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Beyond the Red Pen: A Multidimensional Examination of the Impact of Grammarly on Academic Writing Among Doctoral Students

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Doctoral programs face a wide array of challenges with student retention. Nearly half of all doctoral students do not complete their programs, and writing barriers often contribute to academic persistence problems. This mixed-method study sought to explore doctoral students' perceptions of Grammarly for Education as a writing support tool. Participants included EdD students (n = 38) studying at a mid-sized public institution in the southeastern United States. The research combines inferential statistical analysis, descriptive quantitative analysis, and qualitative analysis of focus group discussions and open-ended survey responses. The linear regression analysis indicates that the number of writing sessions that occurred on Grammarly could statistically predict the percentage improved in writing sessions. The descriptive analysis of the open-ended survey (n = 21) and focus groups (n = 5) indicates overall positive perceptions of Grammarly, with most participants reporting effective identification and correction of grammatical and spelling errors, improved sentence structures, and enhanced vocabulary. Additionally, 52% of participants strongly agree that Grammarly has significantly improved their writing proficiency. Qualitative findings highlight Grammarly's effectiveness in enhancing clarity, conciseness, and flow. Participants value features such as spellcheck, punctuation tracking, and sentence structure recommendations. They also indicated positive changes in writing habits, increased confidence, and heightened awareness of their writing. Concerns about Grammarly include dependency on Grammarly, lack of alignment with APA 7th edition, and lack of effectiveness with the plagiarism detection tool. Finally, practical implications are provided, highlighting how Grammarly can be effectively integrated into doctoral writing.

Keywords: Grammarly, doctoral students, EdD programs, writing supported, Automated Writing Aids

Effective writing plays a pivotal role in graduate programs since students are often required to complete lengthy assignments that necessitate higher-order thinking skills (Simpson et al., 2016). Ensuring grammatical accuracy, clarity, and proper structure is also paramount for students to master (Varelas et al., 2015). Particularly at the doctoral level, students need to be equipped with good writing skills to convey complex content proficiently (Duchardt et al., 2016)

through various forms, including dissertations, proposals, comprehensive exams, and other lengthy assignments. Writing tools, including automated writing aids such as Grammarly, can foster enhanced writing competency in students (Bailey & Lee, 2020; Ghufron & Rosyida, 2018; O'Neill & Russell, 2019).

The standard, free version of Grammarly helps improve grammar, punctuation, and style in written content, aiding users in achieving a polished and professional writing style. Educational institutions can purchase the premium version, Grammarly for Education, for academic units or the entire institution (Grammarly, 2022). Grammarly for Education is being used by over 3,000 institutions worldwide (Grammarly, 2022). Grammarly for Education provides all the benefits of Grammarly Premium and the ability to use a single sign-on, style guide, and administration panel (Grammarly, 2022). It also includes volume-based pricing, an analytics dashboard, and security features to protect account data (Grammarly, 2022). In addition, it can be embedded into learning management systems and has a plagiarism detector, which compares the students' writing to over sixteen billion websites and articles, as well as other scholarly publications in ProQuest (Grammarly, 2022).

Grammarly for Education provides real-time feedback that students can see while they are writing, and they can determine which suggestions to accept. Grammarly for Education includes the following components (Grammarly, 2022):

● Free version of Grammarly functions and Grammarly Premium access to basic spelling, grammar, punctuation, conciseness, and tone detection support

● Use of an accurate APA citation and reference generator

● Over 400 checks and features pertaining to grammar, vocabulary, and other aspects of writing

● A "Set Goals" function in which students can indicate the desired tone and purpose of their writing

● Clarity-focused sentence rewrites

● Tone adjustments

● Plagiarism detection

● Word choice

● Formality level

● Fluency

● Additional advanced suggestions

There is a paucity of research on using Grammarly at the doctoral level, especially in the EdD context. The EdD program (or Doctor of Education) prepares students to be scholarly practitioners. Coursework in EdD programs tends to focus on practical assignments that can be applied to educational work settings; additionally, it is customary for students to complete a dissertation in practice, which focuses on a problem of practice in their respective fields (Perry & Abruzzo, 2020). Various studies (e.g., Bailey & Lee, 2020; Fahmi & Cahyono, 2020; Ghufron, 2019; Ghufron & Rosyida, 2018) have focused on Grammarly in the language learning context even in graduate programs, but studies at the doctoral level that include native English speakers are limited. Breitenbach and Adler (2022) examined EdD students' perceived writing self-efficacy in the U.S. educational context. Although Grammarly was used to measure the students'

writing proficiency, it was not the central focus of the study since the study explored students' perceived writing self-efficacy. The authors seek to fill a gap in the literature by exploring the effectiveness of utilizing Grammarly as a writing support tool within the context of an EdD program, addressing the need for more comprehensive research in this area to improve the scholarly writing abilities of EdD students. Although this study focuses specifically on EdD students, the results may benefit other doctoral programs, including the more common traditional Ph.D. programs that are more research-based. Furthermore, while research examines the benefits of writing assistance tools like Grammarly, this study provides an in-depth exploration of Grammarly's capabilities in improving writing at the doctoral level through a qualitative and quantitative lens. This mixed-method study explores doctoral students' perceptions and assesses the impact of Grammarly for Education on their academic writing. It also examines whether regular use of Grammarly influences grammar, writing style, and writing proficiency, comparing extended and sporadic usage patterns.

The following research question guided the study:

1. What is the relationship between the number of writing sessions on Grammarly for Education and the corresponding percentage of improvement in writing?

2. What are doctoral students' perceptions regarding using Grammarly for Education in their academic writing processes?

3. What do doctoral students perceive as strengths and weaknesses of the Grammarly for Education program in improving their writing?

Literature Review

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Theoretical Framework

The study is guided by Kolb's (2017) Tripe E technological framework. The framework centers around the central idea that learning is the most essential aspect when implementing technology tools and that educators should leverage the tools as ways for students to engage and enhance learning goals and beyond (Gaer & Reyes, 2022; Kold, 2017). The framework has three folds and the first E emphasizes that the implementation of the technology tool should help students engage with the learning goals (Kolb, 2017); the second E brings attention to the importance of having technology applications enhance the learning goals (Kolb, 2017), and the last E refers to the notion that the use of technology applications should extend the learning goals (Kolb, 2017). In the current research, through exploration of doctoral students' experience with the various features of Grammarly for Education, the researchers will explore whether the application of Grammarly for Education brings added value to enhance the goal of helping doctoral students write proficiently.

Grammarly for Writing Support

In recent years, artificial intelligence and automated writing tools have been used to enhance writing development among students. Various studies indicate that Grammarly improves students' writing ability (e.g., Dong & Shi, 2021; O'Neill & Russell, 2019; Zhang et al., 2020). Grammarly has been used in a wide range of educational contexts. Many studies involving Grammarly focus on English language learners (e.g., Bailey & Lee, 2020; Hakiki, 2021; Qassemzadeh & Soleimni, 2016; Ventayen & Orlanda-Ventayen, 2018), but research is certainly not limited to this population. For instance, a study conducted in Australia by Cavaleri and Dianati (2016) found that Grammarly not only provided helpful explanations to students but

also bolstered their understanding of grammar rules and confidence in writing. The study was limited to only 18 students, though, and eight of the students indicated that they were not native-English speakers. The students were studying in certificate, undergraduate, and graduate-level programs. As technology advances, studies can highlight the potential of automated writing tools like Grammarly to support students in their writing pursuits and enhance the overall writing experience. Furthermore, technology, despite its advancements, is not without limitations. Although studies on Grammarly report improvement in student writing, there are weaknesses that have already been addressed through research, including misleading feedback and minor mistakes (Vantayen & Orlanda Ventayen, 2018). Research plays a crucial role in identifying the current shortcomings of Grammarly and similar tools, leading to ongoing enhancement and efficacy.

Grammarly has also benefited doctoral students with academic writing (Arianto & Wulyani, 2022). Arianto and Wulyani (2022) conducted a qualitative case study with four doctoral students at a public university in Indonesia. Participants were interviewed about their self-regulated writing strategies. Although the study did not specifically focus on Grammarly, one of the major themes that was extrapolated from the data was the role of text processing in improving writing. All participants discussed the importance of Grammarly in aiding in academic writing and the role of Grammarly in identifying typos and learning common phrases. Furthermore, the study was limited to non-native English speakers. A study by Breitenbach et al. (2022) used Grammarly to compare perceived writing self-efficacy with actual writing performance through Grammarly. The results indicated that higher rates of perceived writing self-efficacy are likely connected to written errors in wordiness and grammatical issues. The study, however, did not explore the use of Grammarly or the effectiveness of it. Grammarly was

used as a tool for measuring the students' writing performance as it compares to their writing self-efficacy.

Writing at the Doctoral Level

Writing at the doctoral level is critical for demonstrating expertise and advancing academic knowledge with well-researched and synthesized ideas. Scholarly-level writing requires significant time and effort in researching, selecting, evaluating, and synthesizing the information (Billo & Hiemstra, 2013). Furthermore, doctoral students are expected to contribute knowledge to the field through publications during the doctoral program or upon entering academia (Inouye & McAlpine, 2017, 2019). Considering the years of formal education before entering a doctoral program, there is a common misconception that doctoral students possess strong writing skills upon entering the program. However, many need more essential writing skills to excel in scholarly-level writing (Breitenbach et al., 2022; McPherson et al., 2018). It is also essential for doctoral students to effectively master the mechanics of writing (Duchardt et al., 2016), which can also be a laborious process.

Additionally, pursuing a terminal degree is an intellectually demanding journey, and many doctoral students often find themselves mastering the arts of balancing work, academic studies, and personal responsibilities (Caffarella & Barnett, 2000). Dissertation writing can be especially difficult for students in practitioner-based doctoral programs such as the EdD since many are working and have family responsibilities to tend to (Capello, 2020). Furthermore, EdD programs tend to be shorter in duration than traditional doctoral programs (Perry, 2015), which can equate to less time spent on the dissertation or other writing-intensive assignments. Allocating time for quality scholarly writing becomes especially challenging. Excelling in

scholarly writing at the doctoral level requires dedication, ample time, and the ability to manage academic, personal, and professional commitments effectively.

Effective writing support and constructive feedback are important at the doctoral level to ensure clarity, rigor, and continuous improvement in scholarly writing. Doctoral students need to be given practical feedback to help improve their writing (O'Neill & Russell, 2019). Doctoral programs offer varying forms of writing support, including writing centers focused solely on doctoral programs, direct advising, and peer writing groups (Lively et al., 2021). Additionally, universities have implemented writing centers (e.g., Northwestern University, 2023; Oregon State University, 2023; Westcliff University, 2023), online writing sessions (Maldonado et al., 2021), writing support circles (Larcombe et al., 2007), and grammar and writing courses (Ruppert et al., 2012) to help improve writing development at the graduate level. Additionally, coaches (Rice-Bailey & Baker, 2017) have been used to help guide doctoral students with their writing. Although these initiatives and programs offer a vast range of writing support, providing holistic feedback on technical issues and minor recurring problems can be challenging. Utilizing modern writing tools like Grammarly and similar automated writing aids in conjunction with traditional support further improves the effectiveness of writing assistance, addressing a more comprehensive range of writing challenges and facilitating improved scholarly communication.

Methodology

Design

The study utilizes a mixed-method approach because it provides a more holistic understanding and validation of research findings through methodological triangulation; moreover, mixed-method studies provide more depth by exploring both qualitative and quantitative data, each providing a unique insight into the participants' perspectives (Creswell & Plano-Clark, 2018). The quantitative portion of the study first looked at the 38 participants who used Grammarly for Education within six months. We examined the relationship between the writing sessions that took place on Grammarly and the improvement percentage. Then, out of the 38 participants, a total of 21 filled out an open-ended survey; the analysis of the survey is descriptive in nature and is used to describe and summarize the data points. Lastly, the qualitative portion of the study centers on open-ended surveys and using two focus group ($n = 5$) interviews.

Context

This study was conducted at a mid-sized public university in the southeastern United States. The current total student enrollment at the university is approximately 10,000. Additionally, 25% of students identify as first-generation college students, 23% as adult or non-traditional students, and 25% are military-affiliated. The EdD program presently has 60 students enrolled. Most EdD students have full-time jobs and are employed in K-12 schools or universities. The EdD program includes many writing-intensive assignments in coursework. Furthermore, students complete a written comprehensive exam, a dissertation prospectus, a dissertation proposal, and a full dissertation.

Participants

The participants in the study included all doctoral students who were given access to the paid version of Grammarly in the last six months; the sample size is 38 for the simple regression analysis to explore the relationship between the number of writing sessions that occurred on Grammarly and the percentage of improvement in their writing. The sample size for the open-ended survey analysis is 21, and their demographic characteristics are presented in Table 1. Of the participants, 71.4% are White, 14.3% are Black, 9.5% are of Hispanic Origin, and 4.8% are multiracial. The participants are also grouped by concentrations: 61.9% higher education administration (61.9%), socioscientific studies (4.8%), K–12 leadership (28.6%), and literacy studies (4.8%). When sorting by age, in the study, 9.5% are between the ages of 20–29, 57.1% are between the ages of 30–39, 19% are between the ages of 40–49, 9.5% are between the ages of 50–59, and one participant is above 60 years old. Regarding working experience, 9.5% of the participants have 1–5 years of working experience, 38.1% have 6–10 years of working experience, 38.1% have 16–20 years of working experience, and 9.5% have more than 21 years of working experience.

Table 1

Demographic Characteristics of the Participants

Demographic	Frequency	Percentage
Gender		
Male	9	42.9%
Female	10	47.6%
Non-binary	2	9.5%
Current Role		
K–12 teachers	5	23.8%
K–12 administrators	2	9.5%
Higher Ed Administrators	9	42.9%
Race		
White	15	71.4%

Black	3	14.3%
Hispanic Origin	2	9.5%
Multiracial	1	4.8%
Majors		
Higher Education Administration	13	61.9%
Socioscientific Studies	1	4.8%
K–12 Leadership	6	28.6%
Literacy Studies	1	4.8%
Age		
20–29	2	9.5%
30–39	12	57.1%
40–49	4	19%
50-–59	2	9.5%
Above 60	1	4.8%
Cohort		
2020	3	14.3%
2021	6	28.6%
2022	9	42.9%
2023	3	14.3%
Working Experience		
1–5 years	2	9.5%
6–10 years	8	38.1%
11–15 years	8	38.1%
16–20 years	1	4.8%
21 and above	2	9.5%

Note. Open-ended survey, $n = 21$.

