executed within the classroom. This process can be classified under the umbrella term of fading; at this stage, depending on the progress and competence level of the learner, the instructor gradually removes scaffolding (van de Pol et al., 2010).

The third step prioritises communication and maintains that instantaneous classroom interactions are crucial to learning. Classroom interactions occur at two levels: the primary interactions occur between teacher and student, but at the same time, student-student interactions are prevalent as well. While the teacher provides guidance through lectures and class engagement, students also actively help each other through class discussions or pair/group work. Transfer of responsibility occurs, since at this stage, students participate in discussions to complete the second stage of scaffolding (van de Pol et al., 2010). This, in turn, also assists students on their way of becoming autonomous learners.

It should be remembered that these steps can change in a classroom setting; in the pedagogical arena, the planning and improvisation/innovation of ideas go hand in hand, along with unpredictable and the routine (Walqui, 2006). The classroom is a versatile zone, where variable factors can lead to sudden changes in the schedule. The steps of scaffolding given above shall be used by the researcher to gauge the usefulness of materials used for a writing course.

Apart from Scaffolding, another theory that plays an integral role in the context of technology is Activity Theory (Isssroff & Scanlon, 2002). Based on Engeström's three generations of activity theory suggestion, activity theory can be traced from Vygotsky's concept of mediation that is

remembered in history for its technical and psychological tools (Engeström, 1987). His theory limitation was overcome by Leont'ev, and Engeström further elaborates how any individual proceeds towards an activity with a motive in mind (Engeström, 1987). Also, Guo, Bussey & Adachi (2020) posit how useful the Activity theory is in the creation of a pedagogical system.

Engeström's activity theory combines subjects, objects, tools, community, rules and division of labor, leading towards the outcome (Engeström, 1987). The outcome acts as a foundation for a new activity (Blayone, 2019). In this paper, the researcher will reframe the activity theory to place the designed activities: the goal is to understand how the materials fit in within the activity theory mediated through digital technologies.

Figure 1: *Activity system representation from Isssroff & Scanlon, 2002.*

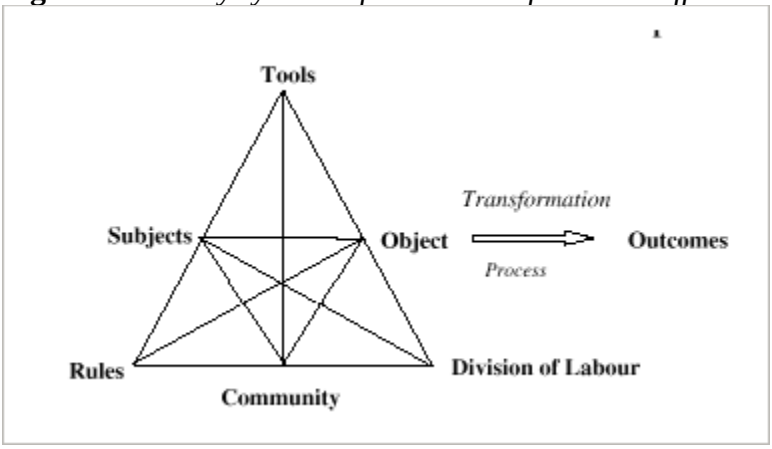


Figure 1 is a representation of the Activity theory. The subject, the object and the community are related to one another in three ways, and their relationship is mutual. The subject and object are connected with one another by tools since the subject uses tools to reach its object. In the meantime, rules govern the relationship between the subject and community. Division of labor mediates the communication between object and community (Engeström, 1987).

Using the literature, the researcher aims to provide an understanding of the effectiveness of online materials used in digital

classes in this paper. The research is based on the following questions:
1. Are online classes effective?
2. Which type of materials enable student engagement during online classes?

Context

It is crucial to ask these questions, now more than ever, since teaching has taken a virtual turn- previously, teaching would take place in the physical setting of a classroom, whereas now, teaching and learning is not confined within the four walls of a classroom. Rather, now the practice takes place in a classroom, albeit in a virtual setting. The researcher, being a faculty member at one of the top private universities in Bangladesh, was directly impacted by the classroom switch. Her responsibilities as one of the course coordinators for a writing course (Intermediate Composition level) meant that duties are two-fold; apart from being one of the primary planners of the Course Outline, she is also helping faculty members to teach the course by providing materials. The coordinators always prepare materials to assist course instructions, abiding by the Course Outline provided at the beginning of the semester, particularly following the Course Objectives with as much precision as possible. This time, the difference is that the coordinators had to prepare online teaching materials for the course in alignment with course objectives. This meant inclusion of accessible online materials, which would also be accepted by faculty members and students alike. The word 'accessible' is used not only in terms of copyright, but also to refer to search of materials that students will be able to work with in an online spectrum.

