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Learning Retention & Technology in Mathematics: Match Made in Heaven? Or Something Else.

by

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The purpose of this study was to explore how the brain learns and retains mathematical information. The second purpose was to determine what best practices can be asserted using technology and other strategies to gain maximum achievement. The study sought to answer the research questions, 'How does the brain learn math?', 'What role does motivation play?" and 'Mindset have on learning retention?' In researching the questions, it was to discover, "What teaching practices ensure maximum retention?," and 'How can the use of technology increase retention?" Or the adverse, does technology inhibit learning retention? The goal was to create an effective learning model with effective technology for impactful intervention.

Introduction

Learning retention is always at the top of the educational spotlight. Each year, Texas mathematics classrooms see a decline in the number of students with proficiency in computational and reasoning skills. The Texas Education Agency reported in their 2022 Assessment Conference's Accountability Update (Texas Education Agency, (2021) that the 2021 STAAR (State of Texas Assessment of Academic Readiness) results showed a decrease in academic performance with a more considerable decline in math than reading. Math saw a 15% decrease in scores. The negative impact of COVID-19 erased years of improvement in math. Even before the impact of COVID-19 on schools across the nation, learning retention has always been an issue. According to one study,

students over five years had up to 40% of their total school-year gains lost during the intervening summers (Atteberry & McEachin, 2020). Whatever the cause of learning loss, teachers and districts are left to find ways to fill the gaps. How can teachers and districts help students make significant academic gains to get struggling students on grade level? This literature review attempts to answer the following questions within the context of mathematics education:

1. How does the brain learn math?
2. What role do motivation and mindset play in retention?
3. What teaching practices ensure maximum retention?
4. How can the use of technology increase retention? Or the adverse, does technology inhibit learning retention?

Literature Review

How the Brain Learns Math

One must first understand how the brain learns to come to any kind of conclusion as to how best to design instruction to attain learning. It is believed that humans are born in a way programmed to mentally represent the regularities they experience in their environment, which we call learning (Olkun, 2022).

Unless learned material is consciously reviewed, humans forget approximately half of the newly learned knowledge in days or weeks. Knowledge connected meaningfully to other knowledge is more stable and less susceptible to decay. (May,

2021) Any new learning is more likely to be retained if the learner has adequate time to process and reprocess it. (Sousa, 2016b.) This rehearsal process is a critical component in the transference of information from working memory to long-term storage. Three criteria help the brain determine whether to move new information into storage or to let it fade away (pruning) from the memory system. Strength of Emotion, Sense, and Meaning are the three criteria (Sousa, 2016a).

Time must be given for Initial rehearsal (when information first enters working memory). If meaning is not attached when the information is provided and no time is given for further processing, then the new information will be lost. Chances of retention are greater if the learner is given sufficient opportunities to elaborate on the details and assign value and relevance to new learning. (Rote Rehearsal, i.e., fact recall; Elaborative Rehearsal, i.e., deeper meaning and interrelationships of concepts)

According to some researchers (May 2021; Lyle 2019), retrieval practice aids in learning retention and facilitates learning. The traditional view in education is learning occurs during episodes of studying. However, there is evidence from research that retrieval practice plays a major role in knowledge retention and has a facilitative effect on learning. (May, 2021) Lyle's research highlighted spaced retrieval practice. This resulted in significant retention of learning among Precalculus students at Hopkins University. Each objective had a set of three to six questions. With spaced retrieval practices, the set of questions was divided into thirds (1-3 questions per objective) and administered in three different quizzes given in the same week the objective was

taught, one week after the objective was taught, and the final quiz was given three weeks after the objective was taught.

Learning mathematics is noticing the patterns between numbers and shapes and expressing them with the language of mathematics. Language can be called mathematization, the process of representing recognized patterns using numbers and other symbols or transcoding between representations. Practicing non-symbolic approximate numbers improves exact arithmetic in school (Olkun, 2022).

Early math skills are an indicator or predictor of future math achievement as well as reading achievement. Dyscalculia is a learning disability associated with mathematics. The cause of dyscalculia, according to some research (Piazza et al., 2010), could be either a pure impairment in non-symbolic number representation or an inability to link this representation with the corresponding number symbols, which in turn influences the precision with which numerosity is perceived.

The Role of Motivation and Mindset

Teacher Mindset

Just as emotion plays a significant role in retention, the mindset also does. Children have a natural ability for mathematics in the early years through play. They can informally gain reasoning, problem-solving, and inquiry skills in everyday experiences. However, there comes a time in early education when mathematical learning moves from informal learning through play to curricular-based teaching to engage learners with concepts, methods, and language formally. This move can result

in negative teacher emotions about these instructional approaches. Such feelings impact teacher motivation and capacity to engage students in meaningful curriculum experiences, which is significant based on research that suggests a direct correlation between teacher and student emotions (White & Malkus, 2019). Gherardi's (2017) findings suggest that "teacher mindset regarding what and how students should learn contributed significantly to how they made sense of instructional technology." Their ideas of what constitutes best teaching practices were either fixed or flexible, that is, open to growth.

Regarding teacher mindset in technology, teachers tend to use what they are comfortable with and know. When asked how they learn about technology, the primary response is through training. Interestingly, much of the training in instructional technology is self-acquired. The data collected in one study led a team of researchers to four themes: 1. Defining technology integration as a process 2. Design as a tool of technology 3. The use of technology in the primary, middle, and secondary classroom is seen as pervasive 4. The value of technology integration in the classroom is constantly changing. This study specifically relates to how to implement 1:1 and how to use the technology in the classroom. It shed light on what technology was most commonly used by teachers and what districts should do to improve professional learning continually (Ruggiero & Mong, 2015).

Professional development for teachers is integral to affecting any real change in instructional design. Just as students learn, teachers must learn and practice first to transfer new learning to the classroom. Smith et al. (2020) used a game-and-play

design framework of professional development for teachers to learn to teach computational thinking. This framework allowed teachers and students to integrate technology-based gameplay into their classrooms. In this model, teachers would first play the game. They would then create a game themselves and have their students play it. Finally, students would create a game themselves. This model fits the strategy that teachers will use what they know. Therefore, the strategy would be an optimal way of integrating new curricula and technologies into the classroom.

Student Mindset

According to psychology, motivated forgetting is the process of intentionally forgetting memories, done consciously or unconsciously. When our mind intentionally forgets memories, it usually does so to reduce anxiety or certain impulsive behaviors. Individuals with negative experiences on learning a particular subject, or those with high anxiety towards the subject, as well as those who perceive that the subject has less use in their daily living, have high chances of forcing themselves to forget what they have learned in that subject. Mathematics is a content area in which many people report a high degree of stress and is reported as people's most hated subject in school. This affects their attitude towards the subject, learning retention, and mathematics performance. Therefore, topics in mathematics have higher chances to motivate forgetting. Students commonly engage in forgetting when they themselves interpret that what they encountered is no longer relevant. Accordingly, student performance and learning retention on topics involving more complex computational skills such as word problems that need analysis and application were directly related to the students'

arithmetic skills. The mathematics word problem-solving skills are affected if students are poor at applying number properties, required operations, and number-solving steps. Mastery of procedural skills affects the students' mathematics performance (Valderrama & Oligo, 2021). Another factor in a student's mindset is their parents. Students with high math anxiety parents are negatively affected. These students are likelier to perform poorly in mathematics (Schaeffer et al., 2018).

Motivation

Studies show that student enjoyment and the value of learning positively affect mathematical achievement (Putwain et al., 2020). Motivational features in multimedia can improve student learning by fostering generative processing, that is the effort to understand content affected by motivation (Mayer, 2014).

Game-based learning brings gameplay into the classroom. It is highly motivational and engaging for students. Using a qualitative research methodology and content analysis, one study of digital games determined that students who played digital educational games performed better in mathematical concepts and subjects than those who did not. They stated that it could be argued online digital games have positive effects on students with low levels of mental disability and basic mathematical concepts (Can, 2020). Another study conducted in Taiwan on elementary students developed an adaptive concept-effect relationship (CER)-based mathematics game system

conducting mathematics diagnostic and remedial learning activities. This game offered an adaptive game process customized by analyzing learning behavior to generate learning guidance individualized for each student. Students solved problems and made decisions in the game by integrating what they had learned throughout the game. When the students replied correctly, the game offered an immediate positive reward. The study results showed the experimental group had significantly better learning achievements than the control group (Chu et al., 2021). Still, another study showed adaptive practicing software used during remote learning supported the work of the Taiwan researchers (Meeter, 2021).

Best Practices

Instructional Design

The Cognitive Load Theory (Sweller, 2016) states working memory can only hold a small amount of information at any one time, and instructional methods should avoid overloading it to maximize learning. The cognitive theory of multimedia learning distinguishes among three kinds of processing demands on the learner's cognitive system during learning:

- extraneous processing (processing that does not serve the instructional objective and is caused by poor instructional design);
- essential processing (processing aimed at mentally representing the presented material and is caused by the complexity of the material), and
- generative processing (processing aimed at making sense of the material and is caused by the learner's effort to engage in learning processes such as selecting, organizing, and integrating)

Considering the cognitive processing limitations of working memory, three important instructional design goals are to reduce extraneous processing, manage essential processing, and foster generative processing. The primacy-recency effect says we tend to remember the best that comes first in a lesson (Primacy) and the second best that comes last (recency). Items in the middle are more difficult to remember. Because of this phenomenon, lessons should flow in what order (Sousa, 2016a).

Shorter lessons of about 20 minutes are likely to result in greater retention. Research on instructional design principles initially focused on techniques for minimizing extraneous processing (such as placing printed text next to the corresponding graphics, reducing extraneous words and graphics, or highlighting the key material). It gradually expanded to include techniques for managing essential processing (such as breaking a complex lesson into manageable parts or providing pre-training in key concepts). In contrast, this special section highlights recent work on instructional design principles that focus mainly on the third goal of fostering generative processing, which has been somewhat understudied compared to the others (Mayer, 2021).

Student-centered learning is also deemed a best practice when considering lesson design. Student-centered learning refers to an educational model that yields and bends to the needs and potential of each individual student first—not to the needs of the state, the teachers, the curriculum, the cohort, the politicians, the schedules, or any other element of the system (Staker et al., 2020). Many schools are beginning to have campuses with differing learning paths to suit individual student needs, such as blended learning, STEM campuses, as well as virtual models. These many options hold the students' needs firmly in mind with the intent to provide an education suited just for them. Many workplaces now offer badging systems instead of complete college degrees or specialized certifications for employees to get the training in the areas they want and need for their jobs. To keep up with the ever-evolving modes of instruction, the industrial classroom model that persists in public education today must be modified.

Finally, regarding instructional design, studies show that physical body movement and the practice of adopting computational perspectives improve learning in mathematics (Sung & Black, 2020). Incorporating concrete sensorimotor experiences within the instructional design can lead to conceptual learning for abstract concepts.

Building Numeracy

Just as phonemic awareness is a prerequisite for learning phonics and becoming a successful reader, developing number sense is imperative for success in mathematics. It is the missing component in the learning of early arithmetic facts. According to Sousa, rote drills and practice do not significantly improve mathematics ability (Sousa, 2016b). One of the best approaches would be incorporating number talks in the classroom.

According to Olkun, the human cognition system is the theoretical structure humans use to acquire knowledge, skill, or habit. Regarding mathematics, it has the ability to represent numbers, space, objects, actions, and the social environment. Therefore, we are born with number sense. Olkun defines number sense as "the ability to intuitively use numbers effectively, efficiently, and fluently in problem situations." The number subsystem of the HCS is built on quantity perception. Quantity perception is divided into discrete quantity and magnitude quantity. Discrete quantities are those that can be counted, and magnitude quantities are those considered to be continuous or measurable. Each type of quantity triggers a different mathematical action. He

concludes that there is a strong correlation between quantity perception and math achievement (Olkun, S, 2022).

Mental competencies help build higher-order thinking, reasoning, critiquing, and making sense of number and number operations. In a study using number talks, Students who develop skills in mental computation are more flexible with multiple strategies that will aid them in many mathematical situations. Participating students developed a strong understanding of patterns and number relationships. In addition, they became better communicators and problem solvers (Pourdavood et al., 2020). In another study, a researcher purposely discovered if numeracy in the strands of accuracy, flexibility, and speed would increase after practicing mental math strategies through Number Talks. The experimental group participated in these talks twice weekly for 30 minutes each. Students were motivated to work on different strategies and explain them to their peers, who listened intently and devised their own strategies to solve problems. This study contends that Number Talks increase numeracy in fifth graders because students use flexible thinking strategies, tackle mental math problems more confidently, are more accurate, and solve math problems faster (May, 2021).

Problem-Based Learning and Multiple Representation

Triple Coding, which is the learning framework that includes using verbal Code (i.e., words and or concepts), symbolic Code (i.e., numbers and symbols), and analog Code (i.e., real-world events, concrete materials, and pictorials), enhances the probability of learning retention and is suitable for examining performance in complex

mathematical problem solving from neuropsychological perspectives. This type of Intervention develops different aspects of the basic number processing system and is more effective than traditional methods (Olkun, 2022). The problem-based learning model gives students a real-world perspective of a mathematical concept, such as the use of triangles in things such as roofs, and poses a question to be solved. Once the problem is identified, students make assumptions to understand the problem. They then make a model and implement that model to solve. When paired with visualization techniques, the problem-based learning approach can significantly increase students' attitudes and confidence (Abate et al., 2022).

Flipped Classroom

The flipped classroom is a methodology that provides a flexible environment (space, time, and learning mode) to learn with a student-centered learning culture. This model typically involves students consuming content prior to the instructional setting, freeing up instructional time for higher-order thinking activities. The outcome-related benefit of educational videos in the flipped classroom hinges strongly on whether they are watched before class for students to be sufficiently prepared. From a constructivist perspective, this prior knowledge encourages students to connect previously developed schemata with the target material in the in-class session and thus actively construct their own knowledge structure. Following the principle of schema building, the newly received content is better and more easily contextualized within a previously acquired schematic macrostructure (Förster et al., 2022). One study suggests that the length of the videos shown pre-class impacts student perception of retention and student

engagement. Short videos of about twenty minutes aid in the chunking of memory components and have the potential to aid in schema construction (Slemmons et al., 2018).

Impact of Technology on Retention

When used for intervention purposes amongst students with the largest gaps, computer-based programs can fill significant gaps in learning. In one study (Ökördi & Molnár, 2022), an online intervention program was developed to boost individual student achievement and promote personal progress, thereby providing a means for differentiation in the classroom. The program embedded the developmental process of the skills in a digital environment, included instruction for the tasks and provided automatic feedback on student performance.

Technology can also be beneficial for students with math anxiety. In one study, a math app was introduced to improve parent-child math interactions. The app consisted of a relevant passage with comprehension questions as well as math concept questions. Parents were encouraged to use it four times weekly but allowed to use it as often as they wanted. The study concluded that this parent-child interaction positively affects student achievement (Schaeffer et al., 2018). In contrast, the results of another study using tutoring game-based technology showed students performed much better when a problem-solving system was given than when the computerized practice was provided (Ran & Secada, 2020). Studies have shown that the amount of screen time

can impact several issues, such as attention span and depth perception, and that younger students should have limited screen time (Sousa, 2016a).

Students with learning disabilities can experience positive and negative outcomes using technology. Technology can significantly enhance access to students with varying needs as embedded text-to-speech features exist to make content more accessible to struggling readers. Speech-to-text features can aid those who struggle to write. However, many of the long-standing barriers to quality, inclusive education for students with disabilities exist within the use of technologies such as consistent, well-prepared special education teachers who understand its use, physical and communication barriers, as well as the compounding effects of cultural differences and poverty (Porter et al., 2021). Technology, if not used correctly, can further increase inequity in learning.

Summary

From this literature review, effective mathematics lesson design should be student-centered, where the student has some part in constructing their learning, and should offer multiple avenues of representing their knowledge of the content taught. Much consideration should be given to the length of teacher-led explicit instruction. All ages have been shown to benefit from short explicit instruction of about 20 minutes. The mathematics lesson design should include number talks to build numeracy and increase mathematical reasoning. Finally, within the learning module,

time must be spent on practicing and assessing the skill multiple times to increase learning retention.

Technology has proven to be very effective in retention. Game-based learning activities using technology prove to be motivational, which increases the chance of retention of the skills played. Technology should also be used as a creative tool to represent knowledge. In contrast, mindful consideration must be given to the amount of time students spend using the technology, as there could be risks to too much screen time.

Most importantly, educators should be mindful that the mindset of their students, as well as themselves, affects learning retention. None of the information obtained from this literature review will prove fruitful unless the educator truly assesses his or her desire to create and implement engaging learning experiences enhanced with technology. Technology is just a tool. How the tool is used is what truly matters.

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ChatGPT Higher Educational Impact

by

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According to the Cyrin Newsletter on 3/23/2023, ChatGPT is an artificial intelligence (AI) chatbot developed by the San Francisco-based AI research company OpenAI. ChatGPT was released in November 2022. The application can have "conversations on topics from history to philosophy, generate lyrics in the style of Taylor Swift or Billy Joel, and suggest edits to computer programming code." (Cyrin, n.d.)

"A distinguishing feature of ChatGPT is that it does not simply give an index of search results but uses its machine-learning abilities to explain complex topics and provide practical solutions. To many, ChatGPT also represents a potentially seismic shift in cybersecurity, exposing unique vulnerabilities that companies and industries are actively working to address." (Sangfor, 2023) The Identity Management Institute stated:

Speed is where AI excels the most by surpassing the human capacity to detect and mitigate threats. Seventy-five percent of cybersecurity executives agree AI allows them to respond to breaches faster, and the technology has been found to speed up evaluations of 'breach worthy' vulnerabilities by 73%. Fifty-nine percent of cybersecurity professionals say AI streamlines the process of detecting and responding to critical system weaknesses, and enterprises using the technology can find and fix such defects 40% faster (Artificial Intelligence).

"The surge of attention around ChatGPT is prompting pressure inside tech giants, including Meta and Google, to move faster, potentially sweeping safety concerns aside. ChatGPT, along with text-to-image tools such as DALL-E 2 and Stable Diffusion, is part of a new wave of software called generative AI" (Cyrin, n.d.).

Google released "Bard" in its race to create AI Chatbots. Bard is designed to simulate conversations with a human and uses a combination of natural language processing and machine learning to provide realistic and helpful responses to questions asked (Martindale, 2023).

The following are the seven areas of discussion in this paper: 1) background including history, benefits, constraints, and dangers, 2) plagiarizing, 3) possible inappropriate auto-grading, 4) use cases summary, 5) findings,6) impact on institutions, and 7) speculated solutions.

On November 30, 2022, OpenAI released a significant update to ChatGPT, an AI language model. This update optimized the language model for dialogue, making "it possible for ChatGPT to answer follow-up questions, recognize mistakes, and challenge incorrect premises." (Introducing ChatGPT) ChatGPT is accessible to the public at chat.openai.com, with a paid subscription option that promises the most up-to-date model and higher performance. This is one of many Language Learning Models (LLMs). See Figure 1 (Life Architect, n.d.)

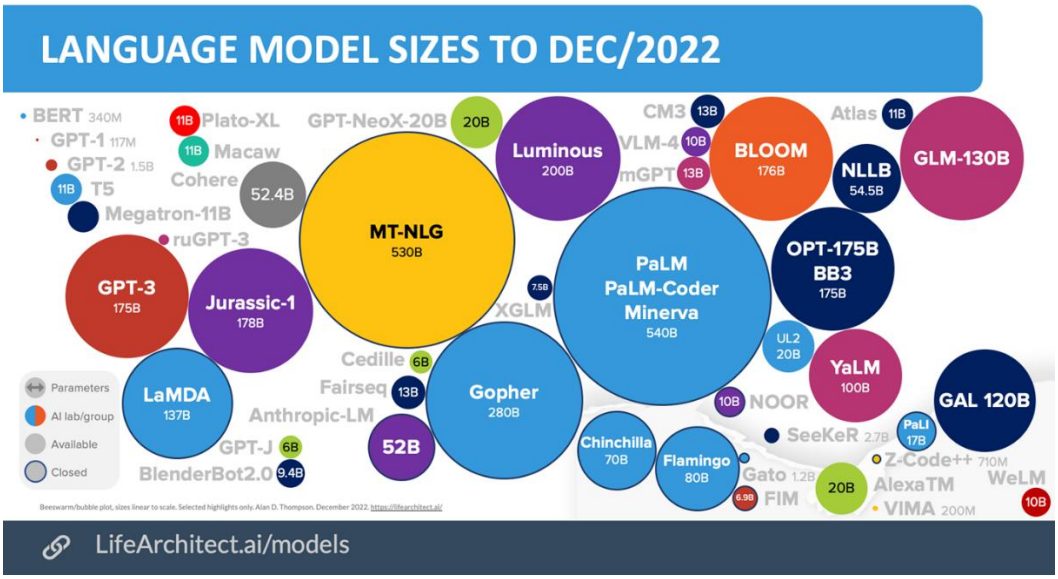

Figure 1. Language Model Sizes to December 2022 (Life Architect, n.d.)