Results

Simple Linear Regression

Research Question 1: What is the relationship between the number of writing sessions that took place on Grammarly and the percentage of improvement in writing sessions?

A simple linear regression analysis was used to examine the relationship between the number of writing sessions that took place and the percentage of improvement in writing

sessions. The continuous independent variable is the number of writing sessions that took place, and the continuous dependent variable is the percentage of writing sessions improved. The null hypothesis is that there is no linear relationship between the number of writing sessions and the percentage of improvement in writing. Through data organization and preliminary analysis, 10 out of the 50 students were excluded from the analysis as they did not use Grammarly at all. As suggested by the Case Diagnostics test for outliers (See Table 2), two outliers with studentized residual values greater than 3 were also removed (Mertler & Reinhart, 2017).

Table 2

Case wise Diagnostics Test for Outliers

Case Number	Std. Residual	Percentage Improved
23	-3.645	35
31	-3.386	50

a. Dependent Variable: Percentage Improved

Various assumptions were also checked before running the linear regression analysis. The results indicated a linear relationship between the dependent and independent variables; independent observations are assessed by the Durbin-Watson value of 2.026. The assumption of homoscedasticity was also met, and the residuals were normally distributed. Furthermore, as indicated by Table 3, the number of writing sessions that occurred on Grammarly accounted for 11.9% of the percentage improved in writing sessions. The regression model is also statistically significant, $F(1, 36) = 4.851$, $p < .05$ (See Table 4). In other words, the null hypothesis is rejected, and the sessions used on Grammarly statistically significantly predicted the percentage of writing sessions improved. The prediction or regression model (See Table 5) should be the following: Percentage of writing sessions improved = 89.175 + (-0.047 x number of writing sessions).

Table 3

The Model Summary: Variance Explained

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.345[a]	.119	.094	8.980	2.026

a. Predictors: (Constant), Sessions

b. Dependent Variable: Percentage Improved

Table 4

The ANOVA Regression Model Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	391.232	1	391.232	4.851	.034[b]
	Residual	2903.110	36	80.642		
	Total	3294.342	37			

a. Dependent Variable: Percentage Improved

b. Predictors: (Constant), Sessions

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B
		B	Std. Error	Beta	t	Sig.	Lower Bound
1	(Constant)	9.175	2.344		38.052	<.001	84.422
	Sessions	-.047	.021	-.345	-2.203	.034	-.091

Open Ended Survey Descriptive Analysis

Research Question 2: What are doctoral students' perceptions regarding using Grammarly for Education in their academic writing processes?

Out of twenty-one participants, nine reported that they always use Grammarly, seven reported that they use Grammarly frequently, four reported that they used Grammarly occasionally, and one said they rarely use Grammarly. Table 2 shows that the descriptive data analysis showed that participants' experience with Grammarly is primarily positive. More than half of the participants stated that Grammarly for Education helps them effectively identify and correct grammatical errors, correct spelling errors, improve sentence structures, provide helpful suggestions to enhance vocabulary and word choice and improve writing style. Grammarly is user-friendly and has seamless integration. It is worth noting that only three out of twenty-one participants believe that Grammarly's plagiarism check is a valuable feature. Less than half of the participants strongly agree that Grammarly helped improve their use of punctuation, and even fewer strongly agree that Grammarly saved them time.

Items	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewh at agree	Strongly agree
Effectively identifies and corrects grammatical errors	3 (14.29%)	0 (0%)	0 (0%)	6 (28.57%)	12 (57.14%)
Effectively identifies and corrects spelling errors	1 (4.76%)	1 (4.76%)	0 (0%)	5 (23.81%)	14 (66.67%)
Improve the use of punctuation	2 (9.52%)	2 (9.52%)	2 (9.52%)	5 (23.81%)	10 (47.62%)
Improve my sentence structures	0 (0%)	4 (19.05%)	1 (4.76%)	2 (9.52%)	14 (66.67%)
Provides helpful suggestions to enhance my vocabulary and word choices.	1 (4.76%)	3 (14.29%)	2 (9.52%)	4 (19.05%)	11 (52.38%)
It makes my writing more precise and coherent.	2 (9.52%)	1 (4.76%)	1 (4.76%)	3 (14.29%)	14 (66.67%)
Offers valuable suggestions to improve my writing style	1 (4.76%)	1 (4.76%)	2 (9.52%)	6 (28.57%)	11 (52.38%)
The plagiarism checker feature is valuable	1 (4.76%)	3 (14.29%)	7 (33.33%)	7 (33.33%)	3 (14.29%)
The integration is seamless and user-friendly.	1 (4.76%)	2 (9.52%)	0 (0%)	6 (28.57%)	12 (57.14%)
Increased my confidence in scholarly writing.	2 (9.52%)	2 (9.52%)	2 (9.52%)	3 (14.29%)	12 (57.14%)
Saved me time.	2 (9.52%)	0 (0%)	3 (14.29%)	6 (28.57%)	10 (47.62%)

Summary of the survey

When asked whether using Grammarly for Education has improved their writing proficiency (see Figure 1), 52.4% of the participants reported that they strongly agree that Grammarly for Education has improved their writing proficiency, 9.5% believed that Grammarly improved their writing proficiency to somewhat degree, 14.3% neither agreed nor disagreed, 14.3% somewhat disagreed, and 9.5% strongly disagreed.

Figure 1

Participants' Perception of Their Writing Proficiency
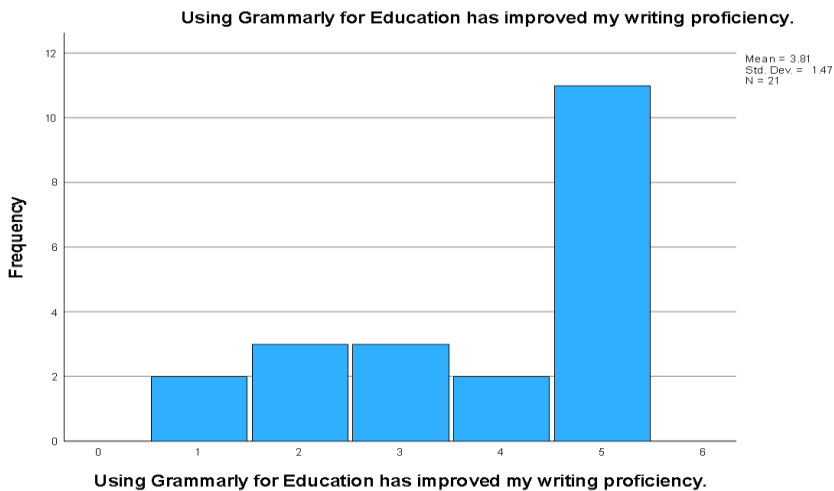
When asked whether participants were satisfied with Grammarly for Education (See Figure 2), 66.75 % reported being extremely satisfied, 23.8% were somewhat satisfied, 4.8% reported they were neither satisfied nor dissatisfied, and 4.8% were extremely dissatisfied.

Figure 2

Participants' Satisfaction with Grammarly for Education

Overall, how satisfied are you with Grammarly for Education?

Mean = 4.48
Std. Dev. = .981
N = 21

(Y-axis: Frequency, values 0.0, 2.5, 5.0, 7.5, 10.0, 12.5)
(X-axis: Overall, how satisfied are you with Grammarly for Education?, values 0, 1, 2, 3, 4, 5, 6)
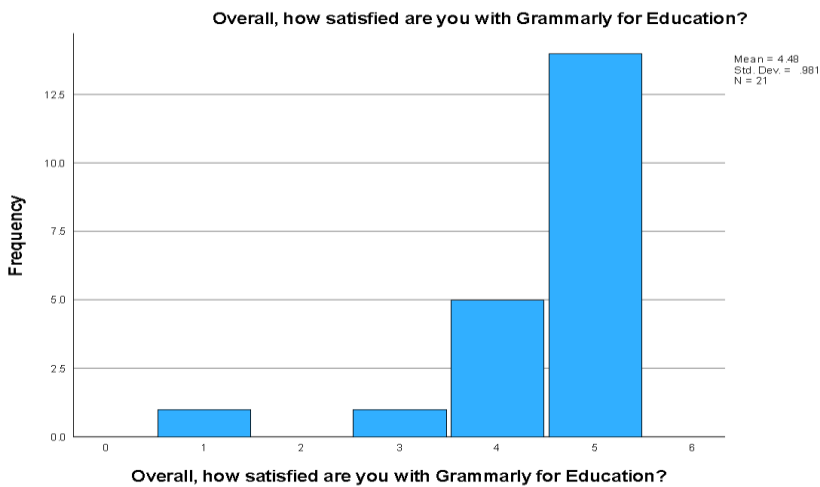
Qualitative Results

Research Question 3: What do doctoral students perceive as strengths and weaknesses of the Grammarly for Education program in improving their writing?

The proceeding section discusses dominant themes that were extrapolated from the focus groups and open-ended survey responses. The first primary theme is the Effectiveness of Grammarly for Writing Support, and the second theme is Grammarly Deficits.

Effectiveness of Grammarly for Writing Support

Participants discussed positive sentiments regarding Grammarly's effectiveness in improving writing. For instance, one participant found Grammarly highly beneficial, stating, "I

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feel like Grammarly really helped me polish my writing, especially in terms of clarity and conciseness." Features such as spellcheck, punctuation tracking, and sentence structure recommendations were highlighted as valuable aspects of Grammarly. A participant shared, "The spellcheck and punctuation tracking are lifesavers for me. It makes my writing much more polished." Another participant provided a more detailed reflection of their experience using Grammarly:

> The repeated reminders and corrections have helped me to identify certain errors that I make on a consistent basis, and I have found that I do not make those errors as much after using Grammarly for several months. Beyond helping with reducing errors, I have also found that the flow of my writing has improved by using the structural and grammatical suggestions that Grammarly provides.

The specific impact of Grammarly at the doctoral level was acknowledged by participants, with the APA style feature being particularly valued. A participant reflected on this, stating, "Grammarly has been a game-changer in my academic writing. The APA style feature is particularly useful for maintaining academic standards." Comparing Grammarly to other writing assistance tools, participants generally expressed satisfaction with its features and ease of use. One participant, for example, indicated, "I've tried a few writing tools, and Grammarly is my go-to. It stands out in terms of features and ease of use." Additionally, a participant stated that they had been using Grammarly Premium before obtaining access to Grammarly for Education and found the tools to be helpful and worth the cost. The participant expanded on this by stating:

> It lightens the load, I feel like. And if I'm having brain fog, which happens all the time. I can be like, it's okay. Grammarly really will give me some suggestions on how to put

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this, you know, on paper, so I love it like… it was worth the money I spent when I was

paying for it on my own… I think some people are prideful like me, and they may not

want to use it at first as a crutch. However, it is not a crutch. I do not know. I feel like the

perception of it can be wrong if that makes sense. Moreover, it is definitely not a crutch.

It just helps enhance your writing.

Participants also identified positive changes in their writing habits and mindfulness about

issues like wordiness. A participant shared, "Grammarly has definitely made me more mindful of

my writing. Even after becoming proficient, I find myself double-checking for clarity and

conciseness." Additionally, participants noted that Grammarly has made them more confident in

their writing. One expanded on the positive changes in their writing by stating:

> I would say that the impact has been huge. As I pointed out above, after receiving
>
> constant reminders and corrections, my own unassisted writing has improved. The
>
> suggestions made by Grammarly for succinctness and clarity have been very impactful,
>
> as they've encouraged me to really evaluate the way that I write and speak.

The participants' responses indicate Grammarly's effectiveness as a tool in improving their

writing through error correction as well as deeper aspects of writing development and

refinement.

Grammarly Deficits

Although participants discussed various benefits of using Grammarly, some deficits were

noted, including a lack of APA 7th edition alignment, overreliance on Grammarly for writing

improvement, and the ineffectiveness of the plagiarism detection tool.

Participants discussed the need for Grammarly to stay updated with academic writing standards, such as the APA 7th edition. One user expressed this concern by stating, "I wish Grammarly would update to reflect the changes in APA 7th edition. It's a crucial aspect for academic writing, and an update would be beneficial."

Overreliance on Grammarly for writing improvement was a prevalent response, with participants expressing concerns about becoming overly reliant on the tool. Although this may not be a deficit of Grammarly itself, it is important to consider possible modifications to the tool to ensure that users are improving and not merely clicking suggestions. One participant articulated this sentiment, stating: "Grammarly is a great tool, but I worry it's making me less careful. I want to ensure I'm growing as a writer, not just relying on corrections." There was a desire among participants to find a healthy balance between utilizing Grammarly as a correction tool and actively developing independent writing skills.

Finally, participants indicated that the Grammarly plagiarism detection tool is not as effective as other programs such as Turnitin. For example, participants noted that Turnitin has a much larger database of sources and features that allow students to see sentences or parts of sentences that may have been plagiarized.

Discussion

The linear regression analysis results reveal that there is a relationship between the number of writing sessions that occurred on Grammarly and the percentage of improvement in writing sessions. The prediction model allows the stakeholders to make predictions about the improvement based on the number of sessions students used. The open survey descriptive analysis reveals predominantly positive perceptions of Grammarly among participants,

showcasing effective identification and correction of grammatical/spelling errors, improved

sentence structures, and enhanced vocabulary. Moreover, 52% of participants strongly agree that

Grammarly significantly improves their writing proficiency. These findings align with other

studies that highlight the role of Grammarly in improving students' writing (e.g., Dong & Shi,

2021; O'Neill & Russell, 2019; Zhang et al., 2020). Qualitative findings shed light on the tool's

effectiveness in enhancing clarity, conciseness, and flow, with participants valuing features like

spellcheck, punctuation tracking, and sentence structure recommendations. Positive changes in

writing habits and heightened awareness of writing were reported. Additionally, participants

indicated that Grammarly helped improve their confidence, which aligns with Cavaleri and

Dianati's (2016) research in the Australian higher education context. The results of the study also

coincide with other studies (e.g., Arianto & Wulyani, 2022) on Grammarly in the doctoral

context, which have reported favorable writing outcomes. Additionally, the results also align

with the Triple E framework that this study utilized as the majority of the students found that

Grammarly brought added value to improve their writing proficiency.