Therefore, it is important to know the background of the students. In Bangladesh, university students usually hail from one of three curriculums of English medium, Bengali medium and Madrasah medium. Amidst all requirements for admission in this university, one requirement dictates the schooling. The university in question admits pupils from the national curriculum and Cambridge/Edexcel curricula. It also accepts students with a US diploma. All mediums receive lessons on Bengali as well as English. Therefore, it is acknowledged that students who receive admission in the university have a standardised level of expertise in both languages. To improve their levels of English, the university provides EAP courses.

EAP, or English for Academic Purposes, is a segment of English for Specific Purposes (ESP) (Dudley-Evans & Jo St John, 1998). Its focus

on the context of academia sets it apart from ESP (Hamp-Lyons, 2011). Although EAP is taught in various settings, the university being researched follows the US curriculum. As a result, all subjects are taught in the L2. Here, the EAP courses are set out into three level courses: ENG102 (Introduction to Composition), ENG103 (Intermediate Composition) and ENG105 (Advanced Composition).

ENG103, or Intermediate Composition, is the second level academic course which aims to improve essay writing, teach summary writing and prompt critical analysing, targeted in the realm of academia. Within the course, students also learn to spot common grammatical errors they encounter in writing and overcome these hindrances in writing. Since this is a writing-based course, qualitative data collection method has been used for research purposes.

Methodology

This study has adopted a qualitative research approach for many reasons Firstly, qualitative research work usually targets in-depth understanding (Allen, 2011). In addition, one of the major aims for collecting qualitative data is to generate content for the empirical part of a research (Flick, 2018). Thus, for better comprehension on this topic, it was necessary to collect perspectives from faculty members responsible for teaching the course (Dörnyei, 2011; Ary et al., 2010). Since this is an interpretive research, it helps to understand the participant's perceptions (Ary et al., 2010). Other features of qualitative research include collection of rich material as well as possibilities of further exploration (Dörnyei, 2011). Similarly, the research questions ask for perceptions and suggestions, which will later be interpreted and explored further. Stickler and Hampel add that qualitative studies in CALL (Computer Assisted Language Learning) can assist to get detailed pictures on numerous language learning scenarios (Stickler & Hampel, 2015). Moreover, being a social-constructivist theory, Activity theory relates to qualitative research by nature, and scholars use a wide range of qualitative data sets to understand why an activity occurs (Roth & Lee, 2007).

Keeping these in mind, a semi-structured interview questionnaire was circulated among 30 faculty members of the institution. This mode of data collection is versatile yet exploratory, thus allowing to collect insightful responses which help to understand the reality of their situations (Kvale, 1996; Punch, 2013; Patton 2015). The questionnaire included a few questions on online classes and materials that they were provided with

by the coordinators at the beginning of the semester to assist during online sessions with students. Online materials that were provided include textbook, practice materials (both subjective and objective), samples for essays and assessments, lecture handouts and online links for practice on a chapter on Transitions. These have been provided to cultivate students' reading and writing skills. The faculty members were requested to provide anonymous comments on these given materials; they had complete liberty to engage in the research as per their will.

Analysis of findings using scaffolding and activity theory

After a hiatus of one month, the interview responses were collected. This break was deliberate: firstly, since this self-selection sampling (Sterba & Foster, 2008; Sharma, 2017) was incorporated, participants could take time to decide whether they wanted to be a part of the survey, Secondly, this break allowed the faculty members to consciously observe how useful the materials have been in their classrooms. Of the study population, 15 subjects completed and returned the questionnaire. The majority of those who responded felt that online classes are effective (10 respondents). Apart from these 10 respondents, three others commented that the effectiveness of online classes vary from one course to next, while the remaining two respondents deemed online classes to be completely ineffective.

Interestingly, there were varied opinions about the type of materials that worked best with students. These varieties have been roughly classified into three categories: Objective, Discussion-based and Unspecified. About 40% of the responses highlight that objective questions work best with students. 'Objective questions' refer to practice exercises and assessment units in the form of multiple-choice questions (MCQs), short questions, short online quizzes and sentence level exercises. One interviewee alluded to the notion of gamification, stating that videos and fun quizzes generate interest on the students' part. The second data set consisted of four respondents, who agreed that discussion-based materials worked with their students. They used Microsoft PowerPoint slides to conduct classes and initiate class discussions, as per the norm in the university. The third set of the data did not specify particulars; while some claimed that students associated better with practice-based material, they did not specify which type. Within this category, others mentioned that students were driven by a variety of content, depending on the chapter being taught in class. One individual

response did not fit under any of the given rubric- as per the interviewee, "students will interact with anything that is tied to their overall grade" (Anonymous faculty member #11, interview questionnaire, 2020).