There are many tools to worry about that can do the same thing as ChatGPT! Note that the years behind the software products indicate the year released. (Orosz):

- Tabnine (2019) formally
- GitHub Copilot (2021)
- Replit Ghostwriter (2022)
- Codeium (2022)
- SourceGraph Cody (2023)
- CodeComplete (2023)
- FauxPilot (2023)
- Tabby (2023)

ChatGPT is based on a neural network architecture called the transformer network, introduced in a 2017 paper by Vaswani et al., and has since become a popular architecture for natural language processing tasks. Specifically, ChatGPT uses a variant of the transformer network called the decoder-only transformer, designed for language modeling tasks. In 2014, Stephen Hawking warned that artificial intelligence could end humankind (Hawking, 2014). In 2015, Elon Musk and former Y Combinator President Sam Altman cofounded OpenAI (Kay, 2023).

In 2016, Gym, a platform that allowed researchers to develop and compare reinforcement learning systems, launched (OpenAI Gym Beta, 2016). Universe has released a toolkit for training intelligent agents across websites and gaming platforms. In 2017, ChatGPT was based on Neural Network Architecture. In 2018, three years after helping found the company, Musk resigned from OpenAI's board of directors. In the GPT series, the first model was released in 2018, with the name GPT-1. This initial version was a relatively small model compared to later versions, with only 117 million parameters. In June 2019, OpenAI released an updated version of the model, GPT-2, which was significantly more extensive and powerful, with 1.5 billion parameters.

OpenAI announced a partnership with Microsoft at the end of 2019 (Paul, 2022). In 2020, the company released another chatbot called GPT-3 in 2020. The GPT-3 or Generative Pre-trained Transformer 3 is an AR (Autoregressive) language model for producing human-like text through deep learning. Currently, ChatGPT uses GPT-3.5 to answer all queries and requests. GPT-3 was released on June 11, 2020, as the successor to GPT-2, and it used a 2040-token-long context and 175 billion parameters.

(Kay, 2023). In 2021, the company released an AI-art generator. Dall-E is an AI system that can create realistic images and even art based on descriptions of the images. In 2022, ChatGPT was launched as a prototype on November 30, 2022 (Hines, 2023). GPT-3.5 was shortly released. Adrian Twarog said one million users signed up in just five days. OpenAI has built CODEX, the engine behind GitHub CoPilot (Twarog, 2023). In 2023, the next version, GPT-4, was released on March 13, 2023 (Weitzman, 2023). In the near future, expect further updates with the current data accessed, and expect major subscription costs.

Like its predecessors, GPT-5 is believed to be based on a transformer architecture trained on a massive corpus of texts to generate human-like responses to prompts. However, GPT-5 is expected to be even larger and more advanced than GPT-3 and GPT-4, which have 175 billion parameters. Visual ChatGPT connects ChatGPT and a series of Visual Foundation Models (VFMs) to enable sending and receiving images during chatting. (Wu et al., 2023) It is different from the ChatGPT-4 Multimodal Feature.

"AutoGPT is certainly a look at the next steps in generative AI. It is like taking ChatGPT or Bing Chat and letting it run wild. The AI is doing almost all the work on its own, making it interesting and potentially scary." (Devine, 2023, para. 2). GPT4All is one of several open-source natural language model chatbots that you can run locally on your desktop or laptop to give you quicker and easier access to such tools than you can get with their cloud-driven counterparts. It works similarly to ChatGPT, but there are no

wait times, and you don't have to log in to use it (Martindale, 2023). Figure 2 summarizes the ChatGPT creation timeline.

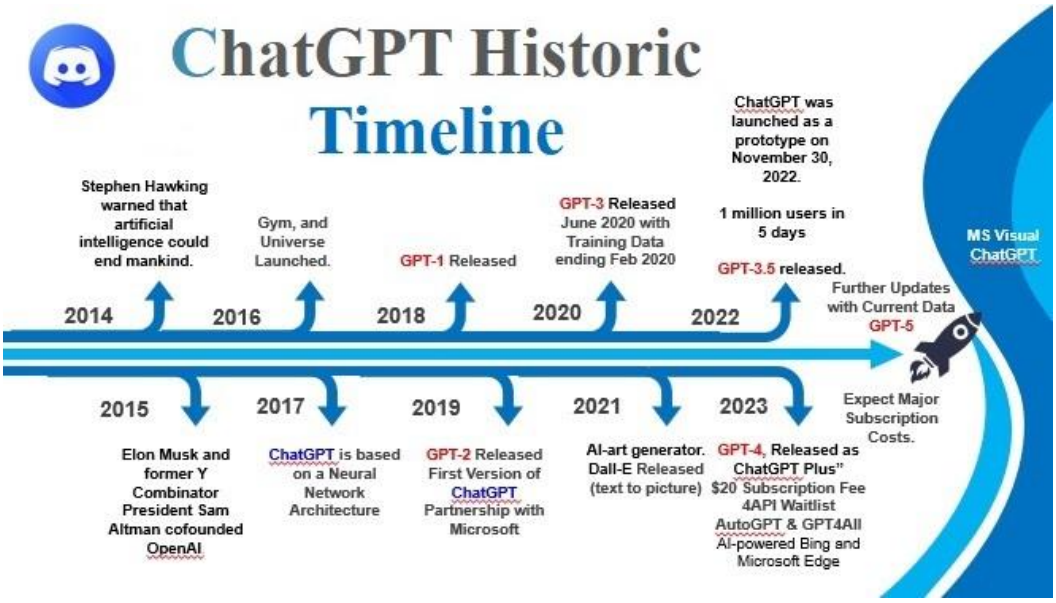

Figure 2. ChatGPT Historical Timeline (Bruster, 2023 developed from Carter, 2023; Hawking, 2014; Kay, 2023; Martindale, 2023; Weitzman, 2023; Wu et al., 2023)

Interestingly, NVIDIA has released PICASSO SHOCKS, which allows "text to video capability." Text to Video Capability is available through Midjourney, DALLE-2 (MS adding to Bing and Edge), Stable Diffusion, Runway, Adobe's Firefly, Blender, NVIDIA Picasso Service (in DGX Cloud), and Premier Pro. (TheAIGRID, 2023b) Microsoft has added the power of ChatGPT to both Bing and Microsoft Edge. (Bing)

Some Constraints are (TheAIGRID, 2023b):

- GPT-4 is available via ChatGPT Plus or GPT Pro
- GPT-3.5 is still faster (due to constraints)
- Limit: 100 messages every 4 hours
- DALL-E is not "buttoned out."

- GPT-4 API obtained through 4APIWaitlist
- 25,000-words limit
- PineScript Editor

Visual ChatGPT is based on the foundational models: BLIP-2, Stable Diffusion, Pix2Pix, ControlNet, and Detection. To run, it requires pasting in the assigned OpenAI API. Visual ChatGPT allows iterative requests to improve items drawn, change colors, add change positions in drawings, etc. To be effective, Visual ChatGPT requires heavy, prompt engineering (Wu et al., 2023).

ChatGPT has been trained on a large corpus (175 billion documents) of text data. It can generate coherent and grammatically correct language, making it one of the most advanced language models (TheAIGRID, 2023a). It has even been suggested that ChatGPT may be the first AI capable of passing the Turing test, an experiment in which a person having a conversation cannot determine if they are conversing with a person or a computer (TheAIGRID, 2023b).

- Some Noted Capabilities
- Creation of Chrome Extensions
- Beats 90% of lawyers trying to pass the Bar
- Creates iPhone Apps
- Creates basic games (SnakePong)
- More accurate in writing
- Able to do taxes (tax consultant)
- Check and create code

- Improves learning

Additionally, according to Twarog (2023), additional capabilities include:

- Multimodal: uses images and text
- Creates a website from drawn images
- Interfaces with the Kahn Academy (personal tutor)
- Assists with exam prep (LSAT, Physics)
- Provides Training for Certifications
- Increases word output to 25,000 using ChatGPT4API
- Summarizes articles

ChatGPT can analyze a picture and logically address the items (West, 2023). One can create a profitable trading bot in seven minutes with ChatGPT (Giannino, 2023). The best six uses for ChatGPT include (Butler):

1. Crafting Complex Prompts
2. Logic Problems
3. Verifying GPT 3.5 Text
4. Complex Coding
5. Nuanced Text Transformation
6. Complex Knowledge Work

Cook (2023) shared four ways entrepreneurs are using ChatGPT during their workday:

- For inspiration and ideas
- To improve or repurpose content

- To ramp up content output
- Improve their processes.

Wu (2023) stated five big problems with OpenAI's ChatGPT, including:

1. ChatGPT Isn't Always Right
2. Bias Is Baked into the System
3. Writing & Plagiarism
4. It Can Cause Real-World Harm if not used appropriately.
5. OpenAI Has All the Power

"ChaosGPT is an altered version of OpenAI's Auto-GPT, the publicly available open-source application" (Pollina, 2023, para. 2) that was assigned the task of destroying humanity. ChaosGPT's recent assignment led to recruiting additional AI agents to research nuclear weapons and send out ominous tweets about humanity (Pollina, 2023).

DarkBERT's release paper gives an overall introduction to the dark web itself. Francisco Pires expounded on DarkBERT's capabilities:

DarkBERT is based on the RoBERTa architecture, an AI approach developed in 2019. It has seen a renaissance, with researchers discovering it had more performance to give than could be extracted from it in 2019. The model was severely undertrained when released, far below its maximum efficiency. To train the model, the researchers crawled the Dark Web through the anonymizing firewall of the Tor network. Then, they filtered the raw data (applying techniques such as deduplication, category balancing, and data pre-processing) to generate a Dark Web database. DarkBERT results from

that database being used to feed the RoBERTa Large Language Model. This model can analyze a new piece of Dark Web content written in its dialects and heavily coded messages and extract useful information from it" (Pires, 2023, para 3).

ChatGPT initiating student plagiarism is a primary concern. ChatGPT has the potential to create a significant plagiarism problem in education. Since ChatGPT does not retain generated text beyond a user's session, the AI does not know that it generated the text. However, services like Turnitin.com may be able to catch instances of plagiarism after the first submission. Further research is needed to confirm this. ChatGPT can complete various written assignments in different disciplines, including software development assignments, term papers, essays, and research work. Lab work, demonstrations, and walkthroughs are less likely to be plagiarized since students must provide evidence of their progress through screenshots, reducing the chances of academic misconduct and promoting more authentic learning experiences.

ChatGPT does not cite references unless requested; however, questions remain if it always does correctly. ChatGPT can encourage student plagiarism. Instead of using ChatGPT to craft an assignment start based on a student parameters' input, they may submit the ChatGPT output intact as a paper without further research and due diligence applied. As a result, writing assignments must change significantly with little input from students and substantial help with ChatGPT.

ChatGPT can also assist professors and teachers with grading assignments, although its ability to tally scores may be limited. This assistance can reduce the workload for educators and provide students with faster feedback on their work;

however, the educator may cut corners and not apply needed subject-experienced input from the assessors.

ChatGPT article use cases have demonstrated excellent use in 1) Online Course Support, 2) Textbook Support, 3) Certification Exam Preparation, 4) Class Exercises Development Support, 5) Generation of Quiz Questions, and 6) Grading Quiz Questions. In online courses, direct interaction with faculty is often limited to email or messaging. ChatGPT provides instant responses to student questions and inquiries, enhancing the level of engagement and support available to students. However, the faculty member must still review the responses. ChatGPT can be utilized to generate topic readings for courses, reducing the need for traditional textbooks and allowing for more dynamic and customized course content. In addition to academic assignments, ChatGPT can prepare students for certification exams by providing practice questions and feedback on their answers to enhance the effectiveness of exam preparation and increase the likelihood of success. ChatGPT can be used to develop a digital forensics in-class exercise.

Based on the authors' research, ChatGPT has the potential to be a game-changer in education. While the impact may vary by discipline, in the field of Computer Science, ChatGPT has already demonstrated the ability to complete a wide range of tasks, from coding stock market analysis predictions to drafting professional papers and research papers. The possibilities for its use in education are vast and could represent a paradigm shift in teaching and learning.

ChatGPT can generate coherent and well-written text for various purposes, including professional papers, memos, and letters. It can summarize and distill complex information into easily understandable language. It can create engaging and appealing presentation slides and quizzes. ChatGPT can engage in sophisticated debates on a variety of topics. It can analyze enormous amounts of statistical data and provide insights and trends. It can create software programs based on specifications and requirements and compose high-quality creative writing, including songs, poems, and love letters. It can assist in writing research papers, including generating ideas and refining language. ChatGPT can build complex models and algorithms for analyzing stock market data and making predictions. Finally, it can adjust the tone, style, and language level to match the needs of different audiences, including students and professionals. It can assist in writing research papers, including generating ideas and refining language.

Other noted findings by the authors of this paper include math calculations often yield unreliable answers. Large datasets and complex numbers in equations are usually not solved correctly. Solving the same equation with the same sets of complex inputs can cause different responses upon regeneration. Many teachers claim that ChatGPT generates average "C" level writing outputs. The generation of code is subpar and average. The Chat layer filters the answers only; the GPT layer does not filter unethical and possible criminal queries; the generation of non-desired illegal responses is possible from the GPT layer.

So, how does the faculty plan for future use? Faculty Statistics - Usage of ChatGPT reports (Productive Teaching Tool):

- 82% of college professors are aware of ChatGPT.
- 72% of college professors are concerned about using ChatGPT for cheating.
- 34% of all educators believe that ChatGPT should be banned in schools and universities.
- 66% support students having access.

In Mills (2023), Solutions (Introducing ChatGPT), there are 1) Policy & Syllabi must be amended to manage new implications, 2) AI text detectors such as OpenAI GPTZero must be used, 3) an assessment overhaul must be completed, and 4) ongoing training and defense must be pursued. University faculty, professors, and instructors must act. Students are using ChatGPT; thus, educators must understand and use this tool to the faculty's advantage. Action is needed at the university level, starting with policies on using ChatGPT. Universities must decide how this tool can help faculty and students work smarter, not harder. Faculty senate leadership must have conversations about the use of this tool. Syllabi must be rewritten to include how ChatGPT can be used in coursework, what each course expectations area is, and how grading will be addressed when ChatGPT is used.

Faculty must consider how to overhaul assignments to deter the use of ChatGPT. More authentic assignments will be given in class or use ChatGPT as a tool in class to complete tasks as one part of a class activity, followed by an analysis of two different assignments, one created by a "real" student and one completed by AI. Faculty must

use this tool creatively to find ways to incorporate it into their coursework. Lastly, faculty must be provided with ongoing training on ChatGPT and offered resources such as the advanced version of ChatGPT4.

Most faculty are familiar with Turnitin and use this resource consistently to detect plagiarism. University administration must have conversations about plagiarism software that cannot detect ChapGPT. For example, Turnitin is a common software that many faculty use to detect plagiarism; however, Turnitin cannot detect AI work from ChaptGPT. Universities could consider purchasing software such as GPTZero, one of many detection tools to help faculty identify plagiarized work. Well-known Plagiarism Detection Software includes:

- Turnitin
- Copyscape
- Grammarly
- iThenticate
- Viper
- SafeAssign
- PlagScan
- Unicheck
- DupliChecker
- Quetext

Methods of determining plagiarism should include references outlining today's motives and techniques of plagiarism. One example of a good reference is "Cheating

and Academic Dishonesty eBook: How to Spot It - and What to Do About It" by Hull (2022). He said that cheating in higher education is not anything new. But the rapid increase of digital technology, along with the pivot to online courses during the COVID-19 pandemic, has created new ways of cheating—and established a simpler means for the cheating student(s) (Hull, 2022).

Why does ChatGPT not police its tool outputs? Essentially, Open AI generates texts based on input from the user. One of the best deterrents for educators is knowing students and their work. One strategy to detect plagiarism is to understand the typical work of students and then compare suspect work. If a student's work changes drastically, with unusual vocabulary and writing structures that are different, then ChatGPT is a possibility. Faculty must come together to determine the best use of this tool and how plagiarism will be detected and dealt with, keeping ChatGPT in mind.

- Prevent Cheating from the Start (Cengage) by:
- Creating Different Versions of Assignments
- Varying values in calculations
- Using randomization of exam questions during quizzes, midterms, and finals
- Incorporating in-class graded activities

In summary, ChatGPT, developed by OpenAI, can generate coherent and polished text across a range of subjects. While this presents opportunities for its beneficial use in education, it also poses challenges concerning student plagiarism. The key points to be discerned are:

Potential for Plagiarism: Since ChatGPT does not retain past user interactions, the same query can generate unique content every time, making this an easy tool for students to plagiarize assignments, from software projects to term papers.

Detection Mechanisms: While services like Turnitin.com might catch instances of plagiarism after the first instance, it remains uncertain if all plagiarized content can be detected, primarily when generated by AI tools like ChatGPT.

ChatGPT in Education: Benefits of ChatGPT in education are extensive. It can 1) support online courses by offering instant responses, 2) replace or supplement traditional textbooks, 3) help in certification exam preparation by providing practice questions, and 4) assist in grading, though this could compromise the quality of feedback, to list a few.

Limitations of Plagiarism Detection Tools: Popular plagiarism detection tools, including Turnitin, might not be fully equipped to detect AI-generated content. New software such as GPTZero could be more effective in this regard.

Knowing Students' Work: One of the most effective ways for educators to spot plagiarism is to be familiar with their students' usual work quality and style. Any drastic deviation could indicate potential cheating using tools like ChatGPT.

Preventative Measures: Institutions can adopt measures like creating different versions of assignments, randomizing exam questions, and incorporating in-class graded activities to mitigate the chances of plagiarism.

In conclusion, while ChatGPT promises to revolutionize the educational landscape, educators and institutions must proactively mitigate its potential misuse. The

balance between leveraging its advantages and ensuring academic integrity remains a topic of ongoing debate and investigation.

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Is There a Place for Generative Artificial Intelligence in Special Education?

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This paper provides a brief overview of the evolution and applications of Artificial Intelligence (AI) in higher education, specifically focusing on its implications for special education. It delves into the historical context of AI, highlighting its significant milestones and early pioneers. The paper discusses various applications of AI in higher education, encompassing personalized learning, intelligent tutoring systems, virtual assistants, automated grading, predictive analytics, innovative content creation, administrative tasks automation, research, and data analysis.

Exploring AI's role in special education emphasizes personalized learning, early diagnosis, assistive technologies, natural language processing, adaptive assessments, social skills training, data analysis, emotional support, teacher professional development, and speech and language assistance. The authors also address ethical concerns, the importance of human interaction, and the need for accessible and inclusive AI tools in special education.

There are some detailed guidelines for faculty members to effectively integrate AI into special education, emphasizing understanding AI technologies, identifying students' needs, ensuring accessibility and ethical use of data, collaborating with AI tools, addressing biases, continuous professional development, evaluating effectiveness, communicating with stakeholders, and maintaining flexibility. The importance of thoughtful integration of AI technologies in all areas of education, emphasizing pedagogical sense over mere technical possibilities. Further, we encourage educators to engage in continuous learning, collaboration, and reflection to leverage AI's potential while ensuring an inclusive and supportive learning environment for all students.

Keywords: Artificial Intelligence (AI), AI in Special Education, AI in Higher Education, Teacher Professional Development

Introduction

Artificial Intelligence (AI) is a complex and rapidly evolving field, and its implications for education can be challenging to grasp fully. AI, short for "Artificial Intelligence," refers to the development of computer systems and machines that can perform tasks that typically require cognitive ability, according to the US Department of Education (May 2023). Whereas Shubjendu and Vijay (2018) concur, in recent years, "AI generally is thought to refer to "machines that respond to stimulation consistent with traditional responses from humans, given the human capacity for contemplation, judgment, and intention" (p. 28).

As cited in the 2023 Office of Educational Technology report on Artificial Intelligence and the Future of Teaching and Learning, a new generative AI chatbot became public in the past year. The recent launch of the Chat Generative Pre-Trained Transformer (ChatGPT) in November 2022 (Forbes, 2023) has amplified interest and concerns. Further identification of this technology was included in the 2023 Educause Horizon Report: Teaching and Learning, which identified several key technologies and practices anticipated to significantly impact the future of teaching and learning. One of the significant impacts identified Included the technology of AI, and Machine Learning (ML) was expected to play a significant role in transforming education. Many institutions of higher learning are grappling with how to harness AI for administration, teaching, and learning purposes while considering the positive and negative impacts and, of course, the needed policies. Likewise, academic programs and individual educators are also

interested in seeking out what AI is, what tools they can use, and how students are using AI.

With the recent introduction and availability of generative AI to the general population, AI is quickly becoming mainstream. Given these new and free tools, various industries, including higher education, are on heightened alert regarding the potential impacts. AI has multiple applications across various industries, including healthcare, finance, transportation, education, and entertainment. It can potentially revolutionize many aspects of society, but there are also ethical and societal concerns that emerge, such as privacy, bias, and job displacement. Specifically, Chat GPT has increased the range and variety of AI for all users in higher education, including administration, faculty, and students. AI in education is projected to grow, and AI applications in teaching and learning are projected to grow more significantly (Zawacki-Richter et al., 2019). This paper presents a brief overview of the history of AI, its range of use in higher education, and its specific applications in special education. AI has the potential to improve inclusive opportunities as well as equal access for all students.