Despite the advantages of Grammarly in improving writing, concerns were raised about

dependency on Grammarly, its lack of alignment with APA 7th edition, and effectiveness issues

with the plagiarism detection tool. Other studies that report weaknesses tend to report issues with

misleading feedback or providing incorrect suggestions (e.g., Ventayen & Orlanda Ventayen,

2018). These insights contribute to a more holistic understanding of Grammarly's impact on

writing proficiency and indicate areas for potential improvement and development. Concerns

were discussed, such as those related to the plagiarism detection tool, APA 7th edition

inaccuracies, and users being over reliant on Grammarly. It's important to recognize that

Grammarly remains a valuable tool for improving overall writing improvement. Further research

and system updates may address the identified concerns, ensuring Grammarly's continued efficacy and relevance in assisting users' writing improvement.

It is vital for doctoral students to be given effective feedback to enhance their writing (O'Neill & Russell, 2019). Academic writing at the doctoral level encompasses critical thinking, research skills, and synthesis of information (Billo & Hiemstra, 2013). Despite the various forms of writing support that exist in universities, such as direct advising, writing centers, and peer writing groups, doctoral students, especially in practitioner-based programs such as the EdD, students are often working full-time and have many demands in their lives. Grammarly and other comparable tools can provide a quick and effective way to provide writing feedback. Nevertheless, despite the advantages Grammarly and similar tools offer in providing quick and efficient writing feedback, it is essential to acknowledge some potential drawbacks.

Conclusion

This study provides valuable insights into doctoral students' perceptions of Grammarly use in improving their writing. The findings highlight the benefits of Grammarly in enhancing grammar, spelling, and overall writing quality. Additionally, students discussed some of the drawbacks of using Grammarly. The study contributes to the existing literature on Grammarly and specifically addresses a gap in the U.S. doctoral context. As technology continues to evolve, understanding the role of Grammarly and other automated writing tools will remain critical in supporting students in their writing development.

This study was limited to ($n =38$) EdD students at one institution in the Southeastern United States. The study may be limited by the size and diversity of the participants. A larger and more diverse sample could enhance the generalizability of the findings. The results should not be generalized across other educational settings. There may also be participant bias since

some of the students may have preconceived notions about tools like Grammarly. Additionally, self-reported perception data could limit the reliability of the study. Having more objective measures, including more rigorous analytic data over the course of the study period, could be beneficial.

Future research could include a broader range of students in a diverse range of doctoral programs. Having a diverse range of demographics, academic or career backgrounds, and program types should be considered to ensure the study's findings are broadly applicable and representative. Additionally, this study was conducted at a CPED, the Carnegie Project for the Education Doctorate, institution. Exploring the use of Grammarly at other CPED institutions could also provide beneficial insights into the use of technological tools for improving writing in other EdD programs. Furthermore, longitudinal studies could be beneficial if degree programs or institutions have access to Grammarly or similar tools for extended periods. Having extended access to the tool could help better explore long-term effects and usage patterns. Students' writing progress can be tracked over the course of several years in a program. This study was also limited to just one writing tool, Grammarly; it could be beneficial to explore and compare several tools to better determine effectiveness in improving writing outcomes.

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Appendix A

Doctoral Students' Perception of Grammarly for Education Survey

1. Current Role
   - K-12 Teacher
   - K-12 Administrator
   - Higher Ed Faculty
   - Higher Ed Administrator
   - Other

2. Concentration
   - Higher Education Administration
   - Socioscientific Studies
   - Nurse Educator
   - K-12 Leadership
   - Literacy Studies

3. Cohort
   - 2018
   - 2019
   - 2020
   - 2021
   - 2022
   - 2023

4. Gender
   - Male
   - Female
   - Non-binary / third gender
   - Prefer not to say

5. Race
   - White
   - Black or African American
   - American Indian or Alaska Native
   - Asian
   - Native Hawaiian or Pacific Islander
   - Hispanic Origin
   - Multiracial
   - Others

6. Age
   ● 20-29 Years Old
   ● 30-39 Years Old
   ● 40-49 Years Old
   ● 50-59 Years Old
   ● Above 60

7. Working Experience in Education
   ● 1-5 Years
   ● 6-10 Years
   ● 11-15 Years
   ● 16-20 Years
   ● Above 21 Years

8. How often do you use Grammarly for Education?
   ● Never
   ● Rarely
   ● Occasionally
   ● Frequently
   ● Always
9. Grammarly for Education effectively identifies and corrects grammatical errors in my writing.
   ● Strongly disagree
   ● Somewhat disagree
   ● Neither agree nor disagree
   ● Somewhat agree
   ● Strongly agree
10. Grammarly for Education effectively identifies and corrects spelling errors in my writing (e.g., misspelled words, mixed dialects of English, confused words, etc.).
    ● Strongly disagree
    ● Somewhat disagree
    ● Neither agree nor disagree
    ● Somewhat agree
    ● Strongly agree

11. Grammarly for Education helps improve my use of punctuation (e.g., misuse of commas, semicolons, quotation marks, punctuation in compound/complex sentences, etc.).
    ● Strongly disagree
    ● Somewhat disagree
    ● Neither agree nor disagree
    ● Somewhat agree
    ● Strongly agree

12. Grammarly for Education helps improve my sentence structures (e.g., misplaced words or phrases, incomplete sentences, etc.).

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

13. Grammarly for Education provides helpful suggestions to enhance my vocabulary and word choices.
- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

14. Grammarly for Education helps me make my writing more precise and coherent.
- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

15. Grammarly for Education offers valuable suggestions to improve my writing style (e.g., tone, wordy sentences, formality, etc.).
- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

16. The plagiarism checker feature in Grammarly for Education is valuable in ensuring originality in my work.
- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

17. The integration of Grammarly for Education into various platforms (e.g., web browsers, and Microsoft Word) is seamless and user-friendly.
- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

18. Using Grammarly for Education has improved my writing proficiency.
- Strongly disagree

- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

19. Using Grammarly for Education has increased my confidence in scholarly writing.
- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

20. Using Grammarly for Education has saved me time.
- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

21. Overall, how satisfied are you with Grammarly for Education?
- Extremely dissatisfied
- Somewhat dissatisfied
- Neither satisfied nor dissatisfied
- Somewhat satisfied
- Extremely satisfied

22. What specific features of Grammarly for Education do you find most beneficial in improving your writing? Please explain.
23. Are there any features or aspects of Grammarly for Education that you feel could be improved? Please share your suggestions.
24. Do you have any additional thoughts related to Grammarly for Education?
25. Would you be interested in participating in a 30-minute online focus group (discussion) on your experiences using Grammarly for Education? Please include your email address here if you are interested.

Appendix B
Focus Group Questions

Current Roles:
How does your current role (e.g., teacher, administrator) influence your need to utilize Grammarly for Education in your daily tasks?

Usage Frequency:
Can you share any specific instances where you found yourself using Grammarly for Education frequently?

Grammar and Spelling:
How has Grammarly for Education's effectiveness in identifying and correcting grammatical and spelling errors influenced your confidence in your writing?

Punctuation and Sentence Structure:
In what ways has Grammarly for Education impacted your ability to construct clear and properly punctuated sentences?

Vocabulary Enhancement and Clarity:
How has Grammarly for Education helped you in enhancing your vocabulary and making your writing more clear and coherent?

Writing Style and Plagiarism Checker:
How do you perceive the suggestions offered by Grammarly for Education to improve your writing style and maintain originality through its plagiarism checker?

Integration and User Interface:
How has the integration and user interface of Grammarly for Education affected your overall experience?

Overall Satisfaction:
Could you elaborate on what factors contribute to your level of satisfaction with Grammarly for Education?

Beneficial Features:
Can you provide specific examples of how the features you find most beneficial in Grammarly for Education have improved your writing?

Areas for Improvement:
How do you envision Grammarly for Education could be enhanced to better suit your writing needs and expectations?

Additional Thoughts:
Is there anything else you'd like to share regarding your experience or thoughts about Grammarly for Education that haven't been covered in the survey questions?

The Pros and Cons of AI in K-12 Education

by

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Artificial Intelligence (AI) is used in many aspects of our daily lives. AI is used frequently in universities across the world. K-12 schools do not use AI on a regular basis throughout their everyday activities in the classroom. Researchers are now focusing their attention on performing studies in K-12 education to see how different types of AI can be implemented in these classrooms daily. This paper focuses on the research studies in K-12 classrooms and whether AI is being successfully implemented in these classrooms. It also focuses on the pros and cons of using AI in K-12 classrooms. The studies show there are many pros of using AI in K-12 classrooms but there are some cons and limitations of using AI in these classrooms. The studies also state more research needs to be implemented to help successfully implement AI in K-12 classrooms.

Keywords: artificial intelligence, pros, cons, K-12, intelligent tutoring system, early warning system, ChatGPT

Artificial Intelligence (AI) is becoming increasingly popular within technology in our

everyday lives. The media talks about AI daily and how it can be used in our day-to-day

routines. The media also talks about how AI is being used in positive and negative ways.

Artificial Intelligence (AI) is the simulation of machines being programmed to think and mimic

human thoughts and human intelligence (Tanveer, Hassan, & Bhaumik, 2020). These smart

machines are built to perform and outperform humans at their jobs. The machines using AI are

programmed using smart actions, speech recognition, and visual intuition, which are human

capacities. AI seeks to automate problem solving, decision-making, and learning characteristics

of the human brain and how it thinks (Tanveer et al., 2020). With all these capabilities, AI has

been introduced into education over the past several years. Schools have been slowly integrating

AI technology into K-12 and higher education classrooms. One of the biggest ways AI has been introduced is through hybrid learning with students in the classroom and students being remote at home. This happened during COVID. Although AI is meant to help improve performance and productivity in schools, schools are hesitant to use these AI capabilities (Tanveer et al., 2020). This has led to schools weighing the pros and cons of introducing different types of AI capabilities in the classroom. There are some pros and cons of using AI in K-12 education. The pros are increasing student achievement and interactive learning through tutoring programs, apps, text-to-speech software, speech-to-text software, spell check, and games. The main cons are having the right hardware, software, money, internet, plagiarism, and privacy of student data (Tanveer et al., 2020).

The pros and cons of AI in K-12 classrooms have been researched over the past several years but not as much as higher education. These studies will be analyzed and synthesized in more detail. These studies will help schools and educators in K-12 classrooms better understand AI and how they can incorporate this technology in their classrooms safely and effectively to help their students achieve success in the classroom.

Review of Literature

The education world has been a crucial part of the lives of humans for many years (Zafari et al., 2022). Due to the growing demand for and use of AI in real world situations, there has been a growing demand for introducing and using AI in education. This has resulted in expanding more research on AI in educational settings to determine its benefits and negative effects in education. AI has made some advancements in helping educators in the K-12 classroom but there are some drawbacks that are holding educators back and being hesitant to

use AI in their classrooms (Zafari et al., 2022). First, the research studies on the pros will be analyzed. Secondly, the research studies on the cons will be analyzed.

Pros

Through most of the research articles analyzed, most of the studies conducted showed how AI helped students in the K-12 classroom. In one article, the research focused on looking at four hundred sixty studies that integrated AI in the K-12 classroom (Zafari et al., 2022). The research then narrowed that number down to two hundred ten that included full texts for their research. Research has been ongoing for about ten years, but they noticed research doubled starting in 2018. So, the study focused on any research conducted after 2017 (Zafari et al., 2022). These studies focused on student performance, selection, behavior, and teaching components using AI (Zafari et al., 2022). The study noticed there were different learning environments for each of the studies. Research has shown that learning environments play a significant role in how students learn. A student's behavior, emotions, and increased concentration can be supported in effective learning environments. Several learning environments, such as classrooms, labs, e-learning, animation, and game-based environments were used in the studies (Zafari et al., 2022). These studies showed that AI technologies improved and increased deeper learning, personal skills, and learning different topics. More AI was used in high schools than elementary and middle schools and focused on STEM courses. Most AI was implemented in these schools where there were more gaming technology opportunities to enhance student learning (Zafari et al., 2022). The studies found that AI in K-12 classrooms allowed students to obtain a high-quality learning process and helped teachers be more efficient. This research study found that there needs to be more complete studies done showing how AI is integrated in K-12 classrooms (Zafari et al., 2022).

In another study conducted, the research states that AI technology has been around in the education world for four decades but there has been limited growth in this technology (Murphy, 2019). More research has been focused now on AI in K-12 classrooms. These researchers are looking at how deep machine learning can dramatically affect classroom instruction, how students learn, and the role of the teacher in the classroom (Murphy, 2019). There has been a tremendous increase in putting more AI applications in classrooms but so far there has not been enough evidence to support these applications being useful in the classroom. There are some existing AI applications that have shown evidence of helping teachers and students in the K-12 classroom (Murphy, 2019). One AI application implemented is the Intelligent Tutoring System (ITS). This type of application adapts to the student's knowledge and only moves on at the student's pace once they show mastery of that skill. These applications are mainly used in reading and math. The ITS application has shown in research-proven results in higher grades and test scores than teacher-led instruction (Gillani et al., 2023; Murphy, 2019). This application also produced similar learning results that are normally shown during small group intervention or one-on-one tutoring instruction (Murphy, 2019). These results have been shown across all grade levels, even up to higher education classes (Murphy, 2019). Another application used in schools is Automated Essay Scoring (AES) (Murphy, 2019). This application first started out as text-to-speech, language-to-language translation, and virtual personal assistants (Alexa, Siri). Another system used more in high school and higher education is grammatical technology help, such as Grammarly. Also, the use of AI applications for reading and scoring essays for students has been administered in middle and high schools and has been shown to be just as effective as a teacher grading the essay (Murphy, 2019). A third application used in K-12 schools is the Early Warning System (EWS) (Murphy, 2019). This application is used to detect attendance, behavior, and

grade performance and identify students at risk of dropping out of school before graduating. According to Murphy's (2019) research, these applications have shown improvement with student achievement, there is still more tweaking and research to be completed on these applications to become more effective in the K-12 classroom.