Although there are differences in opinions about the type of materials, there is a consensus that materials used online are mostly resultant to learning. While five respondents did not find any weakness, certain constraints were noted by s few others. From here onwards, the discussion will refer to the literature to evaluate and decipher the responses via descriptive qualitative analysis, breaking those down to strengths and weaknesses. Although descriptive qualitative research is more common in the medical arena (Kim et. al., 2017; Magilvy & Thomas, 2009), it can also be implemented in the current context as well, since the target is to develop a proper understanding of the instructors' experiences (Magilvy, 2003). To this end, the researcher has provided a discussion on the strengths and weaknesses of online classes, along with suggestions on how to execute successful learning in an online setting.

The responses have been presented in the tables below:

Table 1: *Respondents' answers about the strengths of online classes*

Strengths	**Respondents**
Resources can be adapted	3
Can engage inattentive students	2
Encourages independent study and individual work	2
Uses a variety of media	2
Ready-made materials provided by the co-ordinators made the job easier	2
Material shared online can be shared on screen and on platforms like Google Drive	2
Sample quizzes and most exercises were useful	1
All materials were useful	1
More materials mean more practice; thus, students were well-prepared for class the next day	1
Easy to use	1
Eco-friendly	1
Easily accessible	1
Easier to grade quizzes	1
Availability of blank worksheets	1
Less time consuming	1

The table above reports the common advantages of TELL: more versatility in respect of time, materials and even teaching mediums. Additionally, increased communication as well as student motivation is dominant. A recurrent theme here is learner autonomy, especially since the strengths mention that materials can engage inattentive students, thus acting as Scaffolding level One and Two, thereby leading to independent study and individual work, which can be classified under Scaffolding Three. Once the students reach Scaffolding Three, as the literature suggests, they are on their way to becoming autonomous learners.

Table 2: *Respondents' answers about the weaknesses of online classes*

Weaknesses	**Respondents**
Easy for students to plagiarize for which no objective questions can be used, thus making grading difficult.	2
Weak students have difficulty understanding all aspects of materials	1
Easy to share materials, therefore individuals from other institutions can have access to them.	1
Materials need to be structured.	1
Eye strain	1
Lengthy	1
Time-consuming	1
No assurance whether students are working properly.	1

The next section of the survey was concerned with the weaknesses of online materials. Plagiarism is a prominent issue, since instructors are concerned that objective questions will lead to an increase in cheating and easy accessibility of materials can result in sharing of materials with parties outside of the institution. Two conflicting results appear regarding time and assessment. Here, three respondents have claimed that online materials are difficult to manage in terms of grading and time maintenance. Since no further details were provided, the researcher makes an informed assumption that subjective grading for quizzes is difficult for the instructors. In addition, since the majority of students face internet connectivity issues and lack adequate knowledge about navigating the internet tools, this affects their performance and engagement in the class. Once again, another occurring theme here is learner autonomy. Two faculty members mention that weak students have difficulty understanding

all aspects of materials and there is no assurance whether students are working properly. These issues stem because students are not independent learners, and as many respondents have already recommended, this skill needs to be developed. This has been elaborated in the next section, where respondents suggested methods through which online learning can be encouraged. Several suggestions were provided regarding promotion of learning on an online platform.

1. Four respondents emphasised on the importance of class discussions, driven by learner autonomy. One comment informed how teachers can

   > *"use the online format to provide them (students) with tools and guidelines to learn but they must also want to learn and be in a mindset and circumstance where learning is possible" (*Anonymous faculty member #11, interview questionnaire, 2020)

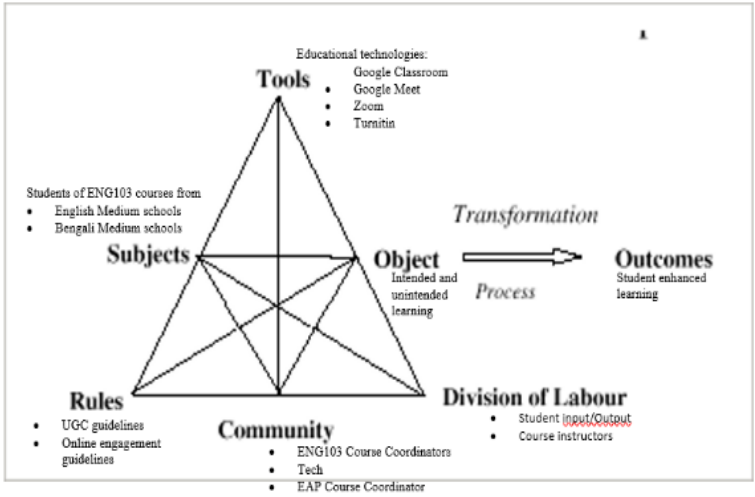
   Therefore, the respondent believes that once instructors provide materials and guidance, meaning once teachers assist learning with Scaffolding levels One and Two, it is partially the students' responsibility to execute Scaffolding Three, where they can use student-student interactions to utilise the course content to the maximum. At this level, self-awareness is developed and collaboration with peers is also encouraged, and this, in turn, aids students to become autonomous learners.