Brief History of Artificial Intelligence

Historically, the development of modern AI as a scientific field began in the 1940s and 1950s. The term "cybernetics" emerged simultaneously, exploring the study of communication and control in living organisms and machines. Early pioneers of AI, such as Alan Turing, Claude Shannon, and John McCarthy, laid the groundwork for formalizing AI as a scientific discipline. The term "artificial intelligence" was coined at a

Dartmouth Conference in 1956, where researchers gathered to discuss the potential of creating "thinking machines." John McCarthy from Dartmouth College, Marvin Minsky of Harvard University, Nathaniel Rochester of IBM, and Bell Telephone's Claude Shannon prepared a research proposal in 1955 and 1956 conducted the workshop; this is generally considered the official birthdate of AI as a new field. However, the ideas and concepts that form the foundation of AI date back even further. AI has seen significant advancements due to the availability of massive computing power and vast amounts of data for training machine learning models.

Today, with big data maturing into a new stage (*Anyoha,* 2017) coupled with the capacity to collect vast sums of information too cumbersome for a person to process, the application of "AI in this regard has already been quite fruitful in several industries such as technology."

AI is a rapidly evolving field with numerous applications across various industries, such as natural language processing, computer vision, robotics, healthcare, finance, and more. Its history continues to unfold as researchers and engineers explore new frontiers and possibilities for artificial intelligence speech recognition.

Artificial Intelligence in Higher Education

The applications of AI in higher education institutions cut across the system and are varied. Table 1 identifies key areas of the varied uses of AI in higher education. These include areas already in use and others yet to be realized.

TABLE 1

Key Areas and Applications in Higher Education

Key Areas	Artificial Intelligence Applications *AI can:*
Personalized Learning	personalize learning experiences by analyzing student data, including their performance, learning style, and preferences. This allows for tailored content, adaptive feedback, and individualized study plans to enhance student engagement and achievement.
Intelligent Tutoring Systems	provide tutoring systems that can provide real-time feedback and guidance to students, helping them in areas where they struggle and adapting the learning pace to their needs. These systems can simulate one-on-one interactions with a human tutor, improving learning outcomes.
Virtual Assistants and Chatbots	deploy chatbots to provide 24/7 on-demand support to students, answering common questions, course information schedules, and campus services.
Automated Grading and Feedback	automate grading for faculty. Natural Language Processing (NLP) algorithms can also analyze written responses and provide constructive feedback on writing skills.
Predictive Analytics	analyze data from students' past performance and behavior and prepare identification of students at risk of dropping out or struggling academically - enabling timely interventions and personalized support to improve retention rates and student success.
Smart Content Creation	assist in creating educational content, such as generating automated lecture transcripts or developing personalized study materials. It can also help curate relevant resources from the vast online educational content.
Administrative Tasks Automation	automate administrative tasks like scheduling and data management. This allows university staff to focus more on strategic initiatives and student support.
Research and Data Analysis	help researchers in data analysis, pattern recognition, and hypothesis generation. It can analyze large datasets, identify trends, and provide insights to accelerate the research process across disciplines.

Artificial Intelligence in Special Education

Higher education institutions play a crucial role in shaping individuals' futures, especially for students preparing to work with those with special needs. As a preparation for discussing AI in special education, the authors have provided background in AI in the previous section. Special education in higher education encompasses preparing teachers to understand and implement programs and services to accommodate the diverse learning needs of students with learning differences or disabilities. In preparing students who will be future teachers, AI has the potential to profoundly impact higher education institutions, faculty members, and students alike. The foundation of special education services is about differentiating learning experiences for each student based on their individual needs so that students will have greater access to understanding and applying learning and improved access to their environment. By prioritizing inclusivity and accessibility, special education programs create environments that foster personal and academic growth for all students, regardless of their individual learning needs. Faculty members also benefit from the experiences gained through working in special education, further enriching their professional and personal lives. As for students, special education equips them with the tools to succeed academically, empowers them for the future, and ensures that they can make meaningful contributions to society. Embracing and supporting special education is a commitment to cultivating diverse, inclusive, and compassionate educational opportunities for all. Artificial Intelligence (AI) will potentially transform special education by providing innovative technology tools and approaches to support the learning and development of students with diverse needs.

Some key areas where AI is being utilized in special education are included below in Table 2.

TABLE 2

Key Areas and Applications in Special Education

Key Areas	Applications *AI can:*
Personalized Learning	assess the individual learning needs and preferences of students with special needs. AI can adapt and personalize learning materials and activities to suit students' unique requirements by analyzing their progress, strengths, and challenges.
Diagnosis	use algorithms can aid in the earlier identification of learning disabilities, developmental delays, and other challenges. AI can alert teachers and parents to potential issues by analyzing student data and behavior patterns, allowing for early intervention and support.
Assistive Technologies (AT)	potentially enhance AT for accessibility and inclusivity in the classroom. For example, speech-to-text and text-to-speech applications can assist students with reading and writing difficulties, while AI-based vision systems can aid visually impaired students. AI can improve the capabilities of assistive technologies, such as communication devices and mobility aids. Educators need to be familiar with the latest AI-driven assistive technologies and how to implement them to support students with disabilities effectively.
Natural Language Processing (NLP)	enhance NLP to process and understand human language, enabling the development of interactive learning tools, chatbots, and virtual assistants that can engage students in conversation, answer questions, and provide academic support.
Adaptive Assessments	create adaptive assessment tools that adjust the difficulty level and content based on a student's performance and capabilities. This ensures that students with special needs are evaluated fairly and accurately, allowing for a more comprehensive understanding of their progress.
Social Skills Training	enhance virtual environments to provide social skills training to students with autism spectrum disorders or other social communication challenges. These simulations offer a safe and controlled space to practice social interactions and develop essential social skills.

Data Analysis and Insights	process/analyze vast amounts of educational data, helping educators identify trends, patterns, and successful interventions for students with special needs. These insights can inform evidence-based teaching practices and program development.
Emotional Support	drive emotional support systems to monitor students' emotional states and intervene when necessary. This technology can identify signs of distress or frustration, offering appropriate resources and strategies to help students manage their emotions.
Teacher Professional Development	be utilized in professional development programs for teachers, providing personalized learning paths to enhance their knowledge and skills in effectively supporting students with special needs.
Speech and Language Assistance	use AI-powered speech recognition and natural language processing technologies can support students with speech and language impairments. Special educator preparation programs could include training on effectively integrating these tools in the classroom.

Assistive Technology is one area within special education services that has been used extensively in the field to support learners but has not often been considered "artificial intelligence," even though many facets of AT would meet the definition. The use of AT can support the understanding of basic knowledge and skills and use AI tools to design and implement customized interventions to cater to the specific needs of students with disabilities.

While AI supports promising practices in special education, it is essential to be mindful of privacy and the importance of maintaining human connection when supporting student learning. AI can increase opportunities for students to be included and expand students' experiences within the school, community, and peer interactions.

However, while AI offers numerous potential benefits, there are also ethical concerns around data privacy, bias, and fairness. Special educator preparation

programs should consider these concerns and ensure educators know the ethical implications of using AI tools.

Human Interaction: AI should complement, not replace, human interactions in special education. It's crucial for special educators to maintain meaningful connections with their students while integrating AI-based tools into their teaching practices.

Access and Equity: Not all schools and districts may have equal access to AI technologies and support for exploration or implementation. Special educator preparation programs should address the potential disparities in technology access and training to ensure all educators can benefit from AI advancements. As time progresses, AI's impact on special educator preparation programs will continue to evolve, and educators and institutions need to stay updated with the latest developments and best practices.

Faculty members will play a vital role in implementing AI in special education effectively. They must be aware of various aspects to successfully integrate AI technologies to benefit students with diverse learning needs.

Following are initial suggestions that faculty members must be mindful of when considering the use of AI in special education:

1. Explore AI applications to gain a basic understanding of AI technologies, including machine learning, natural language processing, and computer vision, and how these technologies can be applied in special education settings to support diverse learners.

2. Identifying students' needs to become skilled in identifying individual students' specific needs with disabilities or exceptionalities. This understanding is crucial for selecting appropriate AI tools and interventions tailored to each student's requirements.

3. Ensure their AI tools are accessible and inclusive, providing equal opportunities for all students to engage with the technology. This includes considerations for students with visual, hearing, or motor impairments.

4. Follow data privacy guidelines and ensure student information is protected and used responsibly. Ensure ethical use of student data in AI applications.

5. Collaborate with AI tools to augment teaching rather than replace them. They should actively collaborate with AI-powered platforms, using them to enhance their instructional methods and meet the diverse needs of students.

6. Address bias and fairness to be aware of potential biases that AI algorithms may exhibit and work to address them. Ensuring fairness and equity in AI applications is crucial in the context of special education.

7. Attend professional development to feel confident and competent in the use of AI. Continuous learning is essential to be committed to learning about the latest advancements in AI in special education.

8. Evaluate AI's effectiveness in special education. Regular assessment of AI tools' impact on student outcomes and engagement will help make data-driven decisions.

9. Consider parent and stakeholder communication to effectively communicate with parents, caregivers, and other stakeholders about using AI technologies in special education. Transparent communication fosters trust and support for AI integration.

10. Flexibility and adaptability are necessary when considering AI usage in special education. Technology evolves rapidly, and the willingness to learn and adapt to new AI tools and methodologies is essential for success.

11. Maintain a focus on good pedagogy as paramount in all considerations and final decisions.

By being well-informed and proactive in their approach to AI in special education, faculty must also focus on creating a supportive and inclusive learning environment that maximizes the potential of AI to benefit all students.

Summary

Embracing AI is an exciting opportunity for special education. It is essential to be mindful that it takes time to understand what AI is and how it applies to Special Education. There are various ways to use AI, so it is easy to get overwhelmed. Start small and learn one aspect of AI to include in your teaching. Then, you can integrate that aspect into your practice and reflect and revise. Take advantage of the professional development opportunities, webinars, and online resources available to learn about the foundation of AI. Give yourself time to explore these technology tools and platforms.

Collaborate with AI experts at your institution, center for teaching support, content area, or partner with colleagues from other institutions to learn more. Consider starting a "community of practice." This will allow you to share experiences with colleagues, exchange ideas, and learn from each other. Connecting with colleagues and online resources will allow you to stay current with these emerging practices.

It is crucial when we learn to integrate new technology into our practice. It is important to reflect, evaluate, and adjust. Include strategies to monitor the impact of using new AI applications. Collect feedback throughout the process to understand the impact on student learning, student engagement, and the quality of your teaching. This is a continuous learning process, and AI is rapidly evolving, so the advancements in the field will be changing. Experimenting and learning from our experiences can be stressful, but it can also be exciting. Take the time to reflect on where you were when you first started exploring AI and adjust as you learn more. In summary, the authors

strongly agree with a statement by Zawacki-Richter (2019): "We should not strive for what is technically possible but always ask ourselves what makes pedagogical sense" (p. 21).

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Ogletree v. Cleveland State University: The Reasonableness of Peeping on Tom

by

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Abstract:

Teachers and schools are intensely interested in protecting the academic integrity of online tests. Students are strongly interested in protecting their privacy from government video intrusion into their homes. For the first time, a U.S. District Court concluded that the Fourth Amendment applies and protects against virtual room scans by a university. This article analyzes the positions of the parties and the Court's extension of privacy rights to unreasonable room scans.

Key Words: Privacy, Justice Brandeis, Room Scans Before Online Tests, Education, Law

Introduction:

Justice Brandeis, in dissent in *Olmstead v. United States,* wrote,

Subtler and more far-reaching means of invading privacy have become available to the government. Discovery and invention have made it possible for the government, by means far more efficient than stretching upon the rack, to obtain disclosure in Court of what is whispered in the closet...

> Experience should teach us to be most on our guard to protect liberty when the Government's purposes are beneficent. Men born to freedom are naturally alert to repel evil-minded rulers' invasion of their rights. The greatest dangers to liberty lurk in the insidious encroachment by men of zeal, well-meaning but without understanding. (*Olmstead v. United States*,1928)

The Chronicle of Higher Education, August 24, 2022, ran an article by Taylor Swaak informing all public higher education institutions that they needed to review a

new case on remote proctoring of tests that scan a student's room (Swaak, 2022). The article suggested that schools using such scans need to review their testing procedures, considering the recent court decision. Minnesota's Office of Higher Education had its attorneys review the case and make recommendations to the schools. During the fall 2022 semester, the provost's office at Minnesota State University, Mankato, sent out an email to all faculty requesting that the faculty refrain from scanning student rooms during remote testing procedures in online classes. The faculty was notified by email that there had been a new court case that raised privacy concerns about the procedure. This aroused the curiosity of these writers and resulted in a search for the case and an understanding of the case's potential impact on online testing. This article will review privacy law and *Ogletree v. Cleveland State University* for insights into the best practices to use in online testing.

Privacy Overview

The word "privacy" is not found in the Constitution of the United States. Louis D. Brandeis (before becoming a U.S. Supreme Court Justice) and his law partner Samuel Warren published *The Right to Privacy* in the *Harvard Law Review* in 1890 (Brandeis & Warren, 1890). This was the first major legal publication to advocate for a right to privacy and define the right as a right "to be left alone" (Burrows, 2013). President Woodrow Wilson nominated Brandeis to the Court in 1916. While on the Court, he continued to develop and implement his ideas on privacy. In the dissent of *Gilbert v. Minnesota* (1920), Justice Brandeis concluded that the First Amendment protected this right. The majority in the case upheld the conviction of Joseph Gilbert for criticizing U.S.

participation in World War I because the majority said that while the First Amendment applies to the states, the states can prioritize their police powers to protect the state. Supreme Court cases of this time concluded that criticism of conscription during a time of war was not constitutionally protected. Justice Brandeis argued that Minnesota had outlawed beliefs and not just actions. If the law were allowed to stand, it would invade the private security of the family if a father could not advise his son not to join the army for reasons of conscience or religion (*Gilbert v. Minnesota*, 1920). One of his most famous cases was *Olmstead v. United States* (1928), which was the first wiretapping case. Chief Justice William Howard Taft wrote the court's opinion. The majority concluded telephone conversations were not protected as much as mailed letters. There was no entry into the house or search and seizure of their papers or effects. The wiretap was not on the defendant's property. It was placed on a publicly available telephone pole off the property (*Olmstead v. United States*, 1920). Brandeis, writing in dissent, concluded that it would not matter if a warrantless wiretap was placed on a phone inside a person's home or whether the wiretap was placed on a telephone line outside of the person's property. The people's privacy on both ends of the call would be invaded. Conversational privacy between them would be violated even if the subjects were lawful, proper, and confidential. He concluded that the drafters of the Constitution sought to protect Americans' thoughts and their property. They sought to confer the right to be left alone from government interference. Regardless of the means used, every unjustifiable intrusion by the government must be deemed a violation of the Fourth

Amendment. Any use of that evidence in a criminal proceeding against the person should violate the Fifth Amendment (*Olmstead v. United States*, 1928).

Brandeis retired from the Court in 1939. His ideas were used by later justices on the Court to find a marital right to privacy in *Griswold v. Connecticut* (1965) and *Katz v. United States* (1967), which established a two-step approach to decide if there is a protected right to privacy in a case. In the *Griswold* case, a married couple wanted to use contraceptives. The Court recognized a marital right to privacy that protected a couple's ability to use contraceptives without government interference. Justice William O. Douglas wrote the majority opinion and found the marital right to privacy in penumbra. He used multiple rights in the Bill of Rights to find the right to privacy in the spirit of the Constitution and to conclude that the right was fundamental (*Griswold v. Connecticut*, 1965). In 1972, the marital right to privacy was found to be an individual right to privacy. It was not tied to a marital setting. In that case, an unmarried person was found to have a privacy right to use contraceptives (*Eisenstadt v. Baird*, 1972). Once the right became an individual right, it was applied to many other activities besides contraceptives. In *Roe v. Wade* (1973), the right to privacy was extended to protect a woman's right to have an abortion. From there, the right to privacy was considered in cases as diverse as gay rights, the right to die, and drug testing.

The *Katz* case overturned *Olmstead* and provided a test to use to decide when there was a reasonable right to privacy that should be protected. The case concluded that a wiretap was a search for incriminating conversations and a seizure of those conversations, which was protected by the Fourth Amendment. Justice Potter Stewart

wrote for the majority that the Fourth Amendment protected people, not places. It no longer would matter if a wiretap were placed in a house or outside on a phone line running through an alley. Law enforcement officers needed to get a warrant for a wiretap to capture conversations (*Katz v. U.S.*,1967). To decide what a privacy right attaches to, Justice John M. Harlan II developed a two-part test. First, a court must determine whether the person thought their actions were private. Second, the Court must decide if that expectation of privacy in a particular circumstance is one that society is willing to recognize (*Katz v. U.S.,* 1967). In other words, whether the expectation of privacy is reasonable. For example, Charles Katz, the defendant in the case, made money by placing bets on baseball games for interstate gamblers through public phone booths. Interstate gambling was illegal, and the Federal Bureau of Investigation (FBI) became aware of his activities. They placed a wiretap on a public phone in a phone booth. Katz used public phone booths because he thought the conversations would be private. He closed the door, paid to make a call, and talked to the receiver in a normal voice. The Court concluded that the average person using the phone booth would also normally conclude such conversations to be private. Law enforcement would have to get a warrant to tap a phone booth. The trespass doctrine of *Olmstead* was overturned. This case has been used beyond wiretaps to help the Court analyze the right to privacy in cases like GPS and mass data collection.

Ogletree v. Cleveland State University

Facts

Online education has certainly been used since before the COVID-19 pandemic. For many years, teachers using the format have hoped for some way to test students securely. Educational companies have tried to devise techniques to fulfill this need. When the pandemic hit, every school rapidly attended online or hybrid classes. Classes were all offered at the students' homes. Proctoring tools Respondus™ (2013) and Honorlock™ (2014) developed tools to attempt to provide more secure students from accessing the Internet or other computer programs during the test. It uses the student's webcam and microphone and the company's software to detect possible cheating during the test. It records a student's movements during a test and will flag the exam if a student tries to leave the room or their eyes wander. Instructors would be able to review the footage if a student is flagged. Videos of the students' tests are stored for up to five years. Both monitoring systems encourage clearly posted guidelines to students and consistent application of their programs across an institution (Campbell, 2022). Room scans were often conducted before starting the test to look for additional computers or phones, other people in the room, and notes or other sources that could be accessed during the test. Respondus™ (2013) and Honorlock™ (2014) required a room scan as part of their prerecorded instructions.

Aaron Ogletree was a chemistry student at Cleveland State University. In the spring semester of 2021, he took his classes online, as most classes at the school were not offered on campus. He could not come on campus during the semester because of

an immune system condition that put him at particular risk for COVID-19. These health issues also made it impossible for him to pass the school's Daily COVID Health Assessment. He could not take classes or even just take tests on campus. He also had family members who were at high risk for COVID-19 (*Ogletree v. Cleveland State University,* 2022). At the beginning of the semester, a course syllabus stated that students were subject to a room scan before, during, and after an exam. The University did not have any written policy concerning room scans. In January, the student objected to the professor, and the scan policy was removed. The professor did not communicate this to the school's Testing Services. February 17, about two hours before the test, Testing Services emailed the class, reminding them of the exam and the requirement for a room scan. He emailed them back, saying he did not have enough time to remove sensitive documents from his workspace. He had confidential settlement documents in the form of 1099s scattered about the room, and his social security number was visible on some. There also were some medications in the room. He lived with his mother and two siblings. Because of the pandemic, they were all stuck at home. Students were required to take the test in an area where they would be alone and uninterrupted. His bedroom was the only location in the house that would work for testing. The student performed the I.D. next to their face requirement to be sure the faces matched and conducted the room scan when the proctor required it. Other students taking the remote test can see the room scans of other students. The scans lasted from twenty seconds to a minute for each scan. The proctor testified that she did not see any tax documents or

medications during the room scan (*Ogletree v. Cleveland State University*, 2022). The room scan and test were recorded and stored by the third-party vendor.

Was There a Fourth Amendment Search?

The Fourth Amendment protects "the right of the people to be secure in their persons, homes, papers, and effects against unreasonable searches and seizures" (Constitution, 1787). In the U.S. Supreme Court case *Katz v. U.S.* (1967), the Court concluded that the Fourth Amendment, barring certain exceptions, protects people and not places. It is unconstitutional to conduct a search and seizure without a warrant anywhere that a person has a reasonable expectation of privacy. A reasonable expectation of privacy test was developed from this case. First, did the defendant subjectively think what he or she was doing was private? Second, is that expectation of privacy objectively one society is willing to recognize (i.e., is the expectation reasonable; *Katz v. U.S.*,1967)?

The plaintiff, Ogletree, argued that the Fourth Amendment applies to room scans, and he has a subjective expectation of privacy in his home, especially his bedroom (*Ogletree v. Cleveland State University*, 2022). Even though, most of the time, no students object to room scans during testing, that does not mean that, subjectively, students do not believe they have a privacy right or that the practice does not violate privacy interests. It may simply mean that students fear retaliation if they test authority.

The defendant, the school, countered first, arguing that the searches were routine. Government officials in public places do not commit unlawful searches when they observe things in plain view. Second, the technology here, video recording, is

generally used by the public, so it cannot be a Fourth Amendment search. Technological changes affect the degree of privacy that society accepts as reasonable. Third, the room scans are not searched. They are limited in scope and only conducted for regulatory administrative purposes (*Ogletree v. Cleveland State University*, 2022). The scan was for the regulatory purpose of protecting exam integrity; the plaintiff was free to object, and the scan only revealed items in plain view. The plaintiff had two hours' warning that the scan would take place, and the plaintiff chose the room for testing.