A case study was completed on AI-supported K-12 classrooms using AI-based tutoring systems (Holstein & Aleven, 2022). These systems recognize students' problem-solving skills and errors to adapt instruction based on the students' needs using real-time models. This study looks at how well classroom teachers work with the AI tutoring systems to enhance student learning. Research has shown student performance has increased when using AI tutoring systems, but it has not looked at how these tutoring systems and teachers work together (Holstein & Aleven, 2022). This study created an AI tool to help teachers interact with the AI tutoring system so they can better help their students. This AI tool is Lumilo glasses that help teachers see students' screens better while monitoring and walking around the classroom (Holstein & Aleven, 2022). If a student was struggling with a certain skill on the tutoring system, a red question mark would pop up on the glasses for that student so the teacher could go over and help that student. These glasses did help teachers identify students quicker and even students they would not have known were struggling with a skill. It allowed teachers to interact with the students and help them and then move on to the next student that needed help. Teachers would also complement the AI tutoring instruction by helping students reflect on what to do next or even encouraging students that were hesitant and struggling (Holstein & Aleven, 2022). This study was conducted at middle schools with teachers that had five years of math teaching experience as well as experience with using the AI tutoring systems in their classrooms (Holstein & Aleven, 2022). The teachers were observed in three different settings. The settings included no glasses, limited

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AI technology with glasses, and glasses with analytics information. The teachers that used the Lumilo glasses with analytics were able to enhance student learning while using the AI-tutoring system. These types of complementary interactions between teachers and AI technology systems have positive impacts on the student's ability to learn and master skills (Holstein & Aleven, 2022). Although, this study suggested more research needs to be completed on teachers and AI technology interactions and more AI technology needs to be developed. It actually allows teachers and AI technology to interact in order to help increase students' learning and mastery of skills (Holstein & Aleven, 2022).

A research study was completed to determine how well students in K-12 classrooms incorporated ChatGPT with their knowledge building (Chen et al., 2023). Chen's study involved ten high school students and one teacher. The teacher was familiar with the Knowledge Building pedagogy, but the students were not familiar with the pedagogy. This pedagogy allows students to deepen their knowledge of the topic through discussions, research, and presentations (Chen et al., 2023). The students were already familiar with ChatGPT. ChatGPT was to be used as a support to help them with their knowledge of the topic. They were able to explore deeper questions to build on their knowledge and inspire discussions that generated new ideas (Chen et al., 2023). Students found ChatGPT to be very helpful and it is easier to find the information they were trying to research. Some students relied on it more than others when it came to writing mechanisms (Chen et al., 2023). The students did come up with some weaknesses and cons of using ChatGPT. These weaknesses and cons will be discussed further in the cons section of this literature review.

Another study shows research on game-based learning in K-12 classrooms. Game-based learning environments have been shown to create positive environments in the classroom for

students. These include engaging, deep, and motivated learning environments that prioritize academic subjects, pedagogy, problem solving (Lee et al., 2021). Traditional instructional methods are not as effective at helping students achieve success as digital games (Lee et al., 2021). Game-based learning has not been researched in upper elementary as it has in secondary schools. The game-based AI technology that is being researched in this study is a life-science problem solving game used in upper elementary grades (Lee et al., 2021). The students played a game where they were the ecologist studying the decline in the population of yellow-eyed penguins in New Zealand. The students use robot baby penguins in the game to gather data on the penguin population. They collect images, audio, and other data on the habitat the penguins live in New Zealand. The students complete many quests and evaluate their hypotheses with their findings. This helps teach students computational thinking skills and problem-solving skills (Lee et al., 2021). Through each task, the students are training penguin robots to recognize patterns in wildlife being observed in the game. They also program their robots to recognize the different types of wildlife as well as record the locations of different wildlife. This game-based learning AI technology is still being studied in the classroom and is being tweaked by input from the teachers and students (Lee et al., 2021). So far, this game is showing lots of potential in the classroom but needs more research and exploration to create a collaborative science game that is engaging that supports the skills that teachers are teaching in the classroom. This game allows students to learn AI as well as learn how to think computationally, learn how to solve problems, and learn how to change and adapt their hypotheses based upon the data collected in the game (Lee et al., 2021).

A study conducted by Ali et al. (2019) focuses on creating a K-12 curriculum that enhances constructionist learning, ethics, and creativity. Students will be problem-solving with

this curriculum. The researchers looked at curricula used in primary and middle schools that students used in the classroom. Robots were used to model positive learning behaviors, curiosity, growth mindset, grit, persistence, and attentiveness (Ali et al., 2019). These robots helped students be able to change their behaviors and increase positive behaviors if curiosity, grit, persistence, and attentiveness in activities in the classroom (Ali et al., 2019). In their study, the researchers also explore using robots to improve creative thinking and creativity in younger children (Ali et al., 2019). Another AI technology used is PopBots which is used for children aged four to six years old. This technology teaches creative learning activities to help students learn knowledge-based systems, generative AI, and machine learning. These activities are hands-on and project-based learning activities. Students can explore by playing rock, paper, scissors against robots to learn knowledge-based systems (Ali et al., 2019). Students also learned pitch and tempo parameters in music to determine musical emotions to learn generative AI (Ali et al., 2019). The students then learned how to teach the robot to distinguish between healthy and unhealthy foods through machine learning (Ali et al., 2019). Kindergarten students performed higher on these activities than Pre-K students performed on the activities. The highest median score was seventy percent. The researchers concluded that more improvements need to be completed to make these activities more aligned with students' developmental ages (Ali et al., 2019). Another AI technology studied was using an ethics curriculum. The curriculum teaches three lessons to students in middle school about the ethical ramifications of AI in the classroom (Ali et al., 2019). The students used Google's Teachable Machine in the first lesson of bias in facial recognition algorithms (Ali et al., 2019). The second lesson focuses on opinions and stakeholders using an ethical matrix (Ali et al., 2019). The last lesson allows students to redesign YouTube's recommender system (Ali et al., 2019). Middle school students realized how ethics

comes into play with each of these lessons (Ali et al., 2019). The last AI technology studied is the Droodle Creativity Game. This game allowed students to collaborate with a social robot using verbal and non-verbal patterns of creativity (Ali et al., 2019). The students come up with titles and compare them with the titles the social robot generates of different drawings. Students that interacted with robots in this game were more creative in their titles and generated more titles than students who did not interact with a social robot in this game (Ali et al., 2019). These technologies showed a positive outcome on helping students learn different AI technologies. Although, more research and upgrades to the activities will make the research more reliable and produce better outcomes (Ali et al., 2019).

Cons

Throughout the review of literature, there were more pro results than con results. One of the cons results was the use of Intelligent Tutoring Systems (ITS). These systems are best for helping students with facts, procedural skills, algorithms, methods, and operations in all subject areas (Murphy, 2019). The ITS are not able to support and help students with effective communication, collaboration, critical thinking, self-management, effective communication, and social and ethical awareness (Murphy, 2019). Also, students' progress through the program at different rates so a teacher is not able to teach a skill and all students are able to work on that skill on the ITS system. Teachers are not always monitoring student progress which could help teachers find students who are struggling and are able to help them with a certain skill by looking at data reports from the ITS system (Murphy, 2019).

Another con that was discovered was the use of Early Warning Systems. These systems can be biased based on the data it is reading. There is gender and racial bias based on the codes

that are input to review when making early warning data to determine which students might fail and drop out of school (Murphy, 2019). This system may over identify one group as needing more services than others based on race or gender based on false positives or negatives (Murphy, 2019). These false positives and negatives can impact how schools trust these systems. If schools do not trust the output from these systems, then, they will be more likely not to use these AI systems in their schools (Murphy, 2019).

In the Chen et al. (2023) study, the students did come up with some risks with using ChatGPT. Students saw the potential for abusing this technology. Students could possibly use this technology to come up with an essay and not revise it to be in their own words and submit the results as their work. Students are likely to use ChatGPT more often than doing their own research because they are too lazy to do the work on their own (Chen et al., 2023). The students also expressed concerns of others inhibiting their learning and intellectual growth by becoming too dependent on AI technology with ChatGPT and other forms of AI (Chen et al., 2023). They even found that ChatGPT was wrong on some occasions for data, was not current data, and sometimes the data they needed had been deleted (Chen et al., 2023). The students also stated that ChatGPT should not replace critical thinking and problem-solving skills (Chen et al., 2023).

Another study was conducted to determine the ethical implications and potential risks in K-12 classrooms (Akgun & Greenhow, 2022). There are several bias and ethical challenges of using AI applications in K-12 settings. These include discrimination, bias, privacy, surveillance, and autonomy (Akgun & Greenhow, 2022). The first concern is the privacy of teachers and students. This relates to sharing too much personal information on online platforms with AI technology. AI systems ask for consent before using the system. Most people do not know what information they are using as data that is shared with others. Teachers, students, and parents basically have

no choice but to agree and share this information when schools use these systems (Akgun &

Greenhow, 2022). Another concern is the use of surveillance. These are tracking systems that

gather information about the actions and preferences of students and teachers. This can threaten

teachers and students' privacy (Akgun & Greenhow, 2022). A third concern is autonomy. The AI

systems use algorithms to make predictions about their actions does not give people the ability to

choose their own interests and values. This can lead to bias and prejudices when the AI system

makes predictions on a person's actions using the system (Akgun & Greenhow, 2022). The last

concern includes both bias and discrimination. The bias and existing power structures are already

embedded in the AI machine-learning models (Akgun & Greenhow, 2022). Gender bias is a big

concern when gender-specific language is used, especially using systems like Google Translate

(Akgun & Greenhow, 2022). Racial bias is a concern as well with facial recognition software.

This software makes biases based on gender and can misidentify someone as a convicted felon

(Akgun & Greenhow, 2022). Due to these concerns, this study created curriculums to teach

students and teachers how to work through these ethical concerns. The study also stated there

needs to be more research conducted to teach AI and the ethics concerns that come with the

systems (Akgun & Greenhow, 2022).

In a study by Godko and Gudlin (2019), AI technology can be grouped into two types of

disadvantages. These are technical and nontechnical disadvantages. AI technology can be

addictive and result in poor academic performance as well as depression (Godko & Gudlin,

2019). The use of virtual agents can also lead to a loss of teachers in schools if it becomes

successful. Another limitation is that virtual agents can lead to less student engagement in the

classroom with teachers and other students (Godko & Gudlin, 2019). Further research on the use

of physical robots needs to be completed to determine if these robots will be more like teachers

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and improve student learning and interest in using the AI technology and collaborate with others (Godko & Gudlin, 2019).

A study reviewed literature on one hundred seven records that integrated AI, machine learning, internet of things, augmented reality, and virtual reality within K-12 classrooms (Van Mechelen et al., 2023). The functions and implications of these technologies are rarely understood due to their complex nature. Students in the K-12 classroom have limited understanding of these technologies and how to effectively use them in the classroom. There is more research being conducted on how to truly and effectively teach students how to use these technologies in the classroom to further enhance their learning and increase student performance academically in all areas of education (Van Mechelen et al., 2023). One of the limitations of this study is that the researchers only used the Scopus database to pull relevant literature. More research from other databases would have expanded their research and increased the amount of literature to choose from on these AI technologies in the K-12 classroom (Van Mechelen et al., 2023). Another limitation is only archived, and non-archived articles were included in the research to keep research current and only studying peer-reviewed articles (Van Mechelen et al., 2023). This study only focused on the emerging technologies of AI, machine language, augmented reality, virtual reality, and internet of things as these are the main AI technologies students are already interacting with frequently outside of school and in the school setting, which is another limitation (Van Mechelen et al., 2023). The study only used articles from 2020 and below as well as not including more emerging AI technology, which would be a limitation (Van Mechelen et al., 2023). A last limitation is the study did not use many researchers or authors to screen and verify the information collected. This study does state that more research needs to be

conducted on these technologies in the K-12 classroom and if it effectively improves students' academic performance (Van Mechelen et al., 2023).

In a final study, Sun and Ye (2023) conducted a study on the moral implications of AI. Moral considerations using AI systems are being researched more frequently now due to the need to understand if AI can act morally. AI robots as teachers is an example used where the robot needs to decide morally which behaviors are acceptable and which are not and how to handle these situations (Sun & Ye, 2023). AI must learn moral compasses of humans through moral norms and values of humans. Another form of morality is using technology (Sun & Ye, 2023). Humans have a moral status, but technology is neutral morally speaking. Technology and tools do not participate in morals. Moral problems can be caused by the abuse of technology (Sun & Ye, 2023). Moral issues involve the agent and patient when considering the morality of AI in education (Sun & Ye, 2023). Human beings are moral agents and patients. AI can play as moral agents whether explicitly, implicitly, or full moral agents (Sun & Ye, 2023). Although moral AI is still in its infancy in research, moral AI can be embedded into AI gradually by simulating situations in which AI technology must make decisions based on morals when interacting with students in the future. Once this can be achieved through more extensive research, this will change the way of teaching and learning through the use of AI and lead to an education revolution that will change education in a big way that we have never seen before in our society (Sun & Ye, 2023).