2. There were some brief remarks about teacher education and material creation. From the context, it can be understood that many respondents believe that teachers need more specialised training in the field of TELL, especially in terms of teaching strategies. One respondent recommended that adopting student-centred approaches and task-based activities during online classes can foster learning. Secondly, a common view among participants was that materials tailored accordingly can assist learning, although no explicit suggestions were made on this point. Therefore, based on previous responses, it can be assumed that these remarks refer to material development in terms of objective assessment (including short online quizzes) and discussion-based lecture content (including Microsoft PowerPoint slides and short video clips).

Figure 2: *Activity theory in the context of the research (adapted from Isssroff & Scanlon, 2002 and Guo, Bussey & Adachi, 2020)*

3. Some recommendations were made on the management level, such as division of classes, eradication of online assessment altogether and introduction of competitions within sections. While these solutions can significantly change the learning atmosphere, the decisions for these are taken by higher authorities. Although it is beyond coordinators' authority to materialise these suggestions in any way in terms of material development, it is an important reminder that management structure can have a profound impact in classroom learning as well.

As shown in Figure 2, the nodes of activity theory work together, go through the transformation process and lead to specific outcomes. Subjects, in this case students of the institution, use educational technologies to reach the learning outcomes of the course. This means students of the ENG103 courses are using technological mediums to progress their learnings. This leads to their object (i) intended learnings, such as those mapped out in the course outline, and (ii) unintended learnings, those learnings which are received to execute the intended learning (technical knowledge, online etiquettes and so forth). Meanwhile, rules set out by the University Grants Commission of Bangladesh as well as institutional online engagement guidelines dictate how course coordinators, technology support team and the overall EAP Course Coordinator approach and address issues and assessments surrounding the subjects. Lastly, the individual responsibilities of students and course instructors determine the learning outcomes, i.e., the object. This is the part where



scaffolding plays a crucial role since educators provide adequate knowledge and create ZPD for the learners. Therefore, this assistance allows students to learn and develop their skills. This, here, is a continuous process of all levels of scaffolding, and as mentioned earlier, can occur in any order. For example, if a teacher is teaching essay structure, she or he usually informs the students of the generic structure and provides examples. This falls under Scaffolding One. At this level, the teacher delivers knowledge slightly higher than the students' current level, so in this case, the student receives knowledge. Afterwards, teachers provide students with guided practice exercises which can be both objective and subjective. The purpose of this practice is to establish and instantiate Scaffolding One. Afterwards, students can be paired or divided into groups and assigned with topics to expand cognitive understanding and social interaction with peers, thus leading to output. This independent work can be classified under Scaffolding Three, which, once again, helps the student to become independent learners, therefore assisting the outcome to accomplish student enhanced learning.

Therefore, the results in this chapter represent the answers to research questions. Findings indicate that for most part, online learning has been proven to be effective. However, there are comments that its effectiveness varies. Usually, learners interact better with small and objective units. Likewise, engaging discussions prompted through a variety of resources also help to promote in-class learning. While faculty instructors can scaffold learning through plethora of resources and various media, problems still arise since most learners are not digitally sound, thus lack the required level of learner autonomy to comprehend content provided in the online spheres. Nonetheless, the research has certain limitations, based on which recommendations for further study in this topic have been made in the next section.

Recommendations

The findings of this paper are subject to some constraints. These limitations arose because the researcher had time limitations to adhere to while conducting this research. Therefore, considering these issues, some recommendations are made for the future research in this field. Once the limitations are highlighted and suggestions have been made, the next part

will discuss research implications and draw a conclusion about the findings.

Firstly, the number of faculty members who participated in the research is relatively small, for which future research can work on a greater sample size to provide further validation of findings. A high sample size means more experiences and opinions, thus ensuring a deeper insight into the issue of how online materials can be incorporated in TELL to aid students become autonomous learners.