The Court in *Ogletree* concluded that the Fourth Amendment applies to virtual room scans by a university. First, the room scans are not like a police surveillance plane flying in public airspace with an officer using binoculars to view plants growing in the middle of a cornfield, which was upheld by the U.S. Supreme Court. The rooms being scanned, in this case, are not in plain view. They are inside the walls and roofs of private homes. Also, room scans are not routine. They go inside homes where people otherwise could not go without consent or a warrant. Second, advances in technology make today's technology look like science fiction in the past. However, the Supreme Court has never held that public adoption of such new technology could *not* still be a Fourth Amendment search. The Katz case, which analyzed new wiretapping technology that could be placed outside a person's home to listen in on calls made from a telephone inside the house, concluded that Constitutional protections still apply, even if new technologies make accessible new places and information not otherwise obtainable without physical intrusion. Video scanners may be readily available, but the public

cannot use them to see inside a person's home. Any decision to change this analysis would have to come from the Supreme Court, especially since such a decision would pare back constitutional protections. Third, the Sixth Circuit Court of Appeals, which oversees the U.S. District Court in Ogletree, concluded that the Fourth Amendment's restrictions on unreasonable searches extend to the activities of civil as well as criminal authorities. The Fourth Amendment applies to searches conducted for noncriminal purposes in homes (*Ogletree v. Cleveland State University*, 2022).

Was the Search Reasonable?

The plaintiff may have a subjective expectation of privacy from scans of the inside of his home, but is that expectation one that society is willing to recognize? The Fourth Amendment only protects against unreasonable searches. Whether a particular search meets the reasonableness standard is judged by balancing the individual's privacy interests in his room against a government's compelling need to intervene. No rights, not even privacy, are absolute. There are times when it may be reasonable for the government to regulate. In criminal cases, reasonableness usually requires a warrant based on probable cause. In this case, the room scans are not based on suspicion of cheating by any student. Individual suspicion is not always required where the government has special needs, and a probable cause requirement would be impracticable. To determine if a special needs exception applies, courts consider (1) the nature of the privacy interest affected, (2) the character of the intrusion, (3) the nature and immediacy of the government concern, and (4) the efficacy of the means of addressing the concern (*Ogletree v. Cleveland State University*, 2022).

First, Mr. Ogletree is an adult. A home is at the core of Fourth Amendment protections. While not physical, the same protections apply to visual intrusions conducted with remote technology. While he enrolled in the university by choice, Fourth Amendment protections should not be limited by this choice. He still retains his constitutional rights. Second, the plaintiff may have had many choices in normal times, but these were pandemic times. There was no school that he could attend and go to school in class. All schools had to go to remote learning. The school's policies on room scans were unclear, nor was the professor's removal of the remote room scan from the syllabus. This left a reasonable impression that he would not have to do the room scan. When it became clear he may have to comply with the room scan; there was little time to find another room or clean the room he was in. Other students might have been able to see materials in his room, although that does not appear to have happened even with the proctor. Third, the university did have an interest in room scans. They would facilitate the proctoring of tests and ensure the fairness and integrity of those test results. Room scans deter cheating and help detect cheaters. However, the Court concluded that the room scans were unnecessary for test integrity. Other means of preventing cheating and ensuring academic integrity that were less intrusive on privacy rights were available (*Ogletree v. Cleveland State University*, 2022). Proctors and proctoring programs can monitor for suspicious movement and prevent students from accessing the internet or study aids during the test. The Court concluded that the efficacy of the means the university chose to advance its purpose of test integrity is important in determining reasonableness (*Katz v. U.S.*,1967). The Court was surprised

the university could not present more evidence regarding the effectiveness of room scans. The Court even suggested that pedagogical alternatives to testing, such as a final paper or project, would minimize or eliminate the need for room scans (*Ogletree v. Cleveland State University,* 2022). Thus, the Court was not convinced room scans were reasonable under the circumstances in this case.

Conclusions on the Significance of the Case

The case was appealed to the Sixth Circuit U.S. Court of Appeals on January 18, 2023. At the time this paper was written, no decision from the appeals court was issued. The trial court balanced the individual's interest in being free from unwarranted government video intrusion into the person's home against the government's interest in maintaining academic integrity during tests (*Ogletree v. Cleveland State University*, 2022). While the pandemic of COVID-19 is over, offering more online classes and the need for proctoring software to assist in delivering online tests has remained. The trial court's conclusion that the Fourth Amendment applies to room scans will likely be accepted by appellate courts. A short sixty-second room scan to check for other people in the room or open notes may not seem very intrusive. However, other cases have arisen where the video monitoring was so invasive that the monitoring would certainly shock the Court. For example, in Palm Beach, Florida, Tara Duncan is suing Pearson Education, alleging that Pearson forced her to bring her computer into a bathroom during the test. To use the facilities, she had to keep her video and audio on and her computer with her during her visit. The proctor told her she would fail the test if she did not follow this procedure (Colton, 2021). This case is unlikely to be litigated because it is

so extreme the school is more likely to settle with the student. As courts are aware of the potential for extreme abuse, the courts are likely to follow this Court's lead and conclude the right to privacy must extend to monitoring tests, especially in the home.

The *Katz* two-part test is unlikely to change. Students will certainly believe what they do in their homes is private. However, whether that expectation is always found to be reasonable could change. This case occurred during extreme COVID restrictions. Students now have choices on where to take tests. They are not limited to their homes. Students could go to a library, church, high school, or community center that may have a small reading room that they could use. They also might be able to test by making arrangements at other schools or test centers for a monitor. Students do not even have to take online classes now. Schools are open, and classes are offered on campus. Students can sign up for an in-class class with tests taken in the classroom. If a class is only offered online by the student's school, the school may approve the same class from another school in an in-class form. These unique facts are unlikely to exist in future cases.

The procedures for online tests by schools and professors will undoubtedly need to be corrected. Schools need to be very clear in their procedures regarding what proctoring services are used and what type of monitoring is used through proctoring services. This information must be accessible to current and prospective services. Professors usually are free to set their own policies on tests, but these must be very clear in the syllabus, and the syllabus must go out on the first day of class so students can make a conscious decision to continue with the class. A separate piece of paper

should be required where a student signs that they have read the syllabus and know the testing procedures. This extra requirement would make a student take notice of the policies in the class. Then, of course, the faculty members need to stick to their policies and not make waivers. Ogletree thought he got a waiver and only found out shortly before the test that he would still be held to the room scan. For an appellate court to analyze reasonableness, the rules need to be clear.

There are other questions not addressed by the trial court. Taking a video record of the student holding up something like a driver's license or passport photo next to their face to record who took the test could be challenging, especially as that video is stored by the testing service. Allowing other students to watch everyone's room scans does not seem necessary. Then, of course, there is the discussion regarding the effectiveness of the programs that monitor twitches and eye movements, among other things, to flag for review by the teacher for possible cheating is also often challenged.

How the appellate Court deals with this case will only affect the states in the Sixth Circuit: Kentucky, Michigan, Ohio, and Tennessee (Witley, 2023). Other circuits will have to decide their own cases. The Sixth Circuit's case will not bind their decisions. If the circuits are not in agreement on how to decide room scan cases, then the Supreme Court may need to take a case and decide for the entire country if the right to privacy applies and whether the proctoring actions in the case were reasonable. The case immediately influences how other students litigate their privacy concerns with online testing procedures (Witley, 2023). Some states, like Minnesota, try adjusting their

practices to avoid litigation preemptively. The state is trying to get schools and professors to create clear and consistent policies.

Private schools may have their room scans affected by the *Ogletree* case. The *Ogletree* case focused on a constitutional right to privacy. The *Katz* case only applies if there is government conduct. Public schools are government conduct and thus governed by *Katz*. Private schools do not exercise government conduct. However, this does not mean private schools do not have to worry about privacy. Initially, the common law only protected property rights. During the 1880s, legal scholars like Warren and Brandeis proposed that the law of torts, which traditionally covers civil cases where another injures one person, should also protect a person against an invasion of privacy. Their article inspired some state courts to expand the law of torts in their states to cover privacy invasions. Some states even created a right to privacy in their state statutes and constitutions (Pedrow & Cognato, 2022). In these states, there would be a question of whether private schools' proctoring procedures would violate state law. If so, these private schools may have to modify their procedures like the public schools.

The judge in *Ogletree* did not fashion a particular remedy. The court asked the parties to confer on an appropriate resolution (*Ogletree v. Cleveland State University*, 2022). What the parties ultimately decide may serve as a model for other schools. The judge, in dicta, suggested that professors should consider papers and projects to be used for grading purposes in online classes rather than traditional tests (*Ogletree v. Cleveland State University*, 2022). These authors, professors who teach large lecture hall classes with many students, are unsure how well that suggestion will be adopted.

Correcting essays takes considerably more time than a scanning tool that grades a multiple-choice test.

Justice Brandeis was a data privacy pioneer a hundred years before computers, cellphone towers, global positioning systems, and other modern ways for government to monitor and track individuals. He was very prophetic in imagining how new technology could be abused by the government. His foundational work has paved the way for people today to protect personal data and have a say in how that data is collected.

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Crisis Migration to Online Methods of Instruction Among Tertiary Institutions in Belize During the COVID-19 Pandemic: Higher Education Administrator's Lens

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Abstract

The entire Belizean education sector, from elementary to tertiary, was adversely affected by the March 2020 lockdown period caused by the COVID-19 pandemic. The pandemic challenged us individually and collectively in unparalleled and unprecedented ways. For the past two years, many Belizean higher education administrators have had the arduous task of navigating their institutions through the disruptive social and economic impacts of the pandemic. The strategies used by these administrators in addressing COVID-19 may provide important lessons in both leadership and shifting priorities in a crisis. This research examines (1) the crisis migration of higher education institutions' crisis response migration methods, (2) how these methods will shape the future of higher education in Belize, and (3) how the addressed crisis will impact the future of online learning and education. Using a mixed method approach, the researchers evaluated the responses of a convenience sampling of 11 tertiary institutions in Belize. The results suggested that the transition was difficult due to a lack of online training for the tertiary instructors and limited resources for both students and teachers; however, the move to a virtual environment has increased opportunities for some students.

Keywords: COVID-19; online learning; online teaching; higher education, COVID-19 pandemic, Belize tertiary education

In 2020, the Belize higher education sector was confronted by the unprecedented challenges and difficulties created by the global COVID-19 pandemic (Bozkurt & Sharma, 2020; Adedoyin &Soykan, 2020). Belize's first case of SARS-CoV-S (COVID-19) was diagnosed on March 23, 2020. To contain the spread of the COVID-19 virus, the Ministry of Education required the closure of all schools on March 20, 2020 (Chadwick et al., 2021) in a proactive response based on the spread in other countries.

Belize tertiary institutions already had challenging and limited digital learning options, and using technology in the academic context (Handel et al., 2020) during this crisis created unique obstacles for academic continuity (Thompson, 2021). Tertiary institutions were expected to cope with this emergency transition during the pandemic, along with all the accompanying uncertainties. Adding to the challenge was the lack of proper equipment, techno-pedagogy, internet access, and proper software within the institutions.

The COVID-19 pandemic made countries adapt to new situations in most sectors, and education was no exception (Octaberlina &Muslimin, 2020; Strielkowski, 2020). COVID-19 taught us that we do not necessarily predict the future of education or design strategies that can ensure outcomes in this volatile world. It has also demonstrated that with the collective capacity of the tertiary institutions, continued learning was possible for students. The education community in Belize responded collectively and instantaneously to the pandemic, ensuring some degree of teaching and learning occurred. Even in crisis mode with limited resources, the institutions labored to ensure students, particularly marginalized students (Fishbane & Tomer, 2020), were reached using various modalities. These modalities included print media, radio broadcasts, the use of various teaching platforms, and technological aids.

Emergency remote education was implemented as a short-term solution during COVID-19 isolation and social distancing requirements. However, this solution did not allow for adequate training of faculty, staff, and student orientation to distance learning. Evidently, educational institutions were not completely and adequately prepared to

include elements of e-learning or online courses in their program offerings. Prior to the pandemic, few institutions in Belize had online courses, and most of these were piloted only with a few selected courses.

This research reviews these higher education institutions' crisis response migration methods and how these will shape the future of higher education in Belize - more specifically, online learning and education.

Literature Review

COVID-19: A Global Pandemic

Belize. Belize has 13 tertiary institutions that include three universities (1 regional (University of West Indies), one national (University of Belize), one private (Galen University), and 10 junior colleges (a mixture of community and church-state institutions). All institutions are members of the Association of Tertiary Level Institutions in Belize (ATLIB), a voluntary professional organization that provides professional development, networking, and a common organization to address concerns. Based on ATLIB's 2021 report, there were a total of 4,980 students enrolled in these institutions, except the University of Belize, whose student numbers were not reported. This data is further disaggregated as follows: 4,237 full-time and 743 part-time students.

Higher education institutions (HEI) have incurred significant financial challenges and constraints brought on by the COVID-19 pandemic. These challenges and constraints are not restricted to government-funded institutions but also private HEIs that do not necessarily have access to government funding. Most institutions focused solely on delivering in-class learning and face-to-face instruction. Administrators

employed their best efforts to manage the pandemic without a structured framework for preparation, capacity, and support to navigate the education sector during this crisis phase of the pandemic. While operating in crisis mode and collaborating with the Ministry of Education (also a member of ATLIB), this approach allowed for identifying commonalities of impacts, potential solutions, and challenges and promoting mechanisms that led to enhanced collaborations amongst the institutions. Belize, like many other countries, viewed "e-learning, distance education and correspondence courses that were popularly considered as the part of non-formal education, but as of now, it seems that it would gradually replace the formal" (Mishra, 2020, p. 3).

Remote Instruction. Tallent-Runnels et al. (2006) added that the persistent increase in technological innovation and internet accessibility had increased motivation for online learning since the beginning of the millennium. Still, Joshi et al. (2020) concluded that the instructional achievement of online learning is debatable because it causes an absence of face-to-face relationships among learners and instructors. Hodges et al. (2020) differentiated adequately planned virtual learning experiences from courses presented online as a response to crisis. These researchers further referred to online education during this pandemic as "emergency remote teaching" because the latter contrasts with planned courses that provide both quality and effective online learning.

A temporary shift of instructional delivery to an alternate delivery mode due to crisis circumstances (Hodges et al., 2020) hit educational institutions throughout the pandemic (Iglesias-Pradas et al., 2021). The impact on courses depended on several

factors, from previous experience with remote instruction to training to ensure best practices. The transition in Belize had several challenges. Belize, like many countries during the pandemic, is faced with the task of meeting the educational needs of its student population, including the vulnerable student population in remote locations with limited to no internet access and scarce technological resources. Institutions worked to mitigate the effects of these challenges on their faculty, administrators, students, and institutions. In the immediate weeks of school closure, some institutions indicated that there were no immediate alternatives for the continuity of education because there was little time for planning and reflection.

Since March 2020, with our education sector's unplanned and rapid transition, many institutions have migrated to some form of hybrid, online, or distance learning. There was little preparation for this type of instruction and insufficient bandwidth and devices for both students and teachers. Many institutions did not have a standard learning management system and had to use online platforms that were not often considered educational. This can be difficult, but cases exist that show that social media can assist with virtual instruction (Sobaih et al., 2020). It can easily be surmised that there could be issues with user experience that were conducive to sustained growth.

Reflecting almost two years later, there are many recommendations for adjustments to address innovatively the gaps in education caused by the COVID-19 pandemic. Many institutions have exhausted their options to secure reliable internet and devices for their more vulnerable student population, which could have long-term

ramifications. Whether the urgency with which schools closed impacted ongoing learning for students is yet to be determined.

Higher Education and Challenges for Digital Learning. The immediate transition to online teaching and learning created problems for teachers, administrators, students, parents, and policymakers (Akour et al., 2020; Flaherty, 2020; Jena, 2020; Vlachopoulos, 2020). The teaching methodology was transformed into a crisis response modality (Gamage et al., 2020) and did not allow for any detailed plan to be crafted and implemented. Arguably, the success of online education is entirely dependent on technological devices and internet connectivity, and this dependency has created great challenges for the institutions. Ribeiro (2020) justifiably stated that this digital transformation of instructional delivery came with several logistical challenges and attitudinal modifications.

Many institutions have made very little advance warning for the transition to online learning and education (Tarkar, 2020). Moreover, there has been little support for faculty to develop a facilitative teaching style of online instruction (or on-campus instruction) (King, 2013). Much of the country's failure to adapt to online learning and distance learning was based on solid institutional guidelines and support for in-classroom teaching and learning.

The inequality in socioeconomic status also posed greater challenges. Students and faculty were reliant on the use of technology at their institutions and free internet access. The school closure impacted the students with no or low socioeconomic power, who could not afford internet access and were vulnerable to falling behind.

Crisis-response Migration Methods. Online learning is not novel. There is evidence that remote learning occurred as far back as the 1980s (Abad-Segura et al., 2020). The decades after have provided maturation time for online education, and online education has regularly been viewed from the perspective of a good-to-have alternative but not a serious-mission model to guarantee the steadiness of instructional activities (Ribeiro, 2020).

According to Adedoyin &Soykan (2020),

> The crisis-response migration methods employed by some universities can be classified into two parts, namely External-Assisted Migration and External-Integrated Migration. External-assisted migration in this article is referred to as a situation whereby universities make use of Web 2.0 platforms designed by external corporate bodies or organizations. In external-assisted migration, some of these institutions provided data of students and faculty members for easy migration and applications of Web 2.0 platforms, such as Microsoft 360, Moodles, etc. External-integrated migration, on the other hand, refers to a situation whereby universities integrate Web 2.0 platforms designed by external corporate bodies or organizations into their personal online learning platforms; such integrated applications are BigBlueButton, Google Classroom, etc. It is also important to note that both External-Assisted Migration and External-Integrated Migration offer the same features for instructional delivery and assessment through video conferencing, submission of assignments, forum discussion, assessment, etc. (p. 4)

The crisis-response migration process of students and faculty members can also be viewed from the level of their digital competency and availability of information on online learning (Aristovnik et al., 2020; Arkorful & Baidoo, 2015). Contemporary students and some faculty members are digital natives (Adedoyin &Soykan 2020), which will create greater comfort with online migration than those who are less comfortable. In addition, the student's motivation and ability to continue to create connections in an online environment have been shown to be beneficial (Wagner et al., 2008).

Aim and Research Questions

The context framing of this study is the distinct emergency of the COVID-19 pandemic that required ATLIB institutions' crisis migration from face-to-face learning and teaching to remote or distance learning and teaching. In this situation, teachers and students did not actively elect or prepare for migration to online/distant/remote learning or teaching. Consequently, this study explores the impact of the crisis migration, inclusive of the readiness of higher education institutions to transition to online or distant learning and teaching during the COVID-19 pandemic in Belize. Specifically, this study will explore the following research questions:

1. What were the modalities of online teaching adopted by higher education institutions in Belize during the COVID-19 pandemic?
2. What did administrators perceive regarding their roles and responsibilities as higher education administrators in the Belizean education sector during a global pandemic and add conceptual depth in a Belizean context?

3. How were the crisis-response migration methods utilized and adopted by higher education institutions in Belize in a circumstance that was often without necessary effective online education theories and models?
4. What is the need for a uniform online learning model that would be sustainable beyond emergency remote teaching delivery?
5. What are the challenges experienced by the higher education institutions in Belize in adapting to the online teaching-learning process during the COVID-19 pandemic?
6. How did the COVID-19 impact enrollment numbers?

Rationale and Significance of Study

Currently, few studies in Belize help identify the impact of COVID-19 and the Belizean higher education institutions' crisis response migration methods. This study can assist in presenting potential solutions that can promote mechanisms that can lead to enhanced collaboration amongst the ATLIB institutions and assist with the Ministry of Education's policy direction for higher education.

Research Methodology

This study utilized a quantitative-qualitative approach, specifically, a concurrent design (Creswell, 2013) where the researcher collected both the quantitative and qualitative data during the same time span to examine the crisis response migration methods of Belizean higher education institutions and how these methods will shape the future of higher education in Belize - more specifically online learning and education. This study is delimited to the member institutions of ATLIB.

The study drew on three data sources for this mixed-method study. The first was a pilot study with three Assistant Deans of three of the institutions from the sample size (n = 3). The second was an online survey with a 100 percent response rate of the remaining 11 member institutions. The online survey consisted of 21 questions (8 open-ended questions and 13 closed-ended questions). Finally, to further triangulate the data collected via the survey instrument, face-to-face interviews were conducted with the deans of four institutions (n = 4) with geographic representation of the member institutions across the country of Belize. These interviews were scheduled in advance by contacting the Deans of these four institutions to determine their willingness to participate and their availability. The semi-structured interviews were recorded using Zoom recording and later transcribed, and thematic areas from the responses were utilized to bolster the information gathered from the survey instruments. The notable quotations and substance from the interviews were captured.