Conclusion

Artificial Intelligence has exploded over the past several years. It has been talked extensively about in the media and explained how it affects our everyday lives. AI has touched us in one way or another as it has been incorporated into everything we interact with daily. We experience AI through new technology at the doctor, grocery store, clothing store, internet, social media, banking, and education. Artificial Intelligence in education has been around for a long time and has mainly been used successfully and fully in higher education. Researchers have now realized over the past several years how AI can be extremely beneficial for students and teachers in the K-12 classroom (Zovko & Gudlin, 2019). There has been more research on how AI can help teachers and students be more efficient and successful in the K-12 classroom. Researchers are finding that AI can be taught and used all the way from kindergarten up to 12th grade. AI may look different at the primary rather than the secondary level, but all students can learn to use it and as well as use it successfully in their classroom. AI that has been introduced and has been shown to provide successful benefits in the K-12 classroom are Intelligent Tutoring Systems, Automated Essay Scoring, text to speech, grammar applications, language translations, Early Warning Systems, tutoring systems with integrated Lumilo glasses, and ChatGPT. Game-based learning environments are AI technology that helps students learn how to think computationally, how to solve problems, and learn how to change and adapt their hypotheses based upon the data collected in the game-based learning. Students enjoy interacting with games and learning to think critically. Students also learned how to use AI effectively and improve their creativity skills by interacting with robots and learning the ethical side of working with AI technology. There have also been some cons and concerns when using AI in K-12 classrooms (Zovko & Gudlin, 2019). These include racial bias, gender bias, abuse of AI applications, privacy, surveillance, autonomy,

discrimination, morality, and taking the place of critical thinking and problem-solving skills. Technical and nontechnical disadvantages were also found during research conducted in the K-12 classroom. Another con found in the research is one study used articles that did not occur after 2020 and studied only emerging technologies of AI, machine language, augmented reality, virtual reality, and internet of things as these are the main AI technologies students are already interacting with frequently outside of school and in the school setting instead of more technologies that students have interacted with outside of the classroom. According to the research on the cons, there still needs to be more research conducted to address and solve these concerns and more teaching opportunities to show teachers and students how to use the AI applications in the classroom. Once these concerns are solved and implemented, AI will be very useful and improve student performance and make teachers' jobs less stressful.

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How has Social-Media Affected Mental Health

by

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This study investigates the effects of social media on mental health through a survey of 261 first-year college students. Participants provided demographic information and answered questions about their social media usage and mental health perceptions. Results indicate that the majority began using social media at a young age and spent significant time daily on these platforms, with 80.3% believing social media influences their worldview and 74.5% acknowledging its toll on mental health. Findings highlight both positive effects, such as enhanced social connectivity, and negative outcomes, including addiction, depression, and anxiety. This study underscores the evolving influence of digital interaction and suggests that while social media fosters community, it also poses significant mental health risks. Implications for future research involve monitoring the dynamic role of social media in mental health outcomes as platforms and usage trends continue to change.

Keywords: social media, mental health, college students, addiction, digital behavior

The question regarding how social media has affected mental health can be interpreted in two ways. Either positive or negative. This project includes a survey given to 261 first-year college students who are asked about their demographics, use of social media, and mental health. Throughout conducting research, there have been noticeable debates on social media and mental health. Many are through journal articles such as, Ferguson, Kaye, Branley-Bell, Markey, Ivory, Klisanin, Elson, Smyth, Hogg, McDonnell, Nichols, Siddiqui, Gregerson, & Wilson (2022), where they conduct a meta-analysis over how debates have taken place with policymakers, scholars, and the public regarding social media reflecting negative psychosocial functioning.

There is also an eBook where Birch (2011) explores different case studies based on historical and critical contexts. Because such debates and analyses exist, it is important to understand how social media can affect mental health.

Literature Review

A theory that has come to the forefront regarding social media and mental health is the displaced behavioral theory. The theory explains that people who spend time in sedentary behaviors, such as social media, have less time to spend face-to-face time with human interaction, which can result in possible mental disorders. A journal article, "Exploring Adolescents' Perspectives on Social Media and Mental Health and Well-Being," by Popat and Tarrant (2022) explains how there have been qualitative studies that support the connection between social media and weaker mental health, with less perspective on adolescents. Popat and Tarrant (2022) describes, "mechanisms through which social media impacts on mental health and wellbeing: self-expression and validation; appearance comparison and body ideals; pressure to stay connected; social engagement and peer support; and exposure to bullying and harmful content," (Popat & Tarrant, 2022, para. 9). The experiment found a positive reaction from online connection but a negative emotion resulting from the fear of not knowing what is going on in other people's lives (Popat & Tarrant 2022). Essentially having the fear of missing out on something. Srivastava, Chaudhury, Prakash, and Dhamija (2019) go in depth about the psychological foundation of the use of social media. For example. "Theoretical postulates propose that self-disclosure made on SNSs [Sympathetic Nervous System] activates the intrinsic reward system due to which the behavior is repeated. High rates of disclosure are driven by motivation to share one's beliefs and knowledge about the world," (Srivastava et al., 2019, para.4). Additionally, "The user gratification theory emphasizes self-discovery, entertainment

value, social enhancement, and the need to maintain interpersonal connectivity though the construct of behavioral intentions," (Srivastava et al., 2019, para. 5). Given this information, it can be shown social media can have positive and negative effects on one's mental health. The more negative effects include depression, anxiety, cyberbullying, narcissism, self-harm and suicide, and [low] self-esteem, (Srivastava et al., 2019). The positives include how social media can connect people in different areas such as education, government, business, and more (Srivastava et al., 2019). A more common effect of social media on mental health is depression, especially in young adults. Yazdavar, Mahdavinejad, Bajaj, Romine, Sheth, Monadjemi, Thirunarayan, Meddar, Myers, Pathak and Hitzler (2020) conducted a multi model research experiment to see how depression is linked with social media. They said, "Researchers have shown that people use Instagram to engage in social exchange and share their difficult experiences. The role of visual imagery as a mechanism of self-disclosure by relating visual attributes to mental health disclosures on Instagram was highlighted by where individual Instagram profiles were utilized to build a prediction framework for identifying markers of depression," (Yazdavar et al., 2020, para. 15). Also, "visual cues gleaned from content and profile images shared on social media can further augment inferences from textual content for reliable determination of depression indicators and diagnoses," (Yazdavar et al., 2020, para. 64). Another crucial factor to mental health and social media would be the concerns of cyberbullying which can include online harassment, exposure to inappropriate violent and sexual material and the decline of face-to-face social interaction, (Collier, 2013). In his report, Collier states that there are several recommendations which include, "...discouraging children below the allowable age from opening social media accounts, incorporating topics such as cyberbullying and inappropriate use of social media into child protection guidelines and placing more emphasis on

educating parents, teachers, and children on how to safely use social media," (Collier, 2013, para. 1). However, the positive aspect of social media and mental health is that people can come together to feel supported. For example, "People with serious mental illness report benefits from interacting with peers online from greater social connectedness, feelings of group belonging and by sharing personal stories and strategies for coping with day-to-day challenges of living with a mental illness," (Naslund et al., 2020, para. 3). People with mental illness who seek help or insight from others online are learning more mental health care seeking behaviors, (Naslund et al., 2020). A review of the literature has revealed a gap in research which can be partially addressed through the conduction of a survey over how social media affects mental health.

Methods

The value of methodology is to provide enough information about the presented research so individuals may evaluate and potentially replicate the study to see the results. To generalize, the survey sample results to the overall population. The population is targeted towards college students, but the sample used is towards first year college students. Combined, these sections layout the format of what, how, and where of the research. The method used for social media and mental health was to survey 261 first-year college students, in which was a small sample of the population that was able to be reached. This type of survey was chosen due to anonymity being seen as a valuable part in this survey research, allowing participants the freedom to respond honestly. The survey included ten questions with three questions being demographics, four questions relating to social media, and three questions relating to mental health. An example of the demographic's questions include What is your gender? An example of the social media questions include How old were you when you first started using social media? An example of the mental health questions include do you believe social media influences the way you see the world

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and society? The questions were based on the research done prior to the survey's conduction. This type of survey was a quantitative method due to the questions asked. It is also important to note that this survey was voluntary. First-year college students are unbiased and were given the survey in a general education class, Introduction to Sociology, where every student must take that class. The survey's content was based on previous research connected to the research question. There has been previous research on this topic, so this study will be added to the other research.

A thorough review of the researcher's Institutional Review Board's guidelines and criteria for research involving human subjects determined that the current project qualifies as exempt from full review by the Institutional Review Board. This research was conducted in established or commonly accepted educational settings and the research involved normal educational practices not likely to adversely affect students' opportunity to learn the content or assess educators providing instruction (45 CFR 46.104(d)(1)).

Limitations

The questions asked were relevant during that time, and it was found that during this year (2022), some of the questions could have been changed or worded differently. More noticeable was the type of social applications that the population used seemed to change. Also, the population was limited to one university, with the sample size limited to one to two classes of students. There are also members of the population who do not use social media. It is also important to note that social media is constantly changing, so it can be difficult for research to develop steadily.

Findings

The first type of questions that were asked were demographic questions. There were 62.7% of females and 37.3% of males who participated, (Figure 1).

Figure 1

Illustration of Genders for the Respondents

What is your gender?
258 responses

63.2%

36.8%

● Male
● Female
● Non-binary
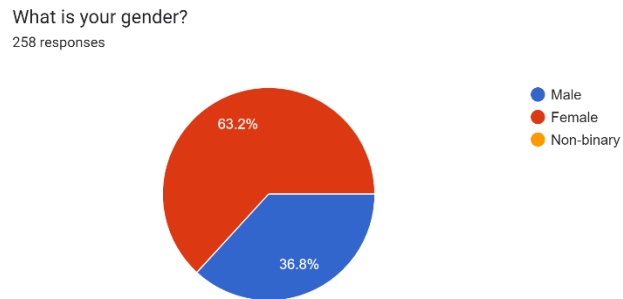
The age groups were 49.2% of 19- to 20-year-old, 27% of 17- to 18-year-old, and 23.8%

of 21-year-old and older, (Figure 2).

Figure 2

Illustration of Age for the Respondents

How old are you?
259 responses

23.6%

49.4%

27%

● 16 or younger
● 17-18
● 19-20
● 21+
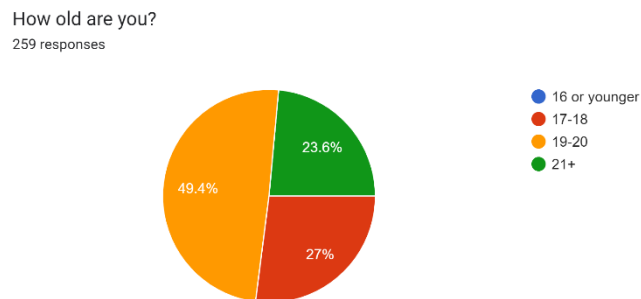
The social classes were 66.4% of middle class, 25% of working class, 4.7% of upper

class, and 3.9% of people who preferred not to say, (Figure 3).

Figure 3

Illustration of Social Class for the Respondents

What is your social class?
259 responses

- Working Class
- Middle Class
- Upper class
- Prefer not to say

66%

25.5%
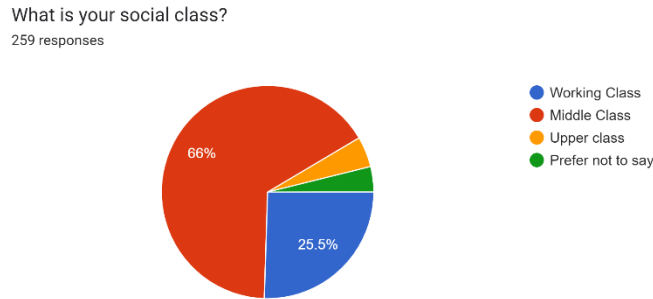
The age groups of people who first started to use social media was 60.4% of 10- to 13-year-old, 29.4% of 14- to 17-year-old, 5.9% of six- to nine-year-old, and 4.3% of 18- to 21-year-old, (Figure 4).

Figure 4

Illustration of Age Groups for First Use of Social Media for the Respondents

How old were you when you first started using social media?
258 responses

- 6-9 years old
- 10-13 years old
- 14-17 years old
- 18-21 years old

29.5%

60.1%
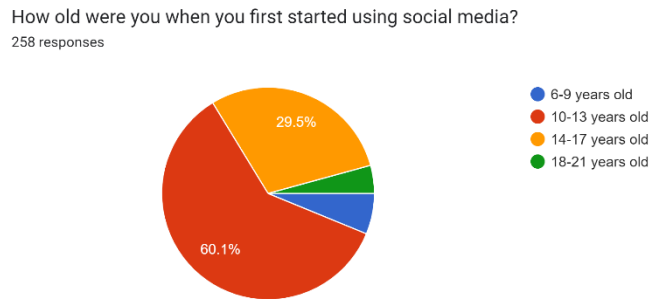
When asked what social media platforms does one use, the only options were Snapchat, Instagram, Twitter, Facebook, and other options, (Table 5). Most of the options were selected, however, 20% of people entered TikTok in the other option. The survey was conducted last year, 2021, when TikTok was not as popular as it is now. Another option that should have been on that question was none.

Table 5

Illustration of Uses of Social Media Platforms for the Respondents

What social media apps do you use? Select all that apply.
258 responses

Snapchat	243 (94.2%)
Instagram	231 (89.5%)
Twitter	113 (43.8%)
Facebook	186 (72.1%)
TikTok	11 (4.3%)
tik tok	10 (3.9%)
Tik Tok	8 (3.1%)
tiktok	8 (3.1%)
Tik tok	3 (1.2%)
Tiktok	3 (1.2%)
Tiktok, Bereal, VSCO	2 (0.8%)
Discord	2 (0.8%)
Tik Tok, Yik Yak	2 (0.8%)
Linkden	1 (0.4%)
vsco, tiktok	1 (0.4%)
BeReal	1 (0.4%)
Twitch	1 (0.4%)
Reddit	1 (0.4%)
Be Real	1 (0.4%)
pinterest, YouTube, tiktok	1 (0.4%)
Yik Yak and PIntrest	1 (0.4%)
Tik, Tok	1 (0.4%)
I used to use Facebook an…	1 (0.4%)
whatsapp	1 (0.4%)
Tik tok, pintrist	1 (0.4%)
Tiktok and pintrest	1 (0.4%)
Tiktok,	1 (0.4%)
tic tok	1 (0.4%)
None	1 (0.4%)

There was also a different question that asked how often does one use social media, the options were hourly, daily, weekly, once a month, and other options, (Figure 6). With this question the other option was used by 11.6% of the respondents. Most of the respondents said rarely, none, and it depended on the app.

Figure 6

Illustration of Amount of Time Spent on Social Media for the Respondents

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Per day, how many hours are you on social media?
259 responses

- 0-2 hours
- 3-5 hours
- 6-8 hours
- 9+ hours

60.2%
14.3%
22.4%
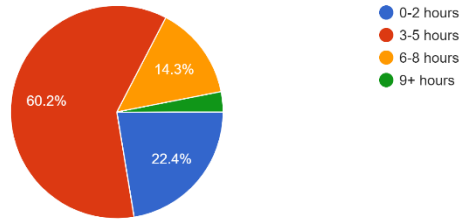
The question that asked how many hours of social media people were on per day include 60.2% of the respondents being three to five hours, 22.7% being zero to two hours, 14.1% being six to eight hours, and 3.1% being nine or more hours per day, (Figure 7).