Additionally, since the questionnaire results were collected one month after the implementation of the classroom materials, it is possible that the researcher may not have a clear and concrete picture of the classroom utilisation of materials. To tackle this, a longitudinal study can be implemented to construct an enhanced image on how online materials can help students to become independent learners over an extended period.

Furthermore, the scope of this study is limited to the teachers' perspectives only— it does not research into students' perspectives on effectiveness of online classes. Therefore, further research could concentrate on students' perceptions of classes conducted online and materials used for these classes.

Conclusion

This study analyse the efficacy of the materials designed for digital classes for a Bangladeshi private university consisting of bi-lingual students. The findings in this research suggest that in general, online classes have been effective, but there is room for improvement. This can be done by greater emphasis on development of learner autonomy, which can be achieved by designing lessons and using materials to scaffold student learning and assist them to become independent consumers of knowledge. This research extends the understanding of how online classes can be beneficial for learners. Nonetheless, there are certain limitations, which, if tackled, can contribute further into the field of online learning.

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STEM Pedagogical Content Knowledge of Preservice Teachers

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ABSTRACT
The United States needs to produce more graduates with the required 21st-century skills such as critical thinking, problem-solving, collaboration and cross-cultural awareness to remain a top competitor in a global marketplace. Science, technology, engineering, and mathematics, commonly referred to as STEM, is a transdisciplinary approach to learning through real-world application. The fastest growing occupations require STEM skills and STEM education and can be effective in promoting desired 21st-century capacities. To successfully teach STEM, educators need pedagogical content knowledge. Students can be greatly impacted by their teachers and K-12 public school may be the first-time students are exposed to STEM education. Even if students do not pursue careers in STEM, they benefit from the communication, collaboration, critical thinking, and problem-solving skills gained from STEM education. The purpose of the correlational quantitative study was to determine the STEM pedagogical content knowledge of preservice teachers and to consider any gaps in STEM pedagogical content knowledge. Recommendations include adding an explicit STEM course into preservice teacher preparation programs and future research.

Keywords: STEM education; 21st-century skills; preservice teachers; teacher preparation; STEM workforce

Introduction

The demand for employees qualified to perform in STEM careers continues to proliferate and the United States needs to contend in a global marketplace to remain in a position of global leadership (National Academies of Sciences, Engineering, and Medicine [NASEM], 2019). Research claims 75% of the fastest-growing occupations will require STEM skills, and STEM careers have the most considerable projected growth (Du Plessis, 2020; Holian & Kelly, 2020). Between 2007 and 2017, employment in the STEM fields grew 24.4% compared to just 4.0% for all other occupations, and this growth is expected to continue and increase by 8.9% between 2014 and 2024 (Noonan, 2017). To remain relevant in a highly competitive global marketplace, the United States needs to produce more STEM graduates (Perna et al., 2010). One of the reasons for an emphasis on STEM education is the globalization of the workforce. Due to the global nature of economics, technology and innovation have become vital to economic success (Casto & Williams III, 2020; Du Plessis, 2020).

While STEM education does not have the same importance in K-12 education as literacy, it may be just as significant in ensuring that more students are retained in STEM careers and build critical skills required even outside of STEM disciplines (Bybee, 2010; Jenlink, 2013). Still, many teacher preparation programs forgo STEM requirements while students pursue state teaching certifications (Garrett, 2008). As such, preservice teachers may lack exposure to explicit STEM education and instructional practices simply because they have not been exposed to the content and pedagogy (Ryu et al., 2019). This could result in gaps in knowledge and skills that can be passed on to students. Therefore, we sought to provide an initial assessment of preservice teachers' pedagogical content knowledge (PCK) in STEM to better inform preservice programs as whether explicit STEM education is needed in teacher preparation programs.

Literature Review

The United States needs to produce more STEM graduates to remain competitive in a global marketplace (Deniz et al., 2021). Currently, research suggests that there are significant gaps in science, technology, engineering and math, or STEMeducation and this negatively impacts the United States in a global marketplace (Bartlett & Bos, 2018). The gap in education may be responsible for the lack of progress in mathematics for fourth and eighth-grade students between 2007 and 2009 (National Science Board, 2022a). Although the United States ranks high in science, 7th place among 37 active OECD countries (Rotermund et al., 2021), the ranking for mathematics is much lower. Currently, the United States ranks 25th of 37 countries in mathematics (Rotermund et al., 2021).

STEM education is important beyond just preparing students for STEM careers. STEM competencies have been shown to support general economic growth within countries competing in a global marketplace (Park et al., 2020). Even if students do not pursue careers in STEM, they benefit from the communication, collaboration, critical thinking, and problem-solving skills gained from STEM education. These skills are crucial to success in an international economy and can be gained through effective STEM instruction (NASEM, 2018).