Population and Sample

This study focused on higher education institutions in Belize. For pragmatic purposes, this study addressed 11 of the 13 member institutions of ATLIB. These institutions were selected because they provided predominantly traditional face-to-face, in-class learning and teaching. For the academic year 2020-2021, these institutions reported a combined total of 537 faculty members: 260 full-time and 277 part-time faculty members, at varying ranks and a combined total of 8,493 students: 6,127 full-time and 2,366 part-time students. This study was initiated in 2021 to understand more

comprehensively how Belizean tertiary institutions migrated to online and/or hybrid learning during the pandemic.

The survey questions were adapted from the IAU Global Survey Report (Marinoni, Land Y Jensen, 2020). The survey was amended based on the pilot study, and it was administered online to all 11 institutions through their Deans. Only one reply per institution was accepted. In the case of multiple responses from the same institution, only one reply was utilized in the analysis. The selection criteria for responses included completeness of answers (complete surveys vs. incomplete surveys), the position of the respondent within the institution (rank based on the highest authority within the institution), and the submission or completion date of the survey. The survey was distributed and attached to an email to the institutions based on the most current mailing list of ATLIB members.

This was followed by a semi-structured interview conducted with four institutions' Deans. There was equal participation for both male and female higher education administrators in the interviews. As it relates to the interviewed administrators, a total of 4 Deans participated in the interviews, 2 males and 2 females from institutions geographically dispersed across the country and representative of the geographic distribution of the institutions across the entire country.

Data Collection Methods and Procedures

A sequential mixed methodology was utilized with two distinct research stages to respond to the research questions and achieve the stated objectives. The research commenced with an online survey questionnaire for deans of the 11 membership

institutions. The results of the survey questionnaire informed the next stage of the research process. The survey questionnaire was then bolstered with a semi-structured, online, one-on-one interview with four deans from selected institutions. The interviews were conducted using Zoom technology. The purpose of the interviews was to capture qualitative data on three research questions (i.e., questions two, three, and four). All interviews were one-on-one, and the interviews were about an hour in duration. All interviews were recorded and transcribed with the interviewees' written and verbal consent. All interviews were conducted in the English language.

Research Instrument

The questionnaire consisted of four sections. Section I requested demographic information for each institution. Section II featured 6 questions on the general assessment of COVID-19's impact on the institution. Section III posed 4 questions to identify the available challenges experienced by institutions and capture what motivated institutions to continue to deliver instruction to students—section IV aimed to collect information to assess how teaching and learning took place during the pandemic. The questionnaire was in the English language.

The semi-structured interview had a total of 6 questions, where two of the questions had follow-up questions (two parts). The research team checked the interview questions and recommended key revisions, which were accepted.

Data Analysis

The survey questionnaire analysis, frequencies, and percentages were utilized to analyze the responses. The questionnaire was analyzed using SPSS version 25. The

qualitative data were analyzed manually through qualitative content analysis. Transcripts directly from the Zoom recordings were transcribed.

Results

What were the modalities of online teaching adopted by higher education institutions in Belize during the COVID-19 pandemic?

The COVID-19 pandemic required a sudden move to an online environment. The first research question looked at the adoption of modalities for online instruction. The results showed that 72.7 percent of institutions (n=8) indicated that online synchronous instruction was the most common. Other versions of online learning were less common, including written communication (forums, chat, etc.), chat sessions with asynchronous video recordings, and sending presentations to students, all occurring 9.1% of the time.

The learning management system for online instruction is important, and factors such as knowledge of the product, cost, and accessibility are important. When asked to select up to three online platforms/software programs utilized for remote /distance teaching and communicating with students during the pandemic, Google Classroom was the most used at 72%. Other highly used platforms included Zoom and Moodle, both at 55%, and WhatsApp Messenger at 36%.

What did administrators perceive regarding their roles and responsibilities as higher education administrators in the Belizean education sector during a global pandemic and add conceptual depth in a Belizean context?

The researchers measured several responses designed to elicit reflection on the part of administrators regarding their roles and responsibilities to education in Belize

during COVID-19. Regarding the impact of COVID-19 on the administrator's institution, eight said that the school was partially open with major disruptions, two indicated that they were open as usual with containment measures in place, and one said the institution was closed entirely. Seven institutions indicated that they received some government support to continue providing student services.

1. Have members of your senior management/faculty/administration been consulted by public or government officials/Ministry of Education in the context of public policies relating to COVID-19? The results of this question were that 45% had been consulted by public or government officials, meaning 55% had not. The schools that indicated that members of their senior management/faculty/administration had been consulted by public or government officials/Ministry of Education in the context of public policies relating to COVID-19 summarized these discussions as follows:
    - Guidelines for safety and reopening of schools.
    - Information (Presentation done) sharing about COVID-19, its transmission, and prevention (including vaccine information).
    - The situation is fluid. As issues developed, MOE officials were in dialogue with ATLIB administrators on matters of delivery.
    - The Tertiary Level Rep has been effective in communicating with us.
    - There were several visits from members of the Ministry of Education representatives to ensure that our institution was

observing the COVID-19 protocols. This was necessary to be granted approval to allow students to access campus.

How were the crisis-response migration methods utilized and adopted by higher education institutions in Belize in a circumstance that was often without necessary effective online education theories and models?

To respond to this research question, analysis was conducted on several of the survey questions, namely questions that addressed the following:

1. Were you able to carry out exams as planned during the COVID-19 pandemic closure?
2. Were strategies discussed and implemented to address the above exam issues?

81.8 percent of institutions did not have online courses before the COVID-19 pandemic. In fact, of the 18.2 percent that indicated that they had online courses before the COVID-19 pandemic, five of the institutions that indicated that they did not have online courses before COVID-19 still indicated that they had <= to 14 percent of their courses online. The two institutions that had reported that they had online courses prior to the pandemic stated that they had <=14 percent of their courses already offered online.

Based on the qualitative responses from the selected institutions, in the initial phase during the immediate lockdown period, the methods adopted were focused primarily on ensuring learning continuity. Respondents elaborated on these responses as follows:

Institution 1: "The most effective self-adaptive techniques were email and any other technological platforms that existed that we manipulated at the time. These were all cost-effective because we already had a set budget for this academic year."

Institution 2: We had to change our assessment strategy to tailor it within the time so that classes could be completed within the scheduled time. So that is one of them – the assessments had to be altered… The assessments, content delivery, and modalities that teachers had to use to reach our students."

Institution 3: "...I think about the difficulty of transitioning online. That was a challenge, not for all teachers, but for a few of them. We had collaboration with those that were tech-savvy and those who were not. For some teachers, moving online was nothing new, but for others, it was."

Institution 4: "If I remember clearly, the first one was moving from being an institution that has mostly face-to-face classes to going strictly online. There were only a few classes that were prepared – these were our hybrid classes…We used Google and Canvas.

What is the need for a uniform online learning model that would be sustainable beyond emergency remote teaching delivery?

Institutions were asked to describe/outline their plan to deliver online/hybrid after the COVID-19 pandemic. The thematic quotes are listed below.

Institution I: "To outline our plan to deliver hybrid classes, we brought in a schedule whereby we created shifts. We did Tuesday, Wednesday, and Thursday, with practicum on Friday. Our secondary students come on Tuesday and Thursday. Certain

students come in on certain days, and when they are not in person, they work online at home. We have about 150 students here on a daily basis. We have had to keep online and open our classrooms."

Institution 2: "We split classes into chunks. We did two periods per semester. Students had the option of taking four courses (or 5) each period. We had alarming success with this. Students did extremely well...Although we are getting back to face-to-face, the lessons we learned during our online portion have been applied to our evening courses for working students. Our evening division (mostly business program) still uses our period 1 & 2 style of classes. These students take fewer courses at a time. What we have learned from COVID has been applied to our evening programs. We are trying to ensure our mobile platform and website are properly polished. We began with an online registration, which is still a work in progress."

Institution 3: "I don't think we will ever go back to solely in person. Prior to this whole pandemic, many teachers already had an online aspect. For these teachers, it became easy…We are doing hybrid, and that is our plan now…Even if we come back online, all classes after 4 pm will remain online."

Institution 4: "The plan right now is to have most courses face-to-face and that we will have certain programs go online. Why this change? Online and hybrid are here to stay. Some students do not want to go back to face-to-face. Almost more than 60% of our students want to remain online. We are not chartered to remain online. I know that there was a portion of our students that did not want anything to do with online. Some students have said they will return to finish their degree now that we are going back."

What are the challenges experienced by the higher education institutions in Belize in adapting to the online teaching-learning process during the COVID-19 pandemic?

The institutions experienced numerous challenges: Exams were a major challenge during the COVID-19 closure. According to the responses, the qualitative data revealed several disruptions experienced by institutions as a result of the pandemic. These responses included:

1. Engagement of faculty - e.g., training and retreats did not prove effective when conducted online.
2. Engagement of the students.
3. Difficulty in transitioning student services online, particularly student activities that required face-to-face, had to be placed on hold.
4. The unfamiliarity of the online platform was a major disruption.
5. The flow of teaching and learning was disrupted.
6. There were disruptions in the communication with teachers.
7. One of the major disruptions was the transition from face-to-face to online education.
8. The major disruption was that the schools closed – this disrupted the time that teachers needed to deliver instruction.
9. Finance was also a major concern – many students did not have internet at home.

10. Teachers were concerned that students were copying answers or whether they were learning. Were students learning?

Nineteen percent reported online examinations increased the probability of cheating among students, which was deemed unfair. 21 percent indicated that there was reduced student interaction, and 15 percent declared anxiety about the quality and consistency of internet service or quality of equipment as a challenge. Other challenges included 15 percent reporting that there was a need for more time and effort to design lessons and fair assessment tools, while 11 percent were challenged with the need for more time and effort to design lessons. Additionally, 11 percent stated that the lack of technological competency and training to use e-learning platforms posed challenges. Finally, 9 percent perceived ineffective communication as a challenge.

How did COVID-19 impact enrollment numbers for the academic year 2021/2022?

Fifty percent of the institutions interviewed did not experience a decrease in enrollment. As such, one institution reported, "Moving online helped our programs become more accessible. We had a cohort in Toledo [the southernmost district in Belize] that would not have been possible if things were not moved online. In January, we had 16 students enrolled, and now we have 54 students from Toledo. Our enrollment did not decrease." Another institution experienced fluctuation in student enrollment, where one semester, there was an increase. In another, there was a decrease, indicating, "Factors that led to increase was that we standardized our online program. We ensured that all of us were using Google Classroom. All classes used the same structure so that students could easily view all of their courses."

Those institutions that experienced a decrease often attributed it in ways similar to one respondent: "We had a severe decrease in enrollment. Finances were the major factor. If students did not have the finances, they could not buy internet. If they did not have a laptop before, they needed one now. These were major concerns."

Another institution indicated, "It was a drastic drop from about 250 students. We are slowly improving from this, but it still is not where we want it to be. Mostly, the economic factor played a part. Many people's jobs are related to tourism. Students had to either help their families supplement food or continue school. Many students wanted to continue in the program, but they decided based on how they needed to spend their time. Some families only had one computer among 3-4 siblings. It frustrated many students that they didn't have access to equipment. It was financially very hard for students to continue school and help their families."

Recommendations

The impact of COVID-19 may be evident in education long into the future. There are concerns with learning gaps and educational opportunities, which makes this a unique time for the Belize Ministry of Education, policymakers, higher education administrators, and tertiary education stakeholders who can evaluate, re-engineer, and reform our educational system and, by extension, our tertiary education sector. As collaborators and partners, these stakeholders will need to make calculated decisions for revival and sustainability.

Adaptation of best practices in developing hybrid or online modalities for teaching and learning.

The COVID-19 experience has given us the opportunity to engage in the development of our faculty's techno-pedagogical skills, techniques, and competencies to enable delivery utilizing various modalities. Additionally, we can now transition to remote learning, inclusive of hybrid and online learning and teaching modalities, in an effort to avoid abdication of individual institutions' responsibility to provide education for its students in a safe and healthy environment.

Implementation of online teaching-learning in HEIs. There is now an opportunity for the Government of Belize to emphasize the importance of integrating technology (ICT - Information Communication Technology) and online education in tertiary education's teaching and learning processes (Misra et al., 2020). The individual institutions have demonstrated that they have invested in online learning and teaching. Technology in teaching and learning can now be integrated into the educational methodology to offer blended learning or hybrid education.

Promote collaborative communities and partnerships across all disciplines and institutions to work on instructional design, delivery, and assessments. Partnerships and collaborations are essential for the way forward. These collaborations and partnerships include innovative ideas and solutions to revolutionize education practices in times of and post-global crisis. Institutions can consider embarking on a phased approach to develop content, utilizing sequential and incremental designing of online learning content. This can be done in collaboration with other institutions with similar objectives and content areas. Institutions can consider how to rethink and reframe courses and course activities for the online and distance learning environment.

The exposure to this modality warranted instant transition but not necessarily the transformation of pedagogical practices and content delivery.

Enhance Responsive Governance and Leadership. Policymakers, higher education administrators, teacher educators, and educators can lead the development of innovative techniques to steer higher education institutions during a period of global uncertainty.

Measurement of learning losses can be reviewed. The study did not reveal that any of the tertiary institutions were able to quantify the learning losses due to the pandemic. The implementation of monitoring mechanisms can assist in determining the effectiveness and effects of online education and blended learning.

Conduct a study on the mental health of students as well as anxiety and depression. Conducting a study on the mental health of students, as well as the anxiety and depression they experienced during the COVID-19 pandemic, can be instructive for the integration of mental health policies in our higher education system. According to Iyer, Azis&Ojcius (2020), students experienced anxiety when adjusting to the new methods of educational instruction and were fearful for their health and safety (p.5). Loneliness and isolation were reported as the main experiences of students and faculty.

Conclusion

The entire pandemic experience has taught us that we cannot necessarily predict the future of education or design strategies that we believe can ensure outcomes in this volatile world. If this were so, our Belizean tertiary institutions would have to behave

with certainty and continue following a predictable pathway definitively. The pandemic spurred by the novel coronavirus has become a chrysalis for pedagogical practices, content delivery and development, examinations, and test-taking. Our shared sense of purpose can be greater than our differences, and it is common objectives that lead to innovative solutions.

Administrators and educators play a vital role in setting the educational trajectory post-COVID-19. The crisis-response migration methods adopted by Belizean institutions are limited to delivery modality without in-depth consideration of effective online education theories and models (Adedoyin &Soykan, 2020, p.9). The collective capacity of administrators and educators can influence transformational changes through collaboration with the Government (Ministry of Education) to work collectively to avert future global and domestic challenges. The time has not yet come for an all-encompassing, holistic digital transformation of education in Belize. Still, there exists great potential for tertiary institutions to play a critical role in developing robust curricula and uniform online learning models that would be sustainable beyond national and global crises.

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Preservice/Inservice Teachers and Controversial Content: Teaching Tough Topics

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Abstract

In the current "anti-woke" era, discussions of diversity, equity, and inclusion (DEI) in education have become increasingly politicized, creating challenges for teachers at all levels of academe as they try to balance their instructional content with new state-mandated laws without risking their jobs. Pre- and in-service teachers are particularly vulnerable as they have been threatened with immediate termination, fines, or even jail time. Yet, it remains critical that teachers at all levels (particularly the middle and secondary) can discuss their state-approved content with students while working within the newly adopted, state-mandated course curriculum changes.

This project aimed to define several activities and strategies that can help teachers discuss tough topics while staying within the boundaries of each state's legal mandates.

Key Descriptors: Teacher preparation; Political polarization; DEI training; Teaching Tough Topics

In 2020, Florida universities were directed by the state's Board of Governors to prioritize diversity and inclusion plans. Universities throughout the state aligned their strategic pillars to include diversity and inclusion as a metric that measures equity for all students (DeSantis, 2023). Traditionally, underrepresented students were welcomed into the university community through clubs, student organizations, and university programs that were aligned to promote cross-cultural understanding and celebrate student body diversity.

However, in 2021, proposals were made in the Florida legislature that sought to abolish those same plans by prohibiting universities from mandating courses on

"racism, sexism, female studies, gender studies, African American History, and other concepts," but would require schools to survey students, faculty, and staff about their political beliefs to ensure "intellectual diversity" was allowed. Opponents of this legislation argued that politicians were attempting to suppress conversations about systemic racism and inequality (Anders, 2021), while proponents argued that this legislation was necessary to protect free speech and prevent indoctrination of students (Education Matters, 2021).

Legislative Policy Shifts in Florida

The state of Florida recently passed a continuous series of legislative bills aimed at K-12 education that sparked significant controversy and debate. One such bill (FL House, 2022), also known as the "Stop Woke Act," was adopted in 2022 as the Individual Freedoms Act (IFA). This bill places strict limitations on the topics that an employer can discuss during diversity training in the workplace, with the aim of preventing what some lawmakers view as the teaching of divisive or controversial topics related to race and ethnicity. The bill has been criticized (NBC Miami, 2022) as an attempt to stifle important conversations about systemic racism and other forms of oppression.

Another legislative bill (FL Senate, 2022), known as the Curriculum Transparency Bill, passed in the Florida legislature and requires school districts to be transparent in selecting instructional, reading, and library materials. The legislation seeks to preserve parents' rights to decide what materials their children are exposed to in school. Media

specialists are responsible for ranking, eliminating, or selecting instructional materials, with selections open to the public and parents of district students.

A third bill (FL House, 2022) has been dubbed the "Don't Say Gay" bill. This bill puts the power back in the hands of parents by prohibiting classroom instruction about sexual orientation or gender identity in K-3 classrooms. After 3rd grade, conversations about these topics need to be "age-appropriate," which is an arbitrary designation. Critics of the bill argue that it is discriminatory and harmful to LGBTQ+ students, while supporters argue that it is necessary to protect the values and beliefs of families (Putnam, 2022).

Legislative Policies and The Impact on K-12 Education

These legislative bills related to K-12 education in Florida have raised significant concerns and generated heated debate among educators, parents, and lawmakers. While some argue that they protect individual freedoms and promote transparency in education (FLDOE, 2022), others contend that they are discriminatory, limit important discussions about social justice issues, and violate academic freedom (Feingold, 2023). While the long-term impact of these bills on K-12 education in Florida remains to be seen, their immediate effects have terrorized educators with the threat of immediate termination, fines, or incarceration, and the ramifications of this legislation will likely continue to be the subject of debate and scrutiny in the years to come (Griffith, 2023).

Florida's Laws: Protect Individual Freedoms and Transparency in Education

Preservice and in-service teachers in Florida classrooms during this polarizing and divisive political climate have been forced to navigate these challenges, all the

while preparing their students for success in a highly competitive and academically demanding future. Preservice teacher educators who are teaching subject matter content deemed controversial or socially challenging are under particular scrutiny. While some may be able to traverse these challenges successfully, others may be discouraged from engaging in these important discussions, potentially limiting their students' exposure to important ideas and perspectives.

During a series of personal conversations with preservice teachers and educational personnel, the authors asked them to reflect on their current instructional predicament. When asked their opinions about how the new legislation affects them, preservice teachers, in-service teachers, and k-12 media specialists have legitimate questions:

- *What is going on? How am I going to teach relevant information to my students with the threat of going to jail if I say the wrong thing?* (Jonah, preservice teacher, personal communication, April 8, 2023).
- *Our school still makes us feel like we are in control. However, I have colleagues who teach US history and are planning how to teach about the Reconstruction and post-Civil War history. They are afraid to say the wrong thing and upset the parents.* (Andrea, 7th grade history teacher, personal communication, February 23, 2023).
- *I always feel like I am tiptoeing around what is okay in terms of what the state allows me to say. I am always scared that a student might take what I say wrong, and I will have an angry parent at my door. Of course, I keep my opinions out of the classroom, but it is so difficult when you have to teach about*

Civil Rights history. (Kelsey, 8th grade history teacher, personal communication, March 7, 2023).

- *We were called into a meeting, and the AP (Assistant Principal) looked at her notes…*' Well, folks, we have been told to have all our books vetted before we can display them in the classroom. Any questions…check with Tom.' *I looked up and saw 100s of eyes looking at me. What the heck? I had no idea what to do!* (Tom, Media Specialist, personal communication, January 24, 2023).

Legislative Policies and Their Impact on Higher Education

In higher education, these recent policies have significantly impacted diversity, equity, and inclusion (DEI) programs and initiatives. Politicians called for the elimination of these programs (which had previously been mandatory in 2020). In January 2023, an order was issued prohibiting Florida higher education institutions from using any state funding to support DEI or critical race theory, which were deemed "discriminatory initiatives" (Diaz, 2023, p.1) Students were granted the right to report a teacher to the administration (in higher education, as well as elementary and secondary school) if the topics discussed in class offended them, unwittingly or unintentionally, and could be grounds for immediate termination for the educator.

These policies have created a fearful and challenging environment for higher education officials who work on DEI committees, with some educators reporting that their emails were searched and others stating that their institutions canceled all scheduled DEI programs (Griffith, 2023). The elimination of DEI programs and initiatives in higher education could negatively affect campus diversity and inclusivity and limit

opportunities for students to learn about important social justice and equity topics. This policy is also in direct opposition to the initiatives for DEI practices as stated in the university's strategic plan, the Florida state social studies standards, and the statewide Consent Decree (passed in 1992), which mandates that all public school teachers in the state of Florida have ESOL (English for Speakers of Other Languages) endorsement to be capable of teaching content to English learners in the mainstream classroom. These policies also raise concerns about academic freedom and free speech in higher education. Many educators argue that these policies could stifle academic inquiry and limit the ability of professors and scholars to explore controversial topics and express their views without fear of retribution (Griffith, 2023). This stance could have a chilling effect on the intellectual climate in higher education and limit the ability of institutions to attract and retain diverse and talented faculty and students.