Figure 7

Illustration of Hours Spent on Social Media for the Respondents

How often do you post on social media? (I.e, pictures, comments, videos, etc.)
255 responses

- Hourly
- Daily
- Weekly
- Maybe once a month
- Never
- Maybe once every few months
- Rarely
- Depends on what app. FB and Snap-a…

1/4

56.9%
12.2%
18.8%
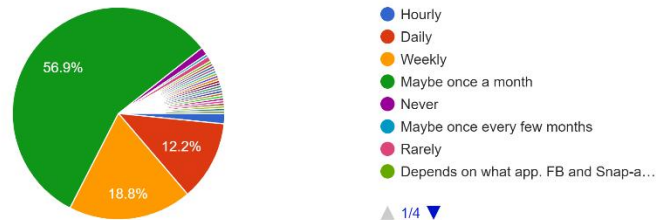
When asked if they believed that social media influences the way they see the world and society, 80.3% of respondents said yes, 14.6% of respondents said maybe and 4.7% of respondents said no, (Figure 8).

Figure 8

Illustration of Influence for the Respondents

Do you believe that social media influences the way you see the world and society?
257 responses
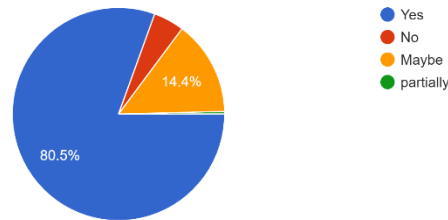
When asked if social media is addictive, 55.1% of respondents said they strongly agree, 37.5% of respondents said agree, 6.6% of respondents said they were neutral, .4% said they disagree, and .4% said they strongly disagree, (Figure 9).

Figure 9

Illustration of Addiction for the Respondents

Social media is addictive.
259 responses
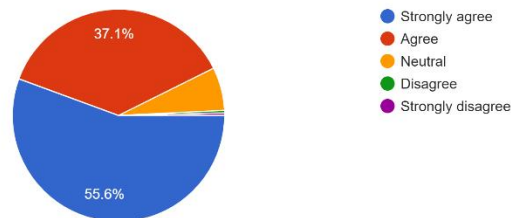
When asked if social media takes a toll on your mental health, 38.3% said they strongly agree, 38.3% said they agree, 10.9% said they were neutral, 8.6% said they strongly disagree, and 5.9% said they disagree, (Figure 10).

Figure 10

Illustration of Toll on Mental Health for the Respondents

Social media takes a toll on your mental health.
259 responses
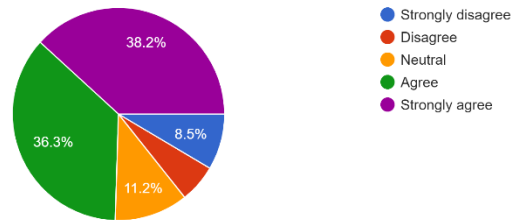
Based on these findings, it can be proven that social media can negatively affect an individual's mental health.

Discussion

Important notice of the data include that more than half the respondents said they began to use social media at ages 10 to 13 years old. The notability of this question and answer is the youthful age that the respondents began to use social media. It is important in understanding how that can contribute to exposure at an early age. The next implication of the data is that only 0.4% (one person) did not use a form of social media and more than half the respondents that use a form of social media are on it for 3 to 5 hours per day. This is revealing in terms of understanding how relevant and common social media has become. Out of 261 respondents, only one person does not use social media. The next data includes 80% of respondents said they believe social media influences the way they see the world and society, 92.7% respondents said they strongly agree or agree that social media is addictive, and 74.5% respondents said they strongly agree or agree that social media takes a toll on mental health. The indication of the above findings is social media can have a negative impact on mental health. The implications for future research include the future changes of social media and how those changes will correlate with effects on mental health. The answers to one of the questions uncovered an unexpected insight. The question was, "What social media apps do you use? Select all that apply," the

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answers to select include, Snapchat, Instagram, Twitter, Facebook, and other option. The "other"

option was used by 25.6% of the respondents, where 20% of the respondents said they used

TikTok as a social media app. This goes on to show how social media can change in a year.

After all the results were collected, it suggested that the hypothesis, social media can negatively

affect mental health, to be correct.

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Artificial Intelligence in the ELA Classroom: Secondary Teachers' Lived Experiences and Perceptions

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Artificial intelligence in education (AIED) remains one of the most talked about emerging trends in education. While artificial intelligence (AI) is not new, integrating it into K-12 schools has created a mix of positive and negative perceptions regarding how to do so effectively. This phenomenological study explores secondary English language arts (ELA) teachers' perceptions, as they offer arguably the most critical perceptions. However, they need to be surveyed more to understand this emerging trend's nuances. The literature acknowledges the identifiable benefits and challenges that play a role in incorporating AI into K-12 education, as well as the barriers preventing full integration. The findings of this study indicate a need for campus and district leaders to work collaboratively with teachers to understand how to support schools in their efforts to integrate AI into the secondary classroom effectively.

This phenomenological study aimed to examine teachers' perceptions of the use of artificial intelligence (AI) as an instructional tool in the secondary English language arts (ELA) classroom. The researchers explored secondary ELA teachers' perceptions, as they offer arguably the most critical perceptions, such as perceptions of whether the artificial intelligence in education (AIED) as an emerging trend, benefits of AIED, barriers to using AI, and what are the resources of secondary ELA teachers have to support them in teaching with AI.

Background and Purpose of the Study

The rapid advancements of AI in recent years have garnered widespread interest in its potential applications, including applications in education. The integration of AI into education (AIED) has the potential to enhance student learning experiences and decrease teacher workload, but it is not without complexities. Educators and educational leaders must understand the challenges of incorporating AIED to successfully integrate AI into classrooms, which will require them to adapt their instructional strategies and pedagogical approaches—the willingness to embrace new approaches being paramount to successful integration. One current barrier to that understanding is a lack of research around teacher perceptions of AIED integration.

The purpose of this phenomenological study was to examine teachers' perceptions of the use of AI as an instructional tool in the secondary ELA classroom. Integrating AIED has become a widely discussed trend and educators have expressed mixed views about its impact and potential. While conversations are occurring, the challenge of a growing fear of this technology is also emerging. There are three research questions that guided this study:

1. What are secondary ELA teacher perceptions of the use of artificial intelligence (AI) as an instructional tool?

2. What are secondary ELA teacher perceptions of resources needed to use AI as an instructional tool?

3. What are secondary ELA teacher perceptions of barriers to using AI as an instructional tool?

Literature Review

Perceptions of Artificial Intelligence

The trends in the literature show that machine learning (ML) and AI are critical drivers of growth and innovation that benefit both the field of education and teachers/students as individuals (Karandish, 2021). The development of digitalization has produced significant changes in the field of education (Yang & Chen, 2023). Bartholomew et al. (2020) discussed the role of technology in education and the challenges and successes of reinventing high schools to meet the needs of students and society. However, more research is needed from educators and learning designers on how to integrate AI applications through the student lifecycle so that they can be empowered to access the opportunities afforded by intelligent learning and teaching systems (Zawacki-Richter et al., 2019). The hype surrounding AIED may be attributed to the recent progress in AI, but clarity is lacking around how the development of machine learning can be effectively applied to AIED (Humble & Mozelius, 2022).

Although AI applications attract a significant amount of negative attention and criticism, many researchers (Chen, X. et al., 2021; Chiu et al., 2023; Homolak, 2023; Huang et al., 2023; Humble & Mozelius, 2022; Kolchenko, 2018; Kong et al., 2023) have highlighted the positive outcomes of integrating AI into education. Kong et al. (2023) listed gains in AI concepts, AI literacy, AI empowerment, and the ability to bridge the gender gap as potential benefits, while Chiu et al. (2023) added that providing adaptive teaching strategies, enhancing teachers' ability to teach, supporting teachers' professional development, and predicting students' performance to the list of benefits.

Other studies elaborate on these claims by listing the many benefits that contribute to improving our lives. According to Chen, X. et al. (2021), instructional tutors (ITs) have proven

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efficacy in special education settings, specifically with students on the autism spectrum. It can reduce anxiety and maintain the engagement of students with autism, giving hope for future advancements in special education. Chen, X. et al. (2021) also argued that learners acquiring a second language could benefit from AI that provides input that reduces learners' doubts and anxieties about their second language competence and facilitates their language performance and motivation through online collaboration. Likewise, Huang et al. (2023) urges that AI has the potential to enhance language education and increase motivation in students utilizing technology-enhanced language learning (TELL). According to Kolchenko (2018), despite the usefulness of AI programs as learning tools, AI could not replace an experienced educator; the impactful use of non-verbal cues in the classroom, such as facial expressions, posture, movements, and immediate reactions, cannot be mimicked with AI.

Resources of Artificial Intelligence

Ragoonaden (2017) found a lack of available support systems for teachers, affecting their overall health and well-being and leading to 30-50% of teachers leaving the profession within the first five years. While AI can be a solution to combating this issue, challenges with AI prevent it from being widely and immediately embraced by K-12 school districts across America. Thus, a need to explore teacher perceptions and the resources they need to implement AIED exists. Researchers noted resources for personalized learning and professional development were not only necessary, but accessible with the use of AI. Personalized learning, empowered teaching, and professional development opportunities are enhanced through AI technologies (Chen, X. et al., 2021; Lameras & Arnab, 2021; Özer et al., 2020).

Personalized learning systems are among the most common applications available to assist teachers and students (Akgun & Greenhow, 2022). AI-powered tutoring systems can adapt

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to the individual needs of each student, providing them with the specific instruction and support they need to succeed (Chen, C. et al., 2021; Chen, X. et al., 2021). These systems can also track student progress to identify areas of needed support/intervention (Chen, C. et al, 2021; Chen, X. et al., 2021). An additional form of personalized learning that is increasing in popularity is AI-powered chatbots. Chatbots are especially helpful in using a humanlike tone to converse naturally (Akgun & Greenhow, 2022). In the field of education, chatbots are seen as the future of technology integration and their effectiveness relies heavily on the beliefs of teachers (Yang & Chen, 2023). They argued teachers' perceptions of chatbots are evident through their instruction and how they use the technology. Lee et al. (2020) researched several different chatbots and discussed possible ways that language teachers could use them to teach their students. Teachers have discovered their students can practice speaking and listening skills by conversing with chatbots in their chosen language; thus, chatbots have helped students master speaking and listening components in the curriculum (Chen, X. et al., 2021; Lee et al., 2020).

Patton et al. (2015) examined various professional development programs that empower teachers to take ownership of their learning to develop their individualized teaching practices. Educators need to develop technological competencies and collaboratively explore the impact of technology on teaching and learning (Bakir, 2016).

Barriers to Using AI

The primary barrier regarding AIED is the issue of ethics; educational leaders must ensure schools foster a climate that builds AI literacy while considering and teaching ethics, and professional development must also focus here (Su et al. 2023; Yang & Chen, 2023; Akgun and Greenhow, 2022).

Tlili et al. (2023) noted that for specific AI applications such as chatbots, a reliability challenge exists amongst educators. The reality that AI exhibits autonomy highlights the system's capabilities and exposes what can be rationally feared by those capabilities (Walsh et al., 2021). The issues of reliability and fear are further compounded by barriers surrounding professional development, ethical concerns, academic integrity, and lack of understanding of teachers' needs.

Discussions of the implementation of AIED have raised ethical concerns involving the principles of pedagogical appropriateness, children's rights, AI literacy, and teacher well-being (Adams et al., 2023). Ethics and education are intertwined in the development of society, placing primary emphasis on the consideration of ethics as we integrate AI into the field of education (Yu & Yu, 2023). Adams et al. (2023) emphasize the critical need to address ethics related to AIED, including spreading disinformation from seemingly credible sources. Similarly, Manyika (2022) addresses both the promises and potential risks of AI, emphasizing the importance of responsible and ethical development and implementation. Tasioulas (2022) highlights the importance of human values, rights, and dignity in shaping the development and deployment of AI technologies. In addition to the need for teachers and other stakeholders to understand the complex landscape of AIED, there remains a need for more pedagogically responsive ethical approaches to AI integration in K-12 education (Adams et al., 2023).

Methodology

Research Design

This study employed a phenomenological approach. Phenomenology attempts to reveal the significance of individuals' lived experiences through empirical, subjective data, making it a

good fit for studies in the field of education, since educators are encouraged to question established norms and procedures (Joyner et al., 2018; Larsen & Adu, 2021). This type of research is best suited for gathering and analyzing the perceptions of a targeted group of educators about the use of AI as an instructional tool in the classroom through their thoughts, attitudes, and experiences with the use of AI.

Participants

This study occurred at a suburban public high school campus (grades 9-12) in the Greater Houston, Texas area. According to the TAPR report (Texas Education Agency, 2022), the district serves approximately 13,658 students and is expected to grow to more than 22,000 students by the 2031-2032 school year. The student population comprises 55.7% White students, 38% Hispanic students, 2.5% African American students, and 1.1% Asian students. The district's secondary campuses service almost 7,000 students among four secondary campuses. There are roughly 900 teachers in the district and 400 of which are secondary teachers. The researchers purposefully sampled participants engaged with the phenomenon (Creswell, 2007) to create a representative group engaged with curriculum that is relevant to the study. Individuals involved in this study were certified and experienced secondary ELA teachers, teaching ELA courses in grades 9-12 for a period of 1-37 years. The sample size was manageable at ten study participants (n=10) yet sufficient to ensure data saturation. Upon receiving consent forms to participate, a meeting was scheduled to address any questions the participants had regarding the study.

Data Collection

This research study used semi-structured, one-on-one interviews to gather the necessary data. Semi-structured interviews offered the ability to capture study participants' perspectives on each research question. When needed for further clarification, open-ended, follow-up questions

were asked. The interviews were conducted using the Zoom platform, with video and audio, to capture verbal and nonverbal interactions that could enhance the data collected.