STEM education is an essential aspect of education for the future success of our students (Stohlman et al., 2012). STEM education inspires creativity, engages innovation, promotes problem-solving and critical thinking skills (Siekmann, 2016). According to Aydin (2020), while some students may pursue STEM careers, others still benefit from STEM education by becoming technologically and scientifically literate. Korucu and Kabak (2021) found that classrooms in 21 different countries using STEM positively influenced student motivation, attitude, and academic achievement.

Studies have shown that introducing STEM to young students positively impacts their future career aspirations in the STEM fields (Bagiati et al., 2010; Dejarnette, 2016; Huang, 2017; Jenlink, 2013). Kindergarten through 12th grade (K-12) schools are some of the first places that young students are exposed to formal education. The focus of STEM at the elementary level is less about achievement and more about engaging students in their learning, thus developing an interest in further STEM studies (Aydin, 2020). However, successful STEM learning depends on quality STEM teaching. A framework for understanding teaching is that of pedagogical content knowledge. Historically teacher preparation programs focused exclusively on the teacher's content

knowledge (Mishra & Koehler, 2006). In recent years, more teacher preparation programs in higher education have shifted their focus toward general pedagogical knowledge separately and often at the expense of content knowledge (Mishra & Koehler, 2006). Shulman's contributions defining CK and PK lead teacher preparation programs to focus on either one concept or the other independently (Mishra & Koehler, 2006). However, Shulman proposes pedagogical content knowledge (PCK) as a way of unifying pedagogy and content (Mishra & Koehler, 2006). Shulman suggests that PCK is the most significant component of successful teaching practices (Krepf et al., 2018).

For over thirty years, there has been discussion and debate regarding the definition and meaning of the term pedagogical content knowledge (Krepf et al., 2018). While this study utilizes a sample from the United States, issues regarding STEM education are part of discussions globally including researchers from Germany (Krepf et al., 2018), Jamaica (Mayne, 2019), Mayalisa (Gholami et al., 2021), Turkey (Aydin, 2020), and Taiwan (Chen et al., 2021). There are two main approaches to this ongoing debate. The first primarily elaborates on Shulman's concept of PCK and adds new components (Krepf et al., 2018). The second approach focuses on the interconnectedness among Shulman's knowledge of teaching: dimensions of knowledge (Krepf et al., 2018). Many other theorists have researched PCK and its elements, but a common theme throughout most research is that PCK is a blend of CK and instructional strategies (Gholami et al., 2021). PCK is the basic, context-specific knowledge that teachers activate when reflecting on practice and executing instruction that cultivates the greatest experiences for student learning (Mayne, 2019). This theory is developed from the works of Shulman (1986).

Current Study

Providing quality STEM education is dependent on the knowledge and skills of those teaching it to students. However, as noted earlier, many teacher preparation programs do include specific STEM requirements (Garrett, 2008) and these may leave teachers unprepared to teach STEM. As such, the purpose of this study was to determine preservice teachers' STEM pedagogical content knowledge. The research was guided by two overarching research questions:

1. What is the current level of STEM pedagogical content knowledge among pre-service teachers on the STEM Pedagogical Content Knowledge Scale?
2. Are pre-service teachers' levels of STEM pedagogical knowledge significantly higher or lower than neutral when using the STEM Pedagogical Content Knowledge Scale?

Methodology

Participants

A total of N=64 preservice teachers participated. The survey participants were predominantly White (84%) and female (92%) between the ages of 18-24 (97%). Most students were enrolled in their sophomore year (38%) at the time of the survey. The most frequency program represented was Pre-K-4 (Early Grades) Teacher Preparation program with 56% of the sample enrolled in this teacher certification program.

Instrumentation

The STEM Pedagogical Content Knowledge Scale (STEMPCK Scale; Yildirim & Şahin-Topalcengiz, 2018) was used. The scale includes an introduction that informs participants the purpose to "evaluate your thoughts regarding STEM pedagogical knowledge." Participants are then reminded that their responses are confidential and encouraged to answer all items. They are asked to provide their age, gender, department and class, with the latter two being specific to their program of study and university. The scale present 56 items broken up into six individual tables. Each table provides items corresponding to one of six categories and make up the subscales for PK (12 items), science (8 items), technology (7 items), engineering (7 items), mathematics (8 items), and 21st-century skills (13 items).