The Injunction

On November 17, 2022, Judge Mark E. Waller of the US District Court for the Northern District of Florida issued an injunction prohibiting public and private universities from enforcing the Individual Freedom Act (IFA), which espoused limited academic freedom and silenced discussions on certain topics. The decision is considered a major victory for the academic freedom of professors when speaking in their university classrooms, and it acknowledges the right to receive speech as well as the right to free speech. This decision implies that students and faculty members have the right to engage in discussions and debates on controversial issues without fear of censorship or punishment. The ruling also emphasizes the importance of

academic freedom and its critical role in promoting intellectual inquiry, academic excellence, and the advancement of knowledge.

Most importantly, the injunction provides significant legal protection for academic freedom and the right to intellectual expression in the university classroom. It also sets an important precedent for future cases involving free speech and academic freedom in higher educational institutions. Meanwhile, teacher educators, who are also university professors, must navigate the tenuous academic system gingerly as they are responsible for preparing K-12 teachers to teach in a divisive political climate. Consequently, educators need to utilize new approaches and strategies so that content instruction can still occur during this fragile period. These new instructional approaches should be considered as building blocks for preservice teachers as they prepare to teach controversial topics within their own classrooms.

Redesign Approaches to Instruction

Instructional design must include instruction that prepares preservice teachers to handle tough topics in the classroom. To achieve this goal while operating within the legal boundaries, teachers need to have a well-defined alignment with research that supports their instruction, a deep understanding of state standards, and a vast knowledge of instructional strategies that can facilitate academic success and comprehension of information. Building on this paradigm, the authors identified four major elements that help create a classroom environment that can appropriately deal with and address tough topics, including knowing our students and their home communities, communicating goals and objectives clearly, being thoughtful when

selecting topics, and guiding discussion using appropriate instructional tools. The ultimate goal is to create safe, inclusive, and non-threatening classrooms where learning can take place. One critical aspect of knowing students is to develop a culture of trust and respect within the classroom. Teachers need to understand students' perspectives and what they care about, which can be achieved through preliminary surveys, interviews, and thoughtful discussions.

Additionally, it is crucial to know where the community stands on sensitive issues such as LGBTQ+ (lesbian, gay, bisexual, transgender, questioning/queer plus) communities and their rights, as members face societal challenges ranging from invisibility in the classroom to abusive language, negativity of self, and physical attacks (Heinze, 2021). It is the role of teacher educators to train preservice teachers to create a safe, non-threatening classroom for learning to take place. Inclusive classrooms that provide a safe learning environment that shuns verbal and physical harassment are essential. Where many classrooms were designated safe places with symbols like the gay pride flag and Gay-Straight Alliance meetings, these symbols are no longer permitted. Still, educators are responsible for safety and must provide non-threatening classrooms for all students, regardless of the law.

Instructional approaches must be redesigned and revised when considering teacher training. It is crucial that participants in the field of education be able to survive the controversial bans while providing students with rigorous research-based instruction, effective implementation of state standards, and application of instructional strategies that will facilitate academic success and comprehension of knowledge.

Using Clear Communication

When introducing potentially controversial topics within classroom discussion, teachers need to be thoughtful and shrewd when selecting topics and guide the discussion with appropriate instructional tools using the recommended recipe for success: research-driven instruction, effective implementation of state standards, and applicable learning strategies that allow students to reflect on their learning and formulate personal positions using tools such as writing logs and related literacy strategies.

Another key element of successful instruction is communicating goals and objectives clearly. Again, we stress the importance of strategically selecting topics to be addressed and clearly stating the lessons' objectives. The objectives should be written on the board daily so students and visitors can see how state-approved standards and objectives are addressed in the lesson and taught to students.

Encouraging Critical Thinking in the Classroom

The goal of instruction within the classroom should not be to convince students to adopt a particular stance or belief (which could be construed as indoctrination) but rather to encourage students to think critically about important issues and topics and arrive at their own conclusions based on their own critical analysis and evaluation of ideas. Teachers need to be transparent about their rationale for teaching a particular issue, explain how they intend to approach the topic and be certain that it is age-appropriate, standards-driven, and supported by engaging learning strategies. In addition, parents and administrators MUST be made aware of classroom discussions

and feel welcomed into the learning environment before beginning this type of instruction. According to the Florida Department of Education, the Florida State Standards should shelter the content because it is what educators are obligated to teach.

Selection of Appropriate Topics

We cannot stress enough how important it is that teachers select their instructional topics judiciously. As stated, the key to neutralizing potentially risky discussions is to include practices that are proven effective, such as research-driven instruction and effective implementation of state standards; with skillful strategies and thoughtful assignments that foster critical thinking, students engage in learning and formulate their personal positions and conclusions as a result of their individual constructivist self-discovery.

Research-driven Instruction

Critical literacy is a popular research theory that has met with a great deal of success when effectively introduced during classroom instruction (Hagood, 2002). Critical literacy involves the questioning and examining of ideas and requires students to synthesize, analyze, interpret, evaluate, and respond to the texts they read or listen to (Cox et al., 2017). With critical literacy, students are more apt to learn when the information has relevance to their lives, especially as they bring their prior cultural knowledge and multilingual practices to the equation. Relevance will help learners to better understand the curriculum across the content areas as they read common texts critically. Students can make sense of sociopolitical systems by bringing their own

cultural knowledge (Gonzalez et al., 2006) to the discussion, in addition to their multilingual practices (Lau, 2015). Their worldviews and their unique understanding can be brought into current social issues (e.g., inequities of race, class, gender, and inclusion) and other sensitive topics that need to be introduced and tackled.

Selection of Appropriate State Standards

Preservice teachers need to be cautious when applying state standards to lessons and recognize that some state standards, although mandated by the state, may conflict with some of the newer state laws. For example, a social studies teacher may be asked to teach a lesson on the 15th Amendment and the Reconstruction Era. Students would be asked to recount the progression of civil rights accomplishments and challenges that led to the right of African-American men to vote and, later, to run for political office. One of the lesson's objectives might be determining whether the 15th Amendment was universally adopted throughout the United States. Students might be asked to evaluate the impact of Jim Crow laws on the lives of African Americans and other racial/ethnic minorities (Florida State Standards SS.912. A.2.4; Florida State Standards SS.912. A.2.5) to recognize the impact of the threats, violence, and unethical practices, like poll taxes and literacy tests, that these Americans were forced to endure. Although these benchmarks are annually evaluated on the United States History End-of-Course Assessment, the topics might now be considered illegal to study, according to the new Florida laws that reject an Advanced Placement course on African American studies.

Other major Supreme Court decisions can be discussed that include sensitive topics such as integration, busing, affirmative action, the rights of the accused, and reproductive freedom (SS.912. A.7.8). Assignments can include steps to analyze, assess, and weigh the merits of the results of significant Supreme Court decisions (e.g., SS.912. C.3.10). Students and teachers can plan for instruction where participants may consider alternative choices by selecting from appropriate learning strategies, fortified with images, utilizing guiding questions that consider many perspectives. Useful learning tools include student reflection journals or logs and extended interactive projects that cultivate effective literacy strategies (Daniels & Zemelman, 2014).

Effective Learning Strategies

Daniels and Zemelman (2014) claim that students learn best when their learning has importance and relevance in their lives, when they read everyday texts, and when they can critically make sense of the sociopolitical systems by focusing on social issues. They stress the importance of selecting literacy strategies that support and guide students' reading comprehension and critical thinking so that learners can use text to shape their understanding of complex structures and challenging content issues**.** For example, when using images and visualization as literacy strategies, it highlights and enhances the written text, which is an excellent tactic to heighten further learner engagement on a wide variety of content-area topics. Visual images can provoke emotion and sensory stimulation, which dovetails with the idea of mental images that are conjured in the brain as the reader's prior knowledge and background experiences connect with the text as it is being read. These facets help the reader to form a more

personal overview of the topic, as guiding questions that examine multiple perspectives are presented. Thoughtful extension activities can include student reflection logs, with prompts encouraging critical analysis and reflective contemplation. Teachers can create intensive collaborative projects according to student interest, which extends the learning environment, fosters critical thinking, and leads to eventual academic improvement. Powerful mental images increase comprehension and meaning for students (Daniels & Zemelman, 2014; Gambrell & Koskinen, 2002).

Examining Multiple Perspectives in a Text

Effective readers recognize the importance of examining multiple perspectives found within the text. Specifically, critical readers need to understand that different characters within the text will interpret events through different and unique perspectives. Examining the components of texts is a strategy that can be assisted through the application of frontloading a comprehension activity with images from the book *Lillian's Right to Vote* (2015). Teachers would direct students' attention to the story's multiple perspectives and complete the chart (see Table 1).

Table 1.

Examining Multiple Perspectives of a Story

Examine Multiple Perspectives	Image/Text	Guiding Questions	Reflections

Teachers will point out to students that effective readers must consider that characters may interpret events in different ways, emphasizing the role of point of view

in shaping one's understanding of a story. Additionally, students are encouraged to acknowledge that there is no single version of a story, and gaps and contradictions may arise in telling a narrative. Such critical thinking skills are valuable for effective reading and comprehension and help students develop a more nuanced understanding of complex issues (Comber, 2001).

Next, students would be asked to draw a picture (image) or provide evidence within the text that highlights one of the perspectives expressed by a character within the book. Graphic organizers and pictures depict the discourse structure by representing the interrelationship among ideas and patterns of the text. Encouraging students to use images found in text allows students to find reading passages more engaging and enhances comprehension (Jiang, 2012).

Students would then be asked to respond to guiding questions, which encourages students to think more deeply about the text. When teachers ask well-designed guiding questions during instruction, it can significantly enhance student learning outcomes. Additionally, well-designed questions guide student thinking, help them connect what they already know to new information, and develop a deeper understanding of the material. Moreover, by using guided questions, students are encouraged to become more active participants in their own learning, as they are required to think critically and come to conclusions about the information being presented to them (Nieto, 2018). Guided questions can help to scaffold student learning and enable them to tackle more complex material by breaking it down into manageable parts (Fisher & Frey, 2014). Guided questions include helping students to connect their

prior knowledge to new information, developing a deeper understanding of the material, encouraging active participation in learning, and scaffolding student learning to tackle complex material.

Guiding Questions

Examples of guiding questions in the story *Lillian's Right to Vote* (2015) might include lower-level questions like recall and increasingly more complex levels by asking intellectual questions that require higher-level critical thinking, as found in Bloom's Taxonomy (Krathwohl, 2002).

Who is the main character in this story? What is Lillian trying to accomplish?

Why has Lillian decided to vote in this election?

Why does she have to make such a stressful journey? Why can't she vote somewhere closer to her house?

How are voting precincts decided on, and by whom?

Write an alternative ending to this story. What would you have done to help Lillian?

Reflection Logs

To further explain the benefits of reflection logs, research supports their use to encourage students to reflect on their reading (Roberts & Westville, 2008). Careful crafting of prompts guides students to reason and contemplate new information thoughtfully and deliberately. This method of guiding the format of reading logs provides clear guidelines, useful feedback, and opportunities for revision. The use of reflection logs in education has effectively promoted metacognitive skills, critical thinking, and self-regulated learning (Tofade et al., 2013). Reflection logs provide a space for

students to think about their learning, assess their progress, and make plans for future learning. They also allow teachers to gain insight into their students' thinking processes and adjust their instruction accordingly, offering a more accurate formative assessment.

Additionally, reflection logs have been found to be particularly effective in promoting deep learning when used in conjunction with other active learning strategies, such as problem-based learning and collaborative learning. Essentially, research supports using reflection logs as an effective instructional tool for promoting metacognition, critical thinking, and self-regulated learning in students. Reflection logs for the book *Lillian's Right to Vote* (2015) could be based on Boud et al. 's (2013) reflective log plan based on the reader's reflections where the participant thinks critically about what happened in the text, determines what it means to the reader, and decides if the experience was valuable. Educators can modify the chart to include the desired perspectives and objectives to be studied (see Table 2).

Book Title: *Lillian's Right to Vote* (2015)	
Describe: What happened?	Lillian's trip to the polling location is difficult. She is over 100 years old!
Interpret: What does it mean?	Her main concern is that she won't be able to reach her destination.
Evaluate: How valuable was the learning experience?	The main character is determined to vote in the upcoming election. I wonder if she would have voted for Barack Obama.
Plan: How will you apply what you learned?	I need to study more about voting rights and learn how it works today.

Another reflective activity is the S-I-T strategy, a reading reflection technique created by Kylene Beers and Robert E. Probst in their book "Notice and Note: Strategies for Close Reading" (2012), which prompts students to engage with a text

critically. S-I-T stands for "surprised," "interested," and "troubled," and encourages students to reflect on what they find unexpected, captivating, and challenging in their reading. By doing so, students can develop a deeper understanding of the text and engage in critical thinking. The strategy can be used in various academic settings, such as language arts, social studies, and science classes, effectively promoting thoughtful and engaged reading.

The S-I-T strategy aims to promote critical thinking and reflection in the classroom. Students can deepen their understanding of the material by engaging with a text emotionally and considering different perspectives. The S-I-T strategy asks three questions to guide reflection: (1) What Surprised Me? (2) What Interested Me? and (3) What Troubled Me? The first question encourages students to identify unexpected information or ideas in the reading, helping them to think beyond their initial assumptions and biases. The second question helps them to connect with the reading on a deeper level, finding meaning in what they have read. The third question encourages them to confront difficult ideas and develop a more nuanced understanding of the reading. Students may find reflecting on their critical thinking useful by responding to the questions on a 3x5 card (see Table 3).

Overall, the S-I-T strategy is an extremely effective tool for promoting critical thinking and reflection in students. By encouraging them to identify what they find surprising, interesting, and troubling in a text, students can begin to develop questions and ideas for further exploration. This strategy helps them engage with the material more deeply and consider different perspectives on the text. As such, the S-I-T strategy

can be a valuable addition to any classroom, promoting thoughtful and engaging reading practices.

Table 3.

S-I-T Strategy Card

S-I-T Card: After reading this (article, short story, novel, book, or watching a video), I found the outcome (shocking, outrageous, or counterintuitive) because…..	
Surprising	
Interesting	
Troubling	

Classroom Libraries

Classroom libraries have been identified as an essential component of any K-12 classroom. However, teachers and educators in certain states are baffled about what is allowable reading material in classroom libraries. In the article "There's Confusion Over Book Bans in Florida Schools. Here's Why" by Education Week (Pendahkar, 2023), the writer discusses the recent controversy surrounding book banning in Florida schools. The article examines the legislative action taken to ban certain materials and topics from being taught in schools. This has led to concerns about censorship and restrictions on academic freedom.

To address this issue, the article suggests that educators should be aware of any potential restrictions or guidelines related to book banning in their district or school. Educators can consult with their school's library or administration to understand any relevant policies or regulations (Pendahkar, 2023). Additionally, educators can consider

working with organizations or groups that advocate for free speech and academic freedom to support the inclusion of diverse materials in their classroom libraries.

Preservice and in-service teachers need to be encouraged to create a comprehensive classroom library that can provide students with great access to a wide variety of reading materials, including books, magazines, and other materials that cater to students' varied interests and reading levels. This diversity of reading materials has been found to motivate students to read more often and with greater comprehension precisely because they appeal to a wide variety of specific interests (Krashen, 2004). Moreover, classroom libraries provide opportunities for students to engage in independent reading and self-directed learning, which can enhance their overall academic performance (Allington, 2002). Students who are allowed to select their reading materials from a classroom library tend to be more engaged in reading and have better comprehension skills (Krashen, 2004).

Finally, classroom libraries have been shown to provide significant benefits to K-12 students, such as improved reading motivation, greater engagement, and higher academic performance. Teachers should ensure their classroom libraries are complete, organized, and culturally relevant. They should also offer a wide assortment of reading materials that cater to students' interests and reading levels. With an abundant library, teachers can create extended projects and show material demonstrating the historical precedents for all citizens. Without giving a personal opinion on either side of a controversy, teachers can promote an intellectually exciting classroom when students make their own conclusions after weighing all the facts.

In conclusion, as with all assignments, be sure to leave room for reflection. Graphic organizers can help students classify information, gather their thoughts, emotions, and ideas, reflect, and debrief. Writing is a wonderful tool for individual reflection, with guided prompts to organize their thoughts and conclusions. Additionally, as a wrap-up strategy, exit surveys or tickets are excellent tools to ascertain what students have learned, as well as gather information for teachers to plan further study, determine what questions students are left with, and reveal what potential future activities can be carried out that will expand knowledge and extend comprehension.

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The Use of Artificial Interactive Environments to Increase Academic Motivation in Social Studies Content

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Abstract

The purpose of this study was to review literature related to Artificial Interactive Environments (AIEs) and whether integrating them into social studies classrooms will increase students' motivation to learn. The reviewed studies covered several educational technology topics, including gamification, virtual reality, augmented reality, simulations, and more. After reviewing several studies, the following influences of AIEs were discovered: (1) AIEs have already shown increased motivation in other fields. (2) AIEs have increased the desire to learn about culture. (3) Students report a positive experience using AIEs. (4) Using AIEs has a positive educational outcome. (5) AIEs are being underused in the fields where they would be most effective, such as special needs classrooms.

Artificial interactive environments have been shown to have a primarily positive impact on education. While none of the studies reviewed directly answered whether student motivation can be increased in social studies classrooms, the information gathered suggests that success in other fields can be easily replicated in social studies curricula.

Keywords: Artificial intelligence, Environments, Interactive, Virtual Reality, Augmented Reality, Extended Reality

Introduction

A frequent problem often mentioned by teachers is they need help motivating their students. According to the study "Variables affecting student motivation based on academic publications," "the most important factors affecting student motivation are the fields of teacher, teachers' classroom management skills and their teaching methods" (Yilmaz et al., 2017). This is true for every core subject in grade school, but history has

a unique challenge. While students can more easily see why math, literature, and science are needed for their future, they don't understand how history would apply to their adult lives. This leads to students being highly unmotivated to learn about history.

For clarity, as we begin, *Artificial Intelligence* is a noun that means computer systems or algorithms that have the capability to imitate intelligent human behavior. While *interactive* is an adjective meaning mutually or reciprocally active involving the actions or input of a user. This is especially true when relating to a two-way communication system such as a cell phone, computer, etc. *Environments* include circumstances, conditions, or objects by which one is surrounded. Cambridge Dictionary, Etymonline, Oxford, and *Merriam-Webster concur with the meanings of the terms.*

One proposed solution to the lack of motivation to learn history is reintroducing artificial interactive environments (AIEs) into the classroom. AIEs can include many things, from virtual reality to simulations or video games. AIEs are already being used in many advanced degree fields such as medical, engineering, aviation, military combat, and more. The literature in this study will show increased engagement, motivation, and educational outcomes for students who use AIEs.

Statement of Problem:

The purpose of this study is to investigate the effect of artificial interactive environments (AIEs) on the motivation to learn about history for grade school students in social studies classrooms through a review of studies and literature. This study aims to review literature focused on AIEs and how the benefits they give other fields of

education might be transferred into grade school history classrooms. Hopefully, the study will show how AIEs affect the motivation to learn history and how they affect the educational outcome of students' work.

The acronym AIEs, or Artificial Interactive Environments, can be defined as a software program that interacts with the user and simulates an artificial environment. This can include, but is not limited to, augmented realities, an enhanced version of reality created by the use of technology to overlay digital information on an image of something being viewed through a device, such as a smartphone camera (*Merriam-Webster.com)*, virtual realities, an artificial environment which is experienced through sensory stimuli, such as sights and sounds, provided by a computer and in which one's actions partially determine what happens in the environment (*Merriam-Webster.com)*, simulators, a device that enables the operator to reproduce or represent under test conditions phenomena likely to occur in actual performance (*Merriam-Webster.com)*, video games, an electronic game in which players control images on a video screen (*Merriam-Webster.com)*, and more.

Literature Review:

Summarizing the findings of several studies on Artificial Interactive Environments, we will explore the effects on AIEs, AIE history, how AIEs have affected other fields, and whether AIEs can impact learning motivation. Augmented realities (AR) have shown increased interest in learning about history. In a study called "Investigating the effect of augmented reality technology on traditional culture experience motivation

by using a novel Tosenkyo application," researchers looked to see what effect augmented realities had on the motivation of Japanese citizens to learn about traditional Japanese culture (Mizoduchi, 2022). Researchers measured the average motivation of Chinese people to learn about traditional Chinese culture. It found that Chinese people are usually more interested in their traditional culture than Japanese people. An augmented reality game called Tosenkyo was used to teach Japanese about traditional Japanese culture. Researchers found that Japanese interest in traditional culture surpassed Chinese interest after the Japanese experienced the AR game (Mizobuchi et al. 2022). The researchers found an increased motivation to learn about culture, a division of social studies, when participants are exposed to interactive media in the form of AR.