Prior to conducting the study, the researchers developed an interview protocol and had it reviewed by professionals in the field prior to distributing it. This review helped ensure the interview questions would garner data needed to address the research questions, there was no implicit bias in the protocol, and there were no leading questions that would influence answers in a particular direction. The interview protocol was included in the proposal and sent for IRB approval. Additionally, the researchers obtained permission from a representative of the district being studied.

With verbal consent, the study participants' interviews were audio and video recorded in Zoom to be transcribed and later analyzed. Study participants also received a consent letter informing them of the risks, benefits, and assurance of voluntary participation. Details included how data and information will be secured for one year and an acknowledgment that the only benefit to participants was their contribution to scholarly research.

Data Analysis and Trustworthiness

The data were analyzed using descriptive and thematic coding with a coding scheme. The transcripts were read and annotated to pull separate thoughts and ideas. Each thought or idea provided by a participant was described using a single word or phrase that best represented the overall idea. After each transcript was hand-coded descriptively, the researchers grouped minor descriptions into broader descriptor groups. The next step with thematic analysis allowed the researchers to identify themes, patterns, and categories in the data. The researchers then dual-coded each transcript by running them through NVivo. This ensured the transcripts were coded without bias and the interpretations were accurate.

Ensuring the trustworthiness of qualitative research findings is crucial to maintaining the integrity of the study. Therefore, the researchers utilized triangulation by incorporating several strategies to enhance the study's trustworthiness. Through peer review, the researchers sought the help of professionals to analyze the interview protocol to check for bias, any leading questions, and ensure alignment to the research questions. The researchers established prolonged engagement with study participants to build rapport and gain a deeper understanding of their perspectives in the interview process. The researchers also utilized member checking, allowing participants the chance to discuss the researcher's interpretation of their experiences after the transcript was hand coded. After participants confirmed the researchers' interpretations from the hand-coded transcripts, the transcripts were dual-coded with the use of NVivo. By incorporating these strategies, the researchers ensured the trustworthiness of the study and reinforced the qualitative findings reported.

Findings

Research Question 1

Research question one focused on teacher perceptions of how artificial intelligence (AI) could be used as an instructional tool in the secondary classroom. Three themes emerged during the data analysis portion of this study: *emotional impact*, *practical uses*, and *potential impact* (see Table 1). All participants shared their belief that artificial intelligence can be beneficial as an instructional tool in secondary classrooms. Participants expressed this with phrases like *definitely beneficial*, *very helpful*, *good tool*, *a blessing* to describe how they felt about using AI as an instructional tool. Participants used *excited*, *hopeful*, *intrigued*, and *overwhelmed* to describe their feelings about integrating AI into their instructions.

Participants had many ideas for practical use based on ideas they had either heard of from a colleague or tried themselves. While many participants shared ideas for practical uses and the potential impact of integrating AI into their classrooms, almost all participants admitted they were not regularly using such in their own classroom instruction and cited their reason for not yet attempting to integrate AI into their instruction as *not knowing where to start*. That exact phrase was expressed seven times throughout the data collection process. Even though many participants had not yet attempted to incorporate AI into their classrooms, they all shared positive statements regarding the potential impact they believed integrating AI could have.

Table 1

Perceptions of the Use of AI as an Instructional Tool

Theme	Response
Emotional Impact	I've been teaching for a while and sometimes what I've always done isn't what's best for kids today, so I think it [AI] is very beneficial when looking for new, more innovative ideas, but I don't even know where to start.
	Teaching is not designed for AI; it's unnatural in so many ways…I feel like a math teacher before the calculator was invented. It pushes me to be a more proactive educator.
	I have not used AI at all […] it's been a fear […] I don't know what to do with it [AI] in my own practice.
	I'm excited [about the potential of AIED]...in terms of my perception, it's excitement.
	I'm overwhelmed [about the thought of integrating AIED] you know, because I don't know where to start.
	I know some [...] who use it in ways that I feel is not necessarily responsible.
	I feel like [AI translation programs], what a blessing for them [ESL students].

	I think it [AI] can be a beneficial tool as long as we don't rely too heavily on it.
	A lot of educators, especially those of us who are older, didn't have access to this [AI] when we were studying to become educators, so the idea of it sounds scary.
Practical Uses	I hear the bad sides of it [AI] through the media...students are using it to write essays for them.
	I have used AI to help me create test questions and create essay prompts.
	I think AI could be really good for helping students generate ideas…cut down on some of those blank stares when they see a prompt for the first time.
	I personally use it outside of education for creating thoughts and gathering ideas…I found that it can help me with sparking creativity. AI gives me a starting point. I think it's really helpful when looking for multiple choice questions or open-ended questions.
	AI can be used to make personalized study plans…brainstorm ideas for writing prompts, create test questions, provide summaries of readings.
	I've used AI to create CFAs (common formative assessments) and the higher-level thinking questions that we use on exams.
	I've used AI to create rubrics for writing assignments.
Potential Impact	I would say it [integrating AI] is definitely positive and gives teachers a lot of flexibility.
	One of our programs we use in class has an AI feature that will grade short constructed responses which saves teachers time and gives them access to more resources.
	If you have access to the AI…that would enhance the learning process.
	I think the idea is that [AI] becomes the tool and not the master, so controlling it rather than being controlled by it should be the bottom line.

I think anything that can help us [teachers] save time is going to be a positive.

One of the big things is teacher time because in our profession, teachers are leaving in droves.

Research Question 2

Research question two identified teachers' perceptions of the resources needed to use AI as an instructional tool in secondary classrooms. Table 2 shares the identified themes that emerged as *technological infrastructure, professional development,* and *acceptable use policy*. The overwhelming resource identified by most participants was their desire to be trained in AI programs before they felt comfortable allowing students to use AI. Additionally, many participants shared their concerns about a lack of technology, mainly in the form of Chromebooks. They stated that while they have access to Chromebooks, they never have enough for all students to have a device. While participants revealed excitement and hopefulness for integrating AI into their classroom, several participants were adamant that they would not do so unless a policy addressed acceptable use. A few participants shared their experiences with utilizing AI as a teacher to help with mundane tasks. However, most participants seemed unaware of the capabilities of AI for teachers' use. Participants' responses revealed a grave need to develop a professional development plan for student and teacher use

Table 2

Perceptions of the Resources Needed to Use AI as an Instructional Tool

Theme	Response
Technological Infrastructure	I feel like, ideally, each student needs their own computer, and I only have 12 computers in my classroom. Just having the technology for students to access is probably the most necessary resource.

	The sites are blocked; they don't have access to any .ai domains.

In order to use AI in the classroom, you have to have technology…and WiFi to connect to the different programs.

Technology! For me, doing digital work, in general, becomes a conundrum because I don't have the technology/technological resources to do it.

Mostly it's going to be technological resources.

I'm struggling to get computers for all my students, so when we do computer work, I kind of just hope someone is absent so I don't have to go find another computer. |
| Professional Development | I think that training is needed, purposeful training. You need someone energetic and knowledgeable to come in and tell us how to properly use this [AI] and then show us. We need somebody to be our guiding teacher to show us how this can actually be beneficial.

I think with training it would definitely be beneficial.

I need to see it [AI programs] in action and I need to know what that looks like. I'm interested in being trained.

As teachers, we need to be trained–either online professional development or before the school year starts, so we would have to learn how to use it.

I think a resource that is needed is some sort of training for teachers so that they know how to use AI.

Finding the tools is one thing, but learning to use them correctly…we need training on how to use the products. |
| Acceptable Use Policy | I feel like teachers hold back on it [integrating AI] because we need to teach students how to use it responsibly.

I will not be putting AI in my classroom anytime soon unless that training happens…unless we are able to use it properly and teach our students how to use it properly.

More research needs to happen before we implement…how do we teach students that even though this [AI] is an option, how do we use it ethically? |

> We don't know how to teach students to use it [AI] because we
> didn't use it when we were in school…they're going to grow up in a
> world with AI, so we have to teach them how to use it the right way.
>
> I've already had instances where students have used AI
> inappropriately. We're not building skills if they're using AI
> inappropriately. The big thing is teaching these kids appropriate use.

Research Question 3

Research question three revealed teachers' perceptions of the barriers impeding their use of AI as an instruction tool. Table 3 shows the major emerging themes, such as *time constraints*, *ethical concerns*, and *quality and accessibility*. Some participants expressed that the lack of resources was the most significant barrier and firmly believed that not having professional development was a significant barrier for them. Although all participants seemed open to integrating AI into their classrooms, many expressed hesitations stemming from their lack of knowledge about how to use AI and their inability to identify quality AI tools. Many participants did not feel they could identify high-quality AI tools simply because they had not been exposed to various programs and their uses.

While the majority of participants mentioned time constraints being a barrier, one participant expressed that not only did they feel time constraints were impeding them from integrating new tools, such as AI, in their instruction, but they felt these time constraints were also one of the most significant contributing factors to the teacher shortage they are experiencing, making it increasingly more difficult to find time for this integration when they are shouldering the burden of a teacher shortage. Another participant elaborated on the barrier of time constraints resulting from the lack of flexibility in the curriculum. Regardless of where the time constraints stemmed from, many participants felt the need for more time to learn and explore these AI programs kept them from integrating AI in their classrooms.

Another significant barrier, according to participant feedback, was their concerns about ethics. While many participants mentioned ethics, a variety of responses indicated this as a barrier. Some participants felt that teachers using AI programs to grade assignments violated ethics. In contrast, most participants with ethical concerns were more concerned with when and who would teach students ethics involving AI. Other participants mentioned their concern with AI lessening the likelihood of students increasing their critical thinking and writing skills if they lack the ethical considerations for using AI.

Table 3

Perceptions of the Barriers Impeding the Use of AI as an Instructional Tool

Theme	Response
Time Constraints	I think the true barrier is time. We just don't have time to do this.
	The time factor comes in. When am I going to have time to do this?
	It takes time to teach them [students] ethics and proper usage.
	When I look at my curriculum calendar, there is little to no wiggle room to squeeze in time to add this [integrating AI].
Ethical Concerns	My hesitancy is that students will rely too heavily on using AI and not the skills or techniques we talk about in class .It's important to be able to use AI ethically, and you need to have those skills.
	One of the biggest barriers would be ensuring that we're using AI ethically.
	I think the idea behind ethics is that we are training our students to use it to be able to think critically...that's a real world skill.
	Ethically, there are huge barriers…they need to be able to think, read, and write independently and not rely on AI.

	We are going to have to teach kids how to use it the right way, and I don't know what that looks like.
	Misuse is probably my biggest barrier to integrating AI in my classroom.
Quality and Accessibility	Those sites are blocked. They don't have access to any .ai domains.
	Many students expressed fear about the AI programs and how invasive they would be.
	I think it's going to take time to filter through the various sites to find what schools are comfortable using. Until those sites are identified, I think that will remain a barrier.
	There are things that need to be tweaked…in the next 5 or 10 years, once AI becomes more stable…with more boundaries…I'll feel like it's right for education.
	Technology hasn't always been kind to teachers…the fact that we don't know enough about AI or its ramifications…the biggest thing is just the unknown–it causes and creates panic; we're just scared.
	AI lacks voice and personality and I feel that's important for students to integrate into their writing…the lack of sophistication in the AI…it doesn't always offer what you're looking for.

Implications

Findings revealed many positive perceptions of the potential impact of integrating AI in secondary classrooms but also indicated a gross lack of time and training. Participants overwhelmingly agreed that a significant barrier impeding this integration was the need for more training on AI programs for students and teachers. Anders (2023) designed a model that details the continuum of integration as starting with AI only being discussed in the classroom and goes all the way to full integration where students use AI for all aspects of work. It is critical that

before the integration begins, all stakeholders understand the continuum of integration to understand the goal of full integration.

Future Direction

Phenomenology can involve a streamlined data collection form, including only single-participant interviews (Creswell & Poth, 2018). Therefore, the researchers recommend that future researchers explore varying methods to understand the nuances of integrating AI into secondary classrooms. A limitation of this study was the small sample size chosen from the target population. While previous research urges more qualitative studies to be conducted, the researchers recommend seeking participants within the target population who teach various contents beyond this study's ELA teachers.

Additionally, the researchers recommend utilizing a research site that has already begun integrating AI as an instructional tool. This research site would serve as a pilot school to guide future research and capture the perceptions of all stakeholders while also providing crucial data regarding the impact of AI on student learning outcomes and teacher satisfaction, which could be used for future studies on teacher retention.

Conclusion

Teachers' perceptions of using AI as an instructional tool can potentially change the trajectory of 21st-century instruction. These perceptions have the power to impact the implementation of AI in classrooms worldwide. Suppose teachers exhibit positive perceptions of implementing AI and believe that AI can enhance their instruction and student learning outcomes. In that case, they will be more likely to incorporate AI as an instructional tool in their classrooms. On the contrary, teachers with negative perceptions of using AI as an instructional tool will act as an additional barrier to implementing AI in their classrooms. Whether teachers'

perceptions are positive or negative, it is crucial to understand and address them to target their needs appropriately.

The findings of this study reveal an overwhelming number of positive perceptions, revealing participants' excitement and curiosity surrounding the integration of AIED. These implications justify the implementation of ongoing professional development and training to address the needs of participants. Participants' beliefs, attitudes, and willingness to adapt their instruction to incorporate these tools can shape the future of education and profoundly impact student learning. If the participants in this study are truly reflective of the target population, the findings imply that secondary teachers are eager to learn more about using AI and are likely to integrate AI as an instructional tool.

This study also revealed the perceived resources needed and barriers preventing the integration of AIED. The data showed a significant concern for ethics regarding teacher and student use of AI. Additionally, the findings showed the shared concern for a sufficient technological infrastructure in the form of stable Internet/wifi and hardware/devices. Although many participants shared their hope and excitement about integrating instructional tools such as AI, there was much hesitation surrounding the issue. The data confirmed training to be the most needed resource for teachers and students to integrate AIED. This study serves as a reminder of the ever-evolving nature of the field of education. It reinforces the need for teachers to have a voice in the pivots made regarding instructional practices. By valuing and understanding the insight of teachers, we can move forward with a more informed approach to using AI as an instructional tool. We also look forward to more systematic and updated professional development on AI training for teachers in the near future.