The PK subscale items measure teachers' agreement regarding their pedagogical skills including use of different teaching strategies, their ability to create effective learning environments, communicate with students, and evaluate student performance. The five subject specific subscales measure whether teachers agreed to having "enough knowledge" in the subject to teach it. They rate how strongly they agree with being knowledgeable of current trends and tools in the subject, whether they could engage students in the subject through discussion or by combining course material across subjects.

Items are rated on a five-point Likert scale ranging from 1= "strongly disagree" to 5= "strongly agree". Higher agreement indicates stronger pedagogical knowledge. Acceptable reliability has been shown for each subscale, αs ≥.78 (Yildirim & Şahin-Topalcengiz, 2018).

Procedures

The STEM Pedagogical Content Knowledge Scale was administered to preservice teachers via an anonymous online format. Faculty in the preservice education programs at three universities in Pennsylvania distributed the survey via email to their students. All participants had to be currently enrolled in the education program and seeking one of the following certifications: Early Grades (PreK-4), Middle Grades (4-8), Secondary Education (7-12) and Special Education (Pre-K-12). The participants were notified that the survey was voluntary, anonymous, and unrelated to any coursework or other institutional requirements. Participation took place online and all procedures related to the study were approved by the authors' University Institutional Review Board.

Data were analyzed using JASP (JASP Team, 2022). The overall score for the STEMPCK and each of the six subscales were calculated and used in all analysis. To determine pre-service teachers' overall levels of STEMPCK, descriptive statistics were calculated to determine the average scores for the STEMPCK and each subscale along with standard deviation, minimum and maximum scores. To determine whether teachers' scores were significantly higher or lower than neutral, a series of one-sample t-tests were conducted that compared the average score for each subscale to a neutral scale score of 3.00. Given the multiple tests, a Bonferroni corrected alpha value of α=.007 was used. Cohen's d was used to determine effect size. We considered an effect size of less than .20 to be small, .20-.49 to be moderate and .50 and above to be large.

Results

Descriptive statistics for the overall STEMPCK and the six subsections on the STEM Pedagogical Content Knowledge Scale are presented in Table 1. The overall STEMPCK score showed that on average pre-service teachers agreed with items on the scale (M=3.76). However, when examining the average scores for the six subsections, differences appeared. Pre-service teachers had the strongest agreement with items on the pedagogical knowledge scale (PK; M=4.26) and 21st century skills

subscale (M=4.43). Pre-service teachers also agreed with items on the math subscale (M=3.73) and the technology subscale (M=3.62). Pre-service teachers did not agree with items on the science (M=2.93) or engineering subscales (M=2.90).

Table 1.
STEMPCK Survey Subscale Scores (N=64)

	Mean	SD	Minimum	Maximum	Cohen's *d*
STEMPCK	3.76	0.43	2.84	4.57	8.71***
PK	4.26	0.40	3.25	5.00	10.56***
Science	2.93	0.78	1.22	4.44	3.76***
Technology	3.62	0.75	1.71	5.00	4.78***
Engineering	2.90	0.71	1.57	5.00	4.08***
Mathematics	3.73	0.78	2.00	5.00	4.74***
21st-Century	4.43	0.40	3.57	5.00	11.08***

Note: STEMPCK is an abbreviation for STEM pedagogical content knowledge and PK is an abbreviation for pedagogical knowledge. A one-sample t-test was conducted for each subscale to compare the mean score to a neutral score of 3.00 using a Bonferroni corrected alpha value of α=.007.
***p<.001

Pre-service teachers' agreement with items corresponds with stronger STEM pedagogical content knowledge specifically in the areas of pedagogical knowledge, 21st century skills, math and technology. The lack of agreement on items in the science and engineering subscales illustrates weaker pedagogical content knowledge in those areas.

Pre-service teachers' average score on each subscale was significantly different from neutral, p<.001. In addition, the effect sizes ranged from d=3.76 to 11.08 indicating that these differences were large in magnitude. In line with the descriptive statistics, students had agreement with statements measuring their overall pedagogical knowledge, t(63)=25.09, p<.001, 21st-century skills, t(63)=28.74, p<.001, PCK in the areas of technology, t(63)=6.62, p<.001, and mathematics, t(63)=7.43, p<.001. Their agreement was significantly more than neutral. In contrast, they disagreed with having PCK in the areas of science, t(63)0.63, p<.001 and

engineering, $t(63)1.06$, $p<.001$, and this disagreement was significantly lower than neutral.