The literature review "Ten years of augmented reality in education: A meta-analysis of (quasi-) experimental studies to Investigate the impact." (Chang et al. 2022). Researchers reviewed scholarly literature to see how augmented reality has affected education. Researchers examined 134 studies from 2012 to 2021. Researchers set out to document the effects on educational outcomes such as response, knowledge, and skill. Researchers found a more significant mean result in their data when augmented reality is used in all three categories. Additionally, researchers discovered that augmented reality "used to support the learning of languages or social studies is likely associated with higher positive learner responses such as learning motivation" (Chang et al., 2022). This confirms how interactive media can increase academic motivation for social studies.

AIEs have also proven helpful in meeting other educational needs, such as students with disabilities. In "Using video modeling, explicit instruction, and augmented reality to teach mathematics to students with disabilities," researchers explored the impact of video modeling and augmented reality on students with disabilities. Researchers used baseline mathematics evaluations to study 8th-grade students with learning disabilities. It found students with disabilities who were taught using augmented realities "demonstrated high levels of maintenance" and "were able to apply the skills to word problems" (Morris et al., 2022). This demonstrated how integrating augmented realities into special education classrooms can benefit students with mental disabilities.

The benefits of AIEs are not just experienced on traditional desktop PCs but are also easily used in gaming consoles, VR headsets, or even cell phones. In "Android-based interactive media to raise student learning outcomes in social science" (Sujarwo et al., 2022), researchers sought to determine how using interactive media on Android devices affected learning outcomes. Researchers took 60 samples from 70 students. "The results showed android-based interactive media positively affected student learning outcomes" (Sujarwo et al., 2022). It also showed increased interest in the studied material.

From mobile apps to games, AIEs can affect education in different ways. In "Modern Technologies and Gamification in Historical Education," researchers explored whether or not gamification affects professional competencies in historical education. Researchers enrolled 40 students in a three-month online course that used learning

management systems, social media, and augmented and virtual realities. The study found educational progress was made thanks to gamification, "which caused a feeling of excitement and qualitatively influenced the desire to achieve the best educational results." (Moseikina et al.,2022). Researchers added, "Gamified learning allowed educators to keep students' interest in the subject of study" (Moseikina et al.,2022), demonstrating how interactive technologies like games can excite students about learning history.

Another example of gamification in education comes from the study "Effectiveness of the use of animation and gamification of online distance learning during a pandemic" (Inangil, D., Dincer, B., & Kabuk, A.,2022). Researchers explored whether animation and gamification have an impact on knowledge and gamification. Researchers followed 70 nursing students during a diabetes nursing course. They accessed the nurses using the "Diabetes Nursing Knowledge Test" and "Instructional Materials Motivation Survey" (Inangil et al.2022). This study found that knowledge and motivation to learn about diabetes increased after animation and gamification were used in a distance learning course. It showed that knowledge and motivation to gain understanding increased through AIEs.

The use of AIEs has already proven to be effective in other fields. Such as the use of interactive media to train dental students, as in the study "The use of independent, interactive media for education in dental morphology" (Maggio et al.,2012). Researchers tracked two groups of students. One group of students learned

about dental morphology using traditional methods such as books and lectures. The second group learned about dental morphology using an independent interactive program. The two groups were given a written examination and a survey at the end of the class. Researchers found the results were effectively the same. Furthermore, the independent interactive students did much better on the didactic exam and felt more engaged in the class (Maggio et al.,2012). This further demonstrates how interactive media can be more engaging than traditional education methods.

In Uymaz, P., & Uymaz, A. O. (2022) study, "Assessing acceptance of augmented reality in nursing education," researchers looked at how nursing students adapted to using augmented reality as an alternative to traditional learning during the COVID-19 pandemic. Researchers followed 419 nursing students. The nursing students thought AR was helpful and were excited about the application of AR in their future education. Researchers found that "the nursing students have a high intention of using augmented reality technology to self-learn. It was also found that the most emphasized motive behind this intention is the expectation that using augmented reality technology will increase their academic performance" (Uymaz et al. 2022).

AIEs are not just useful for students but also for the educators who teach using them. In the study "Online 3D gamification for teaching a human resource development course," researchers sought to determine if 3D gamification increased motivation and educational outcomes. Researchers used an online 3D gamification problem-based learning model to improve student motivation and learning. Researchers used "an

explorative study using ANCOVA and partial least squares structural equation modeling to test student learning achievement." The work of Chung, C., & Lin, Y. Y. (2022) found the "online 3D gamification PBL model enhanced learning achievement on the courses." They also found that "gamified learning can effectively enhance learners' learning motivation**."** (Chung et al.) They showed how different interactive media can influence results and motivation.

While AIEs like augmented realities (ARs) have proven useful, research has shown ARs are not being used to their full potential. In "Augmented Reality Applications for K-12 Education: A System Review from the Usability and User Experience Perspective," researchers analyzed 49 papers related to Augmented Reality Educational Applications (AREAs). Some of the more notable findings conclude the following: 1. AR designers rely too much on questionnaires, possibly hampering the advance of ARs into education. 2. The learners' age has little effect on the usability of the AR. 3. ARs are being underused in the field of special education (Law et al., 2021). These conclusions suggest ARs are not being used to their full potential.

Another study examined the benefits of extended reality (XR), a combination of virtual and augmented reality, for students learning mathematics. Lai, J. W., & Cheong, K. H. (2022) 's study. "Adoption of virtual and augmented reality for mathematics education: A scoping review" surveyed existing research in the field of extended reality for learning engineering mathematics in higher education. They aimed to "provide an adaptable framework on XR implementation for educators, and potential academic

advances for researchers." Researchers concluded that XR most closely benefits education subjects where visualization is significant. They saw substantial advantages where "spatial arrangement is important, or there are dynamic changes." (LAI & Cheong, 2022.) While this may not always be relevant in mathematics, one could see how this would be beneficial for history/social studies. For example, creating a 3D map in XR could significantly enhance understanding of historical events like battles. Lack of motivation could be the reason for a lack of understanding, which is why XR is a potential benefit for historical education.

Videogames are another form of artificial interactive environments. "Teaching history with the video game Assassin's Creed: effective teaching practices and reported learning" is an exploratory study on the effects of Assassin's Creed in a history class setting. There were 96% of participants in the survey who said they enjoyed the game. Researchers polled participants about which aspect of history they gained the most knowledge. They were given a choice between events, characters, places, monuments, and culture. Most students chose events three times more than the following category and more than all other categories combined. Meaning AIEs may be best for focusing on events. (Karsenti, T. and Parent, S., 2020) Overall, researchers proved that the videogame was a motivational form of media for teaching in the classroom.

Conclusion:

The purpose of this study was to review literature related to Artificial Interactive Environments (AIEs) and their impact on educational outcomes to determine AIEs'

effect on motivation in social studies classrooms. While there are few studies on this specific subject, related studies show potential for AIE integration into the social studies/history curriculum. The literature review illuminates the possibilities the following positive influences can have in growing historical and educational motivation in students: (1) AIEs have already shown an increase in motivation in other fields. (2) AIEs have increased the desire to learn about culture. (3) Students report a positive experience using AIEs. (4) Using AIEs has a positive educational outcome.

Artificial interactive environments have been shown to increase motivation to learn about culture. In the study "Investigating the effect of augmented reality technology on traditional culture experience motivation by using a novel Tosenkyo application," researchers found that Japanese interest in traditional culture increased dramatically after using an augmented reality game (Mizobuchi et al., 2022). This is important because culture is a core aspect of the social studies curriculum. This reinforces the idea that AIEs can increase motivation to learn history.

Students report a positive experience when using artificial interactive environments to learn. Students were found to be more excited and desired to achieve more through education after taking a gamification course. (Moseikina et al.) This demonstrates how interactive technologies like games can excite students about learning history.

Further research must be done to determine the full potential of artificial interactive environments. We know they are popular, motivational, and can increase

educational outcomes. The question is how educators can integrate technology into social studies curricula to increase motivation to learn history.

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The Adventures in Online Education

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Abstract

Online education experienced significant growth during the COVID-19 pandemic, with undergraduate and graduate enrollments increasing by 90% and 79%, respectively. As stakeholders continue seeking high-quality education for the 21st-century workforce, the demand for online education will persist. This demand has led to increased investments in information technology, with a $65 billion Bipartisan Infrastructure Law passed to ensure reliable internet access. As eLearning evolves, it enables learning from anywhere and provides personalized, flexible education. This paper examines the development of eLearning in the United States and globally, exploring enrollment trends, personal experiences, advantages of online education, global demand, quality assurance, and future prospects.

Keywords: eLearning, online education, online learning, remote education, remote learning, COVID-19 pandemic, quality assurance, Quality Matters

Introduction

Online education has existed since the 1960s and has faced scrutiny regarding the quality of education and faculty credentials. However, advancements in accreditation, institutional and program reputation, and quality assurance through peer reviews like Quality Matters have improved stakeholder perceptions. Institutions are utilizing learning management system (LMS) platforms such as Blackboard and Canvas, as well as textbook LMS platforms like MindTap by Cengage and Connect by McGraw Hill, to enhance learning outcomes. These redesigning efforts of faculty and

institutions have enabled online education to flourish as a flexible form of personalized and high-quality education. This paper provides an overview of the development of eLearning in the United States and worldwide, covering enrollment trends, personal experiences, advantages of online education, global demand, quality assurance, and concluding remarks.

COVID-19 Pandemic Enrollment

The COVID-19 pandemic accelerated the adoption of online education, not only for teaching students but also for retraining employees. The demand for online education is driven by the need for job-ready employees and a digital learning experience. Studies indicate that students retain more material when learning online compared to traditional classroom settings. While research on online knowledge retention is limited in higher education, similar results have been observed in employee retraining programs. Involvement with online education goes beyond providing the necessary technological infrastructure, such as a laptop, electricity, and internet connectivity. Digital learning, which incorporates the use of technology, offers several advantages and can contribute to a more personalized learning experience. One of the benefits of digital learning is the ability to deliver content in smaller, more digestible chunks. This approach allows students to learn at their own pace and engage with the material in a way that suits their individual learning style. Research from The Research Institute of America suggests that students retain 25%-60% more material when learning online, compared to 8%-10% in a traditional classroom setting (Christians, 2022; Gutierrez, n.d.; Li & Lalani, 2020; Pezold, 2017; Stevenson, 2020; Zhou, 2023).

The personalized nature of digital learning can be attributed to various factors. Online platforms often offer interactive and multimedia-rich content, which can enhance student engagement. Additionally, online learning allows for adaptive learning technologies and personalized assessments that can cater to the specific needs of each learner. By leveraging data and analytics, educators can gain insights into student performance and tailor their instruction accordingly. The trend of personalized and digital learning is expected to continue in the future. As employers seek job-ready employees, digital learning can equip students with the skills and competencies required in the modern workforce. Moreover, the flexibility and accessibility of online education make it a popular choice among students who value the convenience and opportunities for self-paced learning. It is worth noting that while eLearning offers numerous advantages, a well-designed instructional approach and effective pedagogy are crucial for maximizing its benefits. Educators and institutions play a significant role in creating an engaging and interactive online learning experience that promotes deep understanding and knowledge retention.

Emerging research indicates that online learning can lead to faster knowledge acquisition and retention, both in the context of higher education and employee retraining programs. The study conducted by Brandon Hall Group, which focused on employee learning habits, found that employees tend to learn 40%-60% faster when engaged in online learning compared to traditional classroom-based learning (Pezold, 2017). The ability to deliver information in smaller, more manageable chunks and the flexibility for learners to revisit or skip content based on their individual needs contribute

to this accelerated learning experience. Online learning platforms often provide learners with the ability to replay or reread topics if needed, allowing for reinforcement and a deeper understanding of the material. Learners can also progress at their own pace, enabling them to accelerate through sections they are already familiar with. This personalized approach to learning allows individuals to focus on the areas where they need more support, maximizing their learning potential within the course or training program. While the specific research on knowledge retention in online higher education is still relatively limited, these findings from employee retraining programs align with the notion that online learning can lead to improved knowledge acquisition and retention. By leveraging the advantages of online platforms, such as flexibility, interactivity, and personalized learning experiences, learners are provided with opportunities to engage more deeply with the content, leading to enhanced retention of knowledge. As more research is conducted in the field of online education, we can expect to gain a better understanding of the factors that influence knowledge retention and the effectiveness of different instructional approaches.

Online enrollment in undergraduate courses experienced significant growth from 2015 to 2021, with a decline in overall undergraduate enrollment during the same period. In the Fall of 2015, there were 17,036,778 undergraduate students, and 29% of them enrolled in any number of online courses (U.S. Department of Education, 2020). By Fall 2019, the total number of undergraduate students decreased to 16,565,066, but the percentage of students enrolled in any number of online classes increased to 36% (U.S. Department of Education, 2019). The COVID-19 pandemic had a profound impact

on online enrollment. In Fall 2020, the undergraduate student population decreased further to 15,851,906, but a significant 75% of the students enrolled in any number of online courses (U.S. Department of Education, 2021). This sharp increase in online enrollment can be attributed to the widespread adoption of virtual education as a result of the pandemic. In Fall 2021, the undergraduate student population decreased again to 15,448,420, and 61% of the students enrolled in any number of online courses (U.S. Department of Education, 2022). Overall, during the period from 2015 to 2021, there was a 9% decline in undergraduate enrollment, while online education experienced substantial growth, increasing by 90%. This indicates a significant shift in the education landscape, with more students opting for online learning options over traditional in-person classes.

The online enrollment in graduate courses also experienced significant growth from 2015 to 2021, with a decline in online enrollment during the COVID-19 pandemic. In Fall 2015, there were 2,940,492 graduate students, and 35% of them enrolled in any number of online courses (U.S. Department of Education, 2020). By Fall 2019, the total number of graduate students increased to 3,072,433, and the percentage of students enrolled in any number of online courses further increased to 42% (U.S. Department of Education, 2019). The COVID-19 pandemic led to a surge in online enrollment. In Fall 2020, the graduate student population increased to 3,139,892 graduate students, and a significant 71% of the students enrolled in any number of online courses (U.S. Department of Education, 2021). This increase in online enrollment can be attributed to the widespread adoption of virtual education in response to the pandemic. In Fall 2021,

the graduate student population continued to increase to 3,211,431, but the percentage of students enrolled in any number of online courses declined to 56% (U.S. Department of Education, 2022). This indicates a decrease in online enrollment compared to the previous year, possibly because institutions were returning to more normal practices. Overall, from 2015 to 2021, there was a 9% increase in graduate enrollment, while online education experienced substantial growth, increasing by 79%. This suggests a significant shift in the graduate education landscape, with more students opting for online learning options. However, there was a decline in online enrollment during the COVID-19 pandemic, possibly due to institutions returning to in-person instruction and a transition towards more traditional practices.

Personal Communication

Two personal communication examples illustrate the impact of the COVID-19 pandemic on the learning environment. The first example is from a high school student who experienced a transition to remote learning. Initially, the shift to online classes posed challenges, such as the loss of group activities and hands-on experiences. However, as the students adapted to the online learning platform, the experience became more manageable and prepared them for future online courses. The second example is from a graduate student pursuing a master's degree. They highlight the differences between asynchronous and synchronous online classes, emphasizing the convenience and benefits of online learning. While asynchronous classes allowed for flexible self-paced study, synchronous classes lacked the classroom environment but

offered the convenience of learning from home. The student eventually found online classes more convenient and beneficial than traditional classes.

High School Student

My sophomore year was when the COVID-19 pandemic swept through and closed the world down. I come from a small high school in the middle of corn fields called Lincolnview High School. The start of the 2019-2020 school year was just like any other year. Students flooded the hallways after each bell, we had fellowship with one another during lunch, and we all cheered for the school sports at games. It seemed pretty normal. When March 16, 2020, came around, we were told that we were having a two-week spring break. That two-week break turned into three weeks and seven weeks and eventually went all the way through my sophomore year. At the beginning of the third week, Lincolnview High School decided to switch over to remote learning (Zoom/online classes). All my courses that I had throughout a normal school day were now online, and the social aspect of school was lost. Before the COVID-19 pandemic, my English class was working on reading different novels. We did group activities and hands-on projects to help us understand the concept of the book that we were reading. When school shut down, we continued working on the books but lost the group activities and hands-on experiences which made learning at the time difficult. As the weeks of remote learning carried on, classes began getting easier. As we started to get used to having classes over Zoom and assignments due electronically, the concept of online learning became a reality. We began to understand the idea of how to make the best of what we had. Once school was able to resume in-person classes, a part of online

learning carried over. Assignments were still due electronically, and if you were at home sick, students had the availability to Zoom for their class at home. I firmly believe that experiencing remote learning during my high school career has enhanced my skills and has prepared me for online courses at The University of Findlay (personal communication, October 28, 2022).

College Student

I am a graduate student pursuing a Master of Science in Applied Security and Analytics at The University of Findlay. It was then that I experienced online learning because my classes at the undergraduate in the Philippines were face-to-face, and those courses were before the pandemic. Online classes at The University of Findlay are either asynchronous or synchronous. The first online class I got was an asynchronous class. This course made all the resources available at the start of the semester and had deliverables each week. It was up to the students to manage their time and meet the deadline for the deliverables. Personally, this was a challenge because I would have to email the Professor to get an answer to my questions, which could take hours before I get a response. On the other hand, synchronous classes had a specific schedule for meetings using an online platform. Although this is more similar to a traditional class compared to asynchronous classes, the environment did not feel like a class or a place of learning. The main reason for this is that the interaction between the professor and the students is limited. After some time, I found it more convenient and beneficial to have online classes rather than traditional classes. Asynchronous classes allowed me to study at my own pace, which meant I could

understand the materials more. For synchronous classes, it made it convenient to learn while staying at home (personal communication, November 4, 2022).

Advantages of Online Education

According to U.S. News (2022), online programs do offer several advantages and disadvantages. Pros of online programs include the ability to learn anywhere, the pursuit of a degree from any institution, and the planning of coursework around a student's schedule (News Staff, 2022). Cons of online programs include the students' need to be self-motivated with enhanced time management skills since there is no face-to-face contact with the instructor, and networking can be difficult (News Staff, 2022). There are various options for online students to accelerate the earning of their degrees, such as competency-based and accelerated semesters, which can enable students to complete their degrees more quickly and enter the workforce sooner or obtain a better job position quicker. Whatever the reason is for a student or employee to enroll in an online course or program, accreditation is important. Accredited online programs ensure that courses and degrees meet certain quality standards, assuring students, employers, and other stakeholders. Accreditation also facilitates the transferability of credit between institutions, among other benefits.

As online course offerings grow, accreditation needs to continue its importance. More than 64% of traditional colleges offer online courses and online degrees (Edukan Marketing, 2022). According to Edukan Marketing (2022, Advantages section, para. 1), the following is a list of advantages of online courses and degree programs:

- Everyone Is Welcome: Does not matter who you are, how old you are, or what you know today.
- Flexibility: Online courses offer flexibility in terms of when and where students can study. They can access course materials and lectures at their convenience, allowing them to plan their coursework around their personal schedule. This flexibility is beneficial for students who have work or family commitments.
- Environmental Impact: Online education contributes to reducing carbon emissions and the environmental footprint associated with commuting and operating physical campuses. By eliminating the need for transportation, online learning helps create a more sustainable approach to education.
- Vanity: Participation in online education does not require a student to dress up to get online and do coursework.
- Cost Savings: Online education can be more cost-effective compared to traditional on-campus education. Students can save money on commuting, parking fees, on-the-go meals, housing, and campus fees. Additionally, online courses can have lower tuition fees, and students can avoid additional expenses such as textbooks by accessing digital resources.
- More Opportunities to Participate: Online education allows a student to connect to other students and their instructors via emails and discussion posts without being afraid to ask questions in a classroom.
- More Time to Participate: On-campus classes only last an hour or two, and instructors need to deliver their lessons and assignments and answer questions

from students needing help at that time. In online participation, students can formulate questions and message the instructor to get a more concise answer online.

- Development of Technology Skills: Engaging in online education helps students develop digital literacy and technological skills. They become familiar with various learning management systems, communication tools, and online resources. These skills are valuable in today's digital age and can be beneficial in future career opportunities.

Edukan Marketing (2022, Advantages section, para. 1) further explains the advantages of being on-campus include the following:

- Set Schedules: On-campus classes follow a fixed schedule, helping students stay organized and avoid procrastination.
- In-Person Assistance: Being physically present on campus allows students to seek immediate help from instructors and engage in face-to-face discussions.
- Socializing and Networking: On-campus learning offers opportunities for students to interact with classmates, join study groups, and participate in extracurricular activities, contributing to a more comprehensive college experience.
- Career Networking Potential: Employers often visit campuses for job fairs and recruitment events, providing networking opportunities for students.
- Extracurricular Events: On campus, students can enjoy various events, exhibits, readings, career fairs, and sports activities, enhancing their overall college experience.

It is important to note that the choice between online and on-campus learning depends on individual preferences, learning styles, and circumstances. It also requires self-discipline, motivation, and effective time management skills from students. Additionally, certain subjects or practical skills may be more challenging to teach and learn in an online format. Both modes of education have their own advantages and disadvantages, and students should consider their personal needs and goals when making a decision.

Demand for Online Education

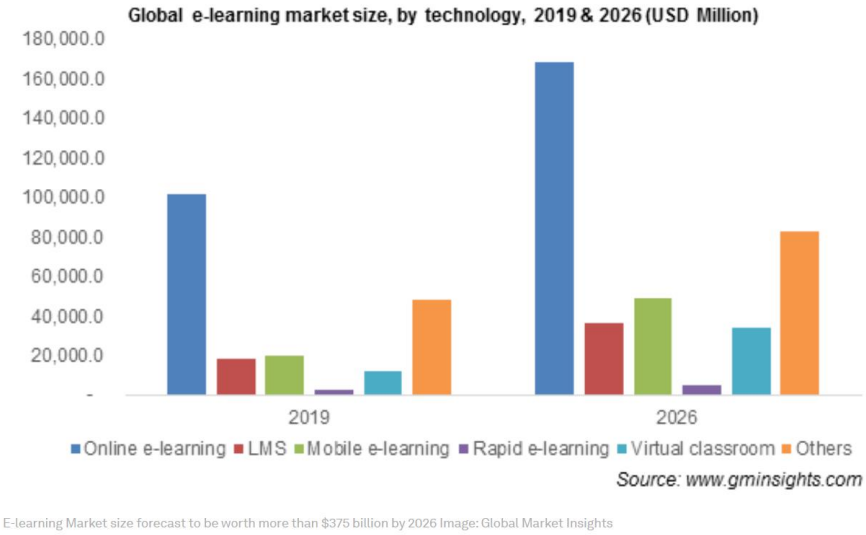
The demand for online education has been steadily increasing, as indicated by the significant growth in online enrollment for undergraduate and graduate students. Between 2015 and 2021, undergraduate online enrollment increased by 90%, while graduate online enrollment increased by 79%. This growth in demand has led to increased investments in information technology (IT) infrastructure to support online learning. According to the World Economic Forum, investments in IT for education were $18.66 billion before the COVID-19 pandemic, and it is projected to reach $350 billion by 2025 and $375 billion by 2026 (Fore, 2021; Lalani & Li, 2020). The eLearning market has already exceeded $315 billion in 2021 and is expected to reach $1 trillion by 2028 (Wadhwani & Gankar, 2022). In North America, specifically the United States and Canada, the market size was $120 billion in 2021 (Wadhwani & Gankar, 2022). The market size is expected to continue growing in North America through 2028, driven by substantial funding being allocated to IT infrastructure. For instance, in November 2021, the U.S. government passed a $65 billion Bipartisan Infrastructure Law aimed at

ensuring widespread access to high-speed and reliable internet (Wadhwani & Gankar, 2022). These investments in IT infrastructure reflect the recognition of the importance and potential of online education. The growth of the online education market is likely to continue as more resources are allocated to enhance digital learning experiences and expand access to high-quality education globally.

As shown in Figure 1, the market for online eLearning is expected to rise faster than other forms of technology through 2026 (Fore, 2021).

Figure 1

Global e-Learning Market Size, by Technology, 2019 and 2026



Note: From "Digital learning can help us close the global education gap," by H. Fore, 2021, *World Economic Forum*, https://www.weforum.org/agenda/2021/01/think-education-is-a-matter-for-governments-alone-think-again. Copyright 2021 by the World Economic Forum.

Indeed, the COVID-19 pandemic has had a significant impact on online education, leading to both students and employers embracing online learning. As remote work and learning became necessary during the pandemic, the demand for online education surged. This not only affected traditional students but also prompted employers to seek online learning opportunities for their workforce. Companies have recognized the need for their employees to acquire new skills, undergo training, and upskill remotely (Wadhwani & Gankar, 2022). To facilitate this, many organizations have implemented online portals or platforms where employees can access training

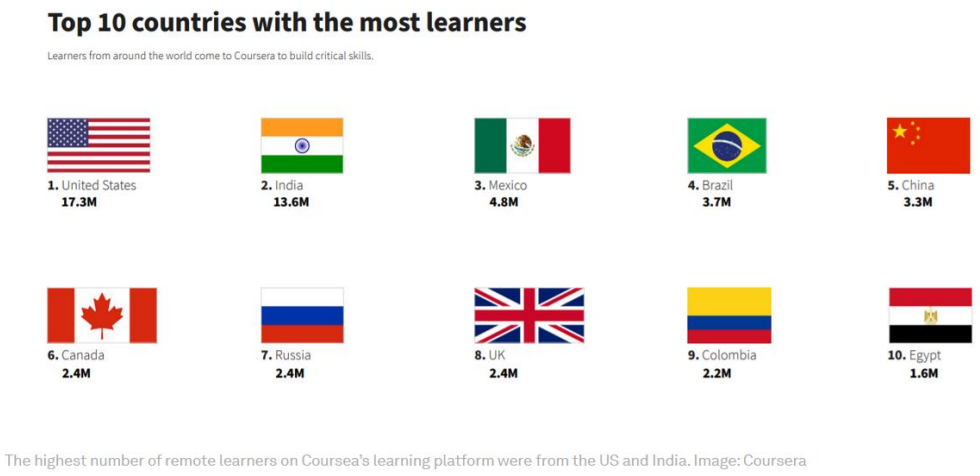
materials, videos, and other resources to enhance their knowledge and skills (Wadhwani & Gankar, 2022). This shift towards online learning for employees allows for flexible and convenient learning experiences, enabling individuals to acquire new competencies without being restricted by location or time constraints. Online education has also played a crucial role in enabling international students to pursue their studies in their home countries. This approach offers cost savings for international students as they can avoid expenses associated with relocating to study abroad. As a result, online education has gained popularity among international students, contributing to the growth of the online education market. The Asia Pacific region has seen the largest number of new online students, with 28 million learners, followed by North America, Europe, and Latin America (Wood, 2022). This global adoption of online education highlights its increasing importance and impact on the education landscape worldwide.

Overall, the COVID-19 pandemic has accelerated the adoption and acceptance of online education, both for traditional students and employees. It has demonstrated the value and effectiveness of online learning platforms, paving the way for continued growth and innovation in the field of online education. As shown in Figure 2, the United States and India are the two countries with the highest number of students enrolled in online education. The United States has more than 17.3 million students enrolled in online learning, demonstrating a significant presence in the online education landscape. India closely follows with 13.6 million students enrolled in online education. These figures highlight the substantial demand and adoption of online education in both countries. It is worth noting that these numbers may vary over time as online education

continues to expand globally. Other countries around the world also have a significant number of students enrolled in online learning, contributing to the overall growth and popularity of online education on a global scale.

Figure 2

Top 10 Countries with the Most Learners



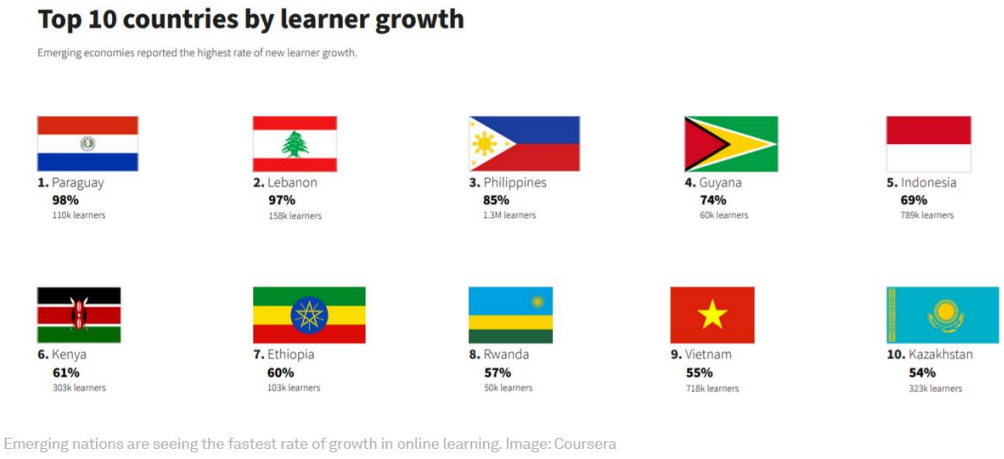
Note: From "These 3 charts show the global growth in online learning," by J. Wood, 2022, *World Economic Forum*, https://www.weforum.org/agenda/2022/01/online-learning-courses-reskill-skills-gap. Copyright 2022 by the World Economic Forum.

It is interesting to note the significant increases in online education enrollment in certain countries. According to Figure 3, Paraguay experienced a remarkable 98% increase, equivalent to 110,000 new students. Lebanon also witnessed a substantial growth of 97%, adding 158,000 new students to online learning. The Philippines recorded an 85% increase, with a staggering 1,300,000 new students joining online education. These figures indicate that emerging economies are experiencing rapid growth in the eLearning market. The availability and accessibility of online education

have provided opportunities for students in these countries to pursue their studies remotely. This growth trend in online education reflects the increasing demand and recognition of the benefits it offers in terms of flexibility, accessibility, and quality learning experiences. It is important to note that while countries have experienced significant growth in online education, the overall landscape of online education varies across different regions and countries. Factors such as government support, investment in digital infrastructure, cultural acceptance, and economic conditions can influence the rate of growth and adoption of online education in each specific region. Also, it is important to note that specific numbers and rates may vary over time as new data becomes available, and different sources may provide slightly different figures.

Figure 3

Top 10 Countries by Learner Growth



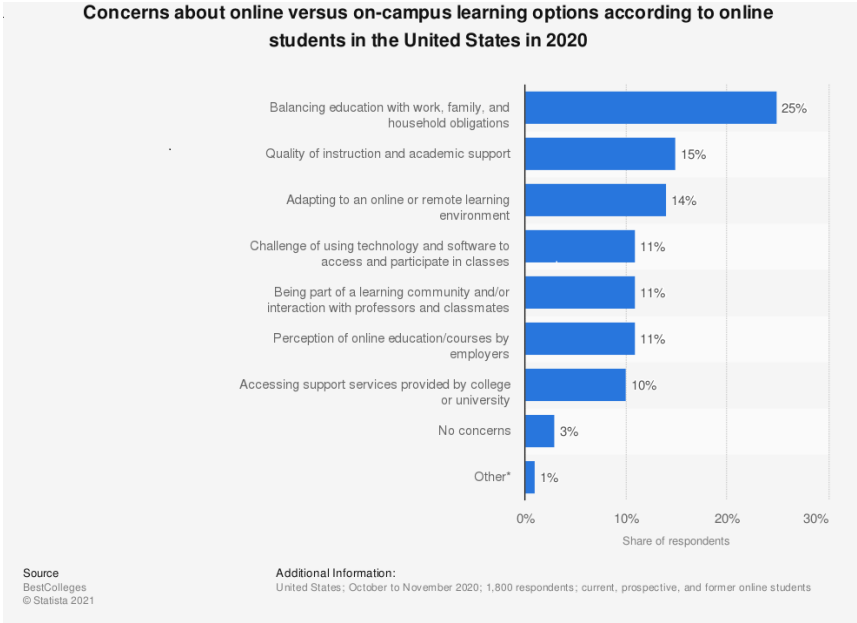
Note: From “These 3 charts show the global growth in online learning,” by J. Wood, 2022, *World Economic Forum*, https://www.weforum.org/agenda/2022/01/online-learning-courses-reskill-skills-gap. Copyright 2022 by the World Economic Forum.

Future of Online eLearning Education

The future of online eLearning education is promising as universities and employers recognize its long-term value and integrate it into various learning contexts. The shift towards eLearning has indeed led universities and educational institutions to recognize the importance of providing access to necessary resources for all learners in the 21st century. It has expanded the possibilities for learning beyond traditional classroom settings, extending into the workplace and various other contexts. To ensure successful online learning experiences, it is crucial for students of all ages to have access to essential tools such as computers, electricity, and reliable internet connections. These resources enable individuals to engage with online educational materials, collaborate with peers, and access academic support. As mentioned in the 2020 survey of 1,800 students, it is understandable that 25% of learners are concerned about balancing their education with other commitments like work, family, and household obligations. This highlights the need for flexible learning options and support structures that accommodate the diverse responsibilities of students. Another concern raised by 15% of the respondents in the survey was the quality of instruction and academic support. As online education continues to grow, it is important for institutions to prioritize providing high-quality instruction and effective support systems to ensure that students receive the education they deserve. Additional concerns revealed from the survey can be seen in Figure 4.

Figure 4

Concerns About Online Learning Options in the United States in 2020



Note: From “Concerns about online verses on-campus learning options according to online students in the United States in 2020.” By E. Duffin, 2021, *Statista,* https://www.statista.com/statistics/944409/concerns-about-choosing-online-education-usa/. Copyright 2021 by the Statista.

Quality Assurance

Quality Matters (QM) is a well-known program in the field of online education that aims to improve the quality of online courses through a peer-reviewed quality assurance process. It provides a framework and set of standards based on best practices to guide instructors and institutions in designing effective and engaging online learning experiences for students. This program emphasizes the importance of aligning course

design with learning objectives, engaging learners through activities and multimedia, promoting instructor-student and student-student interaction, and providing clear guidelines and expectations for assessments and assignments. The peer-review process of QM involves a team of trained reviewers who evaluate online courses based on established standards. The reviewers provide feedback and suggestions for improvement to ensure that the courses meet high-quality standards in terms of instructional design, course content, and learner engagement. By implementing the recommendations and guidelines provided by QM, instructors, and institutions can enhance the overall learning experience for online students. This contributes to the credibility and acceptability of online education by assuring stakeholders, including students and employers, that the courses have undergone a rigorous quality assurance process and adhere to recognized standards of excellence. It is important to note that while QM is a widely recognized and respected program, there are also other accreditation and quality assurance frameworks specific to online education, depending on the region or institution. These frameworks aim to ensure consistent quality and effectiveness in online learning and provide a valuable resource for educators seeking to deliver high-quality online courses. A brief overview of Quality Matters (Quality Matters, 2022) follows.

- Quality Matters is an internationally recognized non-profit organization that focuses on establishing standards, processes, and professional development to ensure online and blended learning quality. Their primary goal is to promote

quality assurance in online education and support institutions in developing effective online courses.

- The organization's website, https://www.qualitymatters.org/, serves as a valuable resource for educators, instructional designers, and administrators seeking guidance and best practices for online course design and delivery.
- One of the key aspects of Quality Matters is its higher education rubric, which places emphasis on course design rather than course delivery or content. The rubric provides a comprehensive framework for evaluating online courses and helps ensure they meet established standards and continually improve over time.
- To achieve certification from Quality Matters, an online or blended course must meet the essential standards across all three-point criteria. Additionally, the review process should result in an overall score of 85 or higher out of 100 points, indicating a high level of quality and adherence to the organization's standards.

Many institutions, like The University of Findlay, choose to partner with external organizations like QM to validate the quality of their online education programs. Becoming a QM member provides institutions with access to various professional development training courses that are specifically designed for instructional designers, faculty, and administrators involved in online education. QM offers a range of professional development opportunities to support institutions in improving the quality of their online courses. These training courses cover topics such as course design, instructional strategies, assessment methods, and technology integration. By participating in these courses, instructional designers and faculty members can

enhance their skills and knowledge in online course development and delivery. In addition to professional development, QM also offers certification courses for partnering members. These certification courses provide a more comprehensive and in-depth examination of online course design and instructional practices. By completing these certification courses, instructional designers and faculty members can earn QM certifications, which validate their expertise and commitment to delivering high-quality online education. By partnering with external organizations like Quality Matters, institutions can benefit from their expertise, resources, and established quality standards. This collaboration helps ensure that online education programs meet rigorous quality benchmarks and provide a positive learning experience for students. It also demonstrates the institution's commitment to delivering high-quality online education and continuous improvement in its online programs.

Quality Matters offers a Teaching Online Certification that consists of seven workshops. This certification is designed to validate instructors' knowledge, abilities, and skills in a set of competencies aligned with the Online Instructor Skill Set defined by QM as essential for effective online instruction. The seven workshops in the Teaching Online Certificate cover various aspects of online teaching and course design. Here are the seven workshops: (1) Gauging your technology skills; (2) Evaluating your course; (3) Exploring your institution's policies; (4) Orienting your online learners; (5) Connecting learning theories to your teaching strategies; (6) Creating presence in your online; and (7) Assessing your learners. Instructors must complete all seven workshops to earn the Teaching Online Certificate. The entire certification program typically takes

approximately 11 weeks to complete, considering the duration of each workshop. By completing the Teaching Online Certification, instructors demonstrate their proficiency in the essential competencies identified by Quality Matters, indicating their ability to deliver high-quality online instruction and create effective online learning experiences for their students.

The Teaching Online Certificate offered by Quality Matters is designed to fulfill six specific competencies associated with the Online Instructor Skill Set. These competencies demonstrate the instructor's knowledge, ability, and skill in various areas necessary for effective online teaching. A breakdown of the six competencies: (1) Institutional context – the instructor understands the institutional context in which they teach; (2) Technologies – the instructor possesses knowledge about the technologies commonly used in the online classroom; (3) Instructional design – the instructor understands the instructional design requirements of an online course; (4) Pedagogy – the instructor understands the pedagogical components of the online teaching and learning process; (5) Assessment – the instructor is knowledgeable about various methods of measuring the success of the teaching and learning process in the online classroom; and (6) Social presence – the instructor establishes a social presence and communicates effectively through writing and/or audio/video. By completing the Teaching Online Certification and demonstrating competence in these six competencies, instructors are equipped with the necessary knowledge and skills to deliver high-quality online instruction and create a positive learning experience for their students.

A well-designed online course is essential for a successful learning experience. An online course must be fully developed and completed before students begin the class rather than building it as the course progresses. When students enter a course, they expect to have immediate access to all the necessary course materials. This includes readings, lecture materials, assignments, and any other resources. Having all the materials available from the beginning helps students plan their study schedule and stay on track. Building an online course as you go can result in a poor student experience. Taking a live course and converting it to an online course is more than just posting a syllabus. It requires careful consideration of how the course will be structured, organized, and delivered online. The expectations of the student need to be clearly defined and easily accessed to help the students navigate the course successfully. Clear instructions and expectations on assignments are crucial and are a good place to begin. Setting expectations goes beyond assessment and grading rubrics. Following established standards such as the QM rubric can guide the design and development of an online course. This includes incorporating measurable course and module learning objectives, ensuring accessibility and usability of course materials, and adhering to best practices in online education. By considering these factors and incorporating them into the design and delivery of an online course, instructors can create a positive and effective learning experience for their students.

Learning from Everywhere

The future of online learning is expected to bring significant changes and advancements. Here are some key aspects that the future of online learning may resemble. There is a shift from ‘learning from anywhere’ to ‘learning from everywhere,’ indicating a move towards global accessibility and inclusivity in online education (El-Azar, 2022). Students will be able to engage in learning experiences from various locations worldwide, breaking down geographical barriers and expanding educational opportunities. This shift provides flexibility in terms of time, location, and pace of learning. This flexibility allows students to personalize their learning experience and engage with the material in ways that suit their needs and preferences. Experiential learning approaches will gain prominence in online education. Students will have opportunities to connect classroom knowledge with real-world experiences. This practical application of knowledge helps students develop critical thinking, problem-solving, and decision-making skills. The once-accepted traditional lectures are being supplemented and complemented by a variety of online resources, such as YouTube videos. Institutions recognize the value of active learning approaches in fostering deep understanding and retention of knowledge. Online courses and programs will increasingly focus on providing high-quality active learning experiences. As technology continues to advance and new pedagogical approaches emerge, the future of online learning holds great potential for creating dynamic, interactive, and learner-centered educational experiences.

The findings from the Gallup survey (2017) highlight some concerns among students regarding their preparedness for the job market and workplace. Here are some key points based on the survey. Only 34% of students felt they would graduate with the necessary skills to succeed in the job market. This suggests that a significant portion of students may feel that their educational experiences are not adequately preparing them for their future careers. Similarly, 36% of students expressed confidence in their readiness for the workplace. This indicates that a considerable number of students may have reservations about their ability to effectively transition from the academic environment to the professional world. The survey also revealed variations in confidence levels based upon students' majors. Students majoring in public service fields, such as criminal justice, education, and social work, felt more confident in the educational skills they were receiving to prepare them for their future careers (Gallup, 2017). On the other hand, science, technology, engineering, and mathematics (STEM) majors expressed greater confidence that their field of study would lead to good job prospects (Gallup, 2017). The survey findings underscore the significance of regularly reviewing and updating the curriculum to align with the evolving demands of the job market. By staying abreast of the latest skills and knowledge required for successful employment, institutions can better equip students with the competencies needed to thrive in their chosen fields. Addressing the concerns raised by students about their preparedness for the job market and workplace requires a collaborative effort between educational institutions, employers, and policymakers. This can involve curriculum enhancements, internships and experiential learning opportunities, career counseling,

and ongoing dialogue between academia and industry to bridge the gap between education and employment.

Conclusion

In conclusion, the future of online learning is promising and transformative. The widespread acceptance and adoption of eLearning have made it clear that it is here to stay. Students of all levels are comfortable with various online learning platforms, benefiting from the flexibility and personalized learning experiences they offer. Investments in IT infrastructure have improved internet access, making eLearning accessible worldwide. The evolving curriculum ensures that courses meet the changing needs of learners and align with the demands of the job market. Educators play a crucial role in maintaining the quality of online education, continuously improving courses and programs to meet or exceed learner expectations. The global growth of eLearning opens up endless opportunities for individuals to engage in meaningful and effective learning experiences. As technology advances and educational practices evolve, eLearning will continue to shape the future of education, providing new avenues for knowledge acquisition and skill development. The potential of online learning is vast, and it holds promise in transforming education for learners worldwide.

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