Discussion

The purpose of this study was to assess preservice teachers' scores in STEMPCK. Having strong PKC can benefit student learning in STEM, and in turn better prepare our workforce. Pedagogical knowledge includes teachers' instructional strategies to deliver content to their students in engaging ways. According to Shulman (1986), pedagogical knowledge is a part of the knowledge teachers need to have to be successful and believes content knowledge is just as significant. Preservice teachers here reported higher than neutral scores in 21st-century skills and the pedagogical knowledge subscales. This included students feeling prepared to utilize multiple instructional strategies, create effective learning environments and having strong communication skills. The 21st-century skills subscale included understanding the role of empathy and respect in teaching and being an effective communicator. These skills will benefit teachers in the classroom. Importantly, they will be modeling the critical 21-st century skills that are needed for a productive STEM workforce.

Preservice teachers had the highest scores in the subject scales of technology and mathematics. In technology, preservice teachers agreed that they had knowledge regarding the subject of technology, have the ability to integrate technology into their teaching, and will use technology tools with students. In mathematics, preservice teachers agreed that they had knowledge of mathematics and possessing effective teaching strategies for mathematics.

Preservice teachers in this study reported low scores in their content knowledge in the subscales of science and engineering. This is concerning as teachers focus more on content they are most comfortable teaching (Chen et al., 2021; Sterling, 2006). Therefore, if we want to increase the likelihood that teachers will focus thoroughly on science and engineering, it is important that teachers have high levels of content knowledge in these areas. In the subscale of engineering, preservice teachers did report that they understand that engineering is based on science and mathematics. However, they scored below neutral in five of the seven indicators related to engineering demonstrating substantial gaps in their engineering PCK. This included a lack of attention to trends in engineering and low enjoyment with engineering. Participants also

indicated that they were less confident in integrating engineering into the curriculum and helping students to learn about engineering.

Preservice teachers had low scores in the science subscale. Participants did not score above neutral on any survey items in science subscale. They reported limited knowledge in scientific content knowledge and indicated that they do not follow trends in science and advanced scientific studies. It was concerning that they disagreed with their ability to be an effective science teacher, and their familiarity with trends and advanced scientific studies.

Implications

Shulman (1986) notes the importance of content knowledge and pedagogical knowledge in preservice teachers. Given that teachers spend more instructional time in content areas in which they have the most content knowledge, it is essential preservice teachers are prepared to teach all content, including STEM (Chen et al., 2021; Sterling, 2006). If preservice teachers have lower than average content knowledge in STEM subjects, it may impact the amount of instructional time teachers devote to this content (Thomson et al., 2018). This would in turn impact students' interest in and preparation for the STEM workforce.

Preservice teachers had scores above neutral in overall STEM pedagogical content knowledge**,** 21st-century skills, and the subjects of technology, and mathematics. However, in science and engineering, preservice teachers' knowledge fell below neutral. This is less than ideal for preservice teachers. As a result, preservice teachers enrolled in teaching preparation programs may not have the knowledge both schools and society want them to have to utilize STEM education to promote 21st-century skills in their classrooms. This might include principals and other educational leaders who are seeking teachers that are capable of helping students become STEM literate. Society at large is also in need of a workforce that is STEM literate and needs knowledgeable teachers in order to produce students for this.

Preservice education programs can address these gaps. For example, education programs could include courses that help to build students' knowledge in science and engineering. These courses might include a focus on current trends in science and engineering and reviewing advanced studies in science, as students themselves low on both of these items. The courses might also address how to teach about trends and scientific findings and ways to integrate this with other STEM subjects.

For example, preservice teachers felt confident in teach math, which suggests they may spend more time teaching math to their students. Incorporating math examples from engineering or science studies could increase their comfort with and also time spent in teaching science and engineering. This would have the secondary benefit of allowing their students to see the interdisciplinary nature of STEM subjects and ways in which they are applied in the real world.

This study is not without limitations. The sample came from one geographical area and was limited in size. The students were largely female and in their sophomore year. The survey used relies on one time point of self-report knowledge. It would be beneficial for future research to explore ways to directly measure this knowledge over time. It may be that preservice teachers' evaluations of their STEM PCK is not accurate, it could also change over time. Future research should seek to replicate the findings here with a larger national sample that includes more advanced preservice teachers. Nonetheless, the large effect sizes observed in this study increase the trustworthiness of the results suggesting that a closer look at preservice teachers' preparation to teach STEM is warranted.

Conclusion

It is clear from the body of research in the literature review of this study that preservice teachers need content knowledge, pedagogical knowledge and therefore STEMPCK is needed to be the most successful in the classroom (Taylan et al., 2022). Based on the results of this study, it can be suggested that teacher preparation programs should be reevaluated to implement explicit STEM course requirements to promote higher levels of self-efficacy in preservice teachers utilizing STEM education and to promote 21st-century skills in their classrooms.

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