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Exploring Online Text Response and Discussion Across Platforms

by

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As online college course offerings continue to increase, instructors must continue to research, develop, and implement best practices in online environments. One particular area of concern is the use of discussions in online classes, specifically to ensure that these discussions are effective learning tools rather than busy work. In classes focused on literature, some form of online discussion is imperative, leading the authors of this paper to explore multiple types of online discussion across various platforms. The authors have implemented five different forms of online discussion in an Introduction to Children's Literature course, including both synchronous and asynchronous discussions and including platforms such as D2L, Nearpod, Zoom, and Flip. This paper lays out the parameters of each form of discussion, discusses student performance in each type of discussion based on rubrics, and shares insights from students regarding their feelings about and experiences with each of the discussion types. Implications for the implementation of discussions in online classes are discussed.

Keywords: online learning, digital discussions, education

The expansion of online course offerings has become a prevalent trend in education. Discussions play a crucial role in enhancing the learning experience within online classes (Kohler et al., 2020; Lee & Martin, 2017). This is particularly true in the context of literature courses, where discussions provide an avenue for students to engage deeply in texts, share interpretations, and explore diverse perspectives (Carter et al., 2024). Ensuring that these discussions are effective learning tools requires thoughtful design and facilitation. Educators must encourage active participation, foster respectful dialogue, and create an inclusive environment. As we shift to increased online course offerings, it is important that we explore ways to make online discussions as rich as a learning experience as possible.

In teacher education courses, online discussions have often been deemed the least useful component of online learning experiences (Lee, 2014). Kohler et al. (2020) explained that

student participation in asynchronous online discussions is a complex and multifaceted endeavor. It is necessary for online course instructors to transform these discussions from seemingly busy work into effective learning tools (Gao, 2014; Lee & Martin, 2017; Xie & Huang, 2014). By fostering meaningful engagement, designing purposeful discussion prompts, and leveraging various platforms, we can elevate online discussions to a pivotal role in online learning experiences.

Methods and Data Sources

This study took place in an undergraduate course in children's literature. All students enrolled in the course were education majors, either studying elementary education or special education, and all students were either in their sophomore or junior year. The study took place over a span of two semesters; in the first semester, there were 24 students in the course, and in the second semester, there were 18 students. It is important to note that this online course existed within a predominantly face-to-face program, so the students involved were accustomed to taking mostly face-to-face courses.

This study was conducted by the course instructors, using instructional materials for the course, along with an end-of-course survey. Data sources included: (1) students' discussion posts across the various platforms required in the course; (2) rubrics scored by the two course instructors to assess students' discussion posts (see Figure 1); and (3) end-of-course student survey regarding students' feelings and preferences about the online discussions.

Figure 1

Text Response Rubric

Criterion/Score	3	2	1
Student knowledge and understandings	Response provides sufficient depth and evidence to demonstrate student's understanding of the text/topic	Response provides some depth and evidence to demonstrate student's understanding of the text/topic	Response lacks depth and does not demonstrate student's understanding of the text/topic
Text references	Clear, accurate response with details, evidence, and examples to support claims with consistent and relevant evidence cited from text	Response includes details, evidence, and examples to support claims with some evidence cited from text	Response lacks details, evidence, or examples to support claims; no evidence cited from text
Use of platform	Response effectively uses tools and features of the platform to enhance communication of thoughts and ideas	Response attempts to use tools and features of the platform to communicate thoughts and ideas	Response does not use tools and features of the platform to communicate thoughts and ideas
Peer Engagement	Rich engagement peers with authentic discussion; invites meaningful exchange of ideas and responses	Some engagement with peers in authentic discussion, while some of the discussion is surface-level and artificial; invites exchange of ideas and responses	Discussion with peers is artificial, surface-level, and forced; does not invite exchange of ideas and responses

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Five types of discussions were implemented in the course across four different platforms.

1. *Text-based discussion on D2L Brightspace* (our university's Learning Management System or LMS). This discussion type was a traditional text-based discussion, in which students responded in writing to a prompt and then provided written responses to their peers' posts, all done on a shared discussion board. This was an asynchronous discussion.

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2. *Video discussion on D2L Brightspace*. This discussion took place in the same environment as the text-based discussion, but students were instructed to either record and upload a video instead of sharing a written response or to use the video record feature embedded in the D2L discussion board. Again, this was an asynchronous discussion. Students posted their videos in response to a prompt and then provided written responses to their peers.

3. *Collaborative board discussion on Nearpod*. This discussion occurred within an instructor-created presentation on Nearpod; embedded within the slideshow were several collaborative boards, where the instructor posed a question and students could respond to the question, respond to peers, or "like" their peers' posts. All responses were written. This was an asynchronous discussion.

4. *Video discussion on Flip* (formerly Flipgrid). Students recorded videos of themselves responding to the prompt or piece of literature, and their peers could respond to their posts in either written or video form. Again, this was an asynchronous discussion.

5. *Live video discussion on Zoom*. This was our only example of a synchronous discussion. Students joined a live Zoom meeting and then moved to breakout rooms to engage in small group discussions, while the instructors moved among rooms to observe snippets of discussion from all groups.

Findings

The results from this research can be divided into student performance and student preference. The discussion of student performance is based primarily on the rubric that was used to assess students' discussion posts, along with observations by the course instructors. The

discussion of student preference is based primarily on the survey that was administered at the end of the course regarding students' feelings and preferences about the discussion types.

We will focus on three of the five discussion types used in the course: the text-based discussions in D2L, the Nearpod collaboration boards, and the Flip discussions. We chose to exclude the video discussions in D2L due to technical issues and obstacles; students and instructors had a difficult time utilizing this platform for video discussions, because of the time required for uploading and downloading videos. The integration of videos on this platform was not as seamless and user-friendly as we had hoped, so after one attempt in each semester, this discussion type was abandoned. Because the Zoom discussions varied greatly from the other types of discussions used, we will discuss them separately at the end of this section. A comparison between this synchronous discussion and the other asynchronous discussions is difficult and not particularly useful.

Student Performance

In the analysis of student performance and engagement within the educational platforms, several trends emerged. Following the rubric that was used to assess students' discussion posts, we considered how students performed in each discussion related to their knowledge and understanding, text references, use of platform, and peer engagement.

Student Knowledge and Understanding

In assessing student knowledge and understanding across the various platforms, the analysis revealed few significant differences. Rubric scores in the area of student knowledge and understanding were relatively consistent across the Flip and D2L text discussions. However, a discernible trend emerged concerning the Nearpod responses, which frequently lacked depth and evidence compared to those on other platforms. Specifically, Nearpod responses tended to lack

the necessary elaboration and substantiation, impacting the overall quality of understanding demonstrated by students. This may have been due in part to the structure of the Nearpod collaboration boards, where the responses are generally the size of a post-it note. This platform could be very effective for certain kinds of discussions or certain prompts, even though it did not work as well for the literary response in this course. Another possible explanation is that students were less familiar with this platform and gained less experience with it, even in our course, than the other platforms.

Text References

When considering text references within the discussion responses, similar observations persisted, with Nearpod responses being notably deficient in text evidence and support. Again, this may have been attributed to constraints imposed by response length limitations inherent to the platform; the Nearpod responses are generally much shorter than those allowed by other platforms. Both the D2L text discussions and the Flip discussions saw many more instances of students' citing and referring to textual evidence. On D2L, text references typically appeared as students citing a quote from the text and then discussing their thoughts about or analysis of the quotation. On Flip, we frequently saw instances of students reading a citation from the text and then discussing it. There were also cases of students using the platform feature to type text onto the video screen, so that the quotations appeared on the screen as they were discussing them. This finding regarding text references underscores the importance of considering platform-specific constraints when selecting platforms and evaluating student comprehension.

Use of Platform

Responses posted in Flip garnered the highest scores in terms of use of platform, with Nearpod trailing behind in second place. In Flip, students utilized the video capabilities for their

discussion responses as well as their responses to peers. Students used the available tools to overlay text on their video screens, including emphasizing the titles of the literature, summarizing key points as bullets, and highlighting important quotations from the text. Within Nearpod, the use of tools and features came primarily through the use of "likes" and the composition of their ideas to fit the "post-it note" style of response. There were fewer observed instances of utilizing various tools and features within the D2L text-based discussion. It is important to consider that the efficacy with which students use features of the platforms may correlate with their familiarity with those platforms. There is a learning curve to becoming proficient in any new online environment; students who were not using the available tools and features may have not been doing so simply because they were unaware of them or did not know how to use them. For this reason, it may be useful to provide a tutorial or set of resources to students for learning about the selected platform or to offer more regular and extended opportunities for students to engage in one specific platform to become proficient with all the tools and features.

Peer Engagement

In terms of peer engagement, Flip once again emerged as the platform with the highest scores, indicating strong interactivity among peers. Students seemed to have more to say to their peers in Flip, both in number of responses and in length of responses, particularly when they replied to peers as videos rather than written responses. Less frequent but noteworthy instances of high engagement were also observed on both D2L and Nearpod. The text-based D2L discussions stood out for the prevalence of "I agree"-type responses, suggesting mostly superficial and artificial interactions between peers that merely served to meet the assignment

requirements. Flip seemed to encourage deeper, more meaningful, and more authentic engagement among peers.

Student Preference

The results of the student survey shed light on clear preferences regarding the modes of interaction within educational platforms. Notably, students expressed a distinct preference for text-based discussion boards and the Flip platform. Within these preferences, several key issues surfaced. Students articulated challenges related to the gathering of their thoughts, indicating a need for platforms conducive to thoughtful expression. Additionally, considerations of familiarity with different discussion types and platforms emerged as significant factors influencing student preference. Students also emphasized the importance of building a sense of community through discussions, suggesting a desire for platforms that foster genuine connections among peers. Finally, authenticity within discussions emerged as a central concern, with students valuing platforms that facilitate meaningful and genuine exchanges. These insights underscore the importance of considering student perspectives when designing and implementing educational platforms, highlighting the need for tools that promote thoughtful interaction, community-building, and authenticity in online learning environments.

In the survey, students were asked to rate three platforms (D2L text-based discussions, Nearpod, and Flip) on a scale of 1-5 on four different criteria: personal expression of ideas, authentic environment for responding to texts, authentic engagement with peers, and engaging platforms for responding to texts. The results of this survey are displayed below in figures 2-5.

Figure 2

Student survey feedback regarding Personal Expression of Ideas
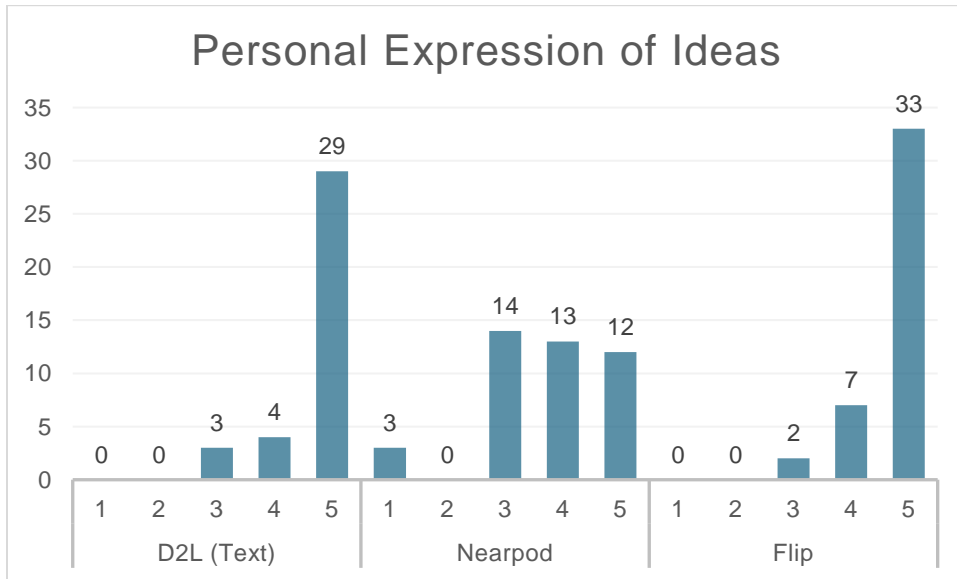
Figure 3

Student survey feedback regarding Authentic Environment for Responding to Text
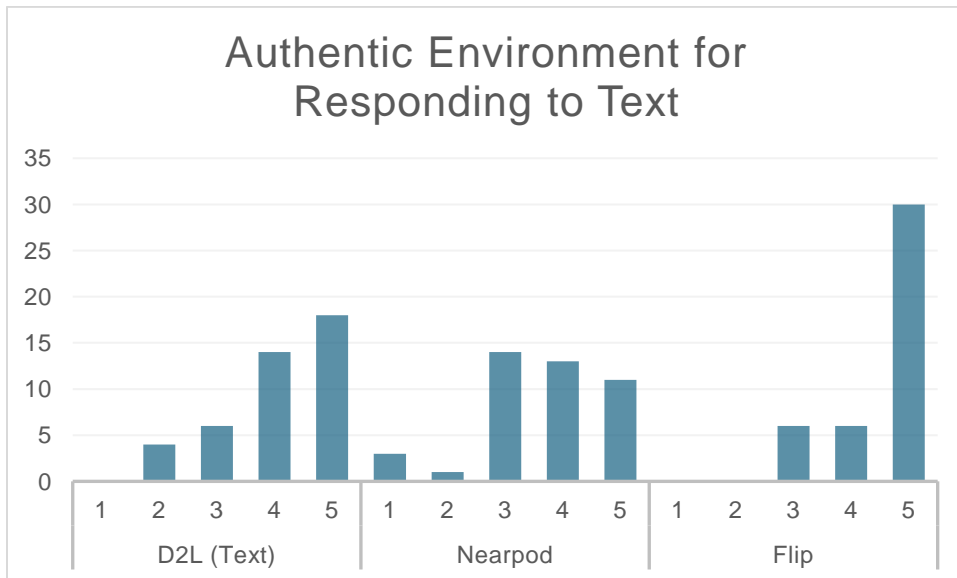
Figure 4

Student survey feedback regarding Authentic Engagement with Peer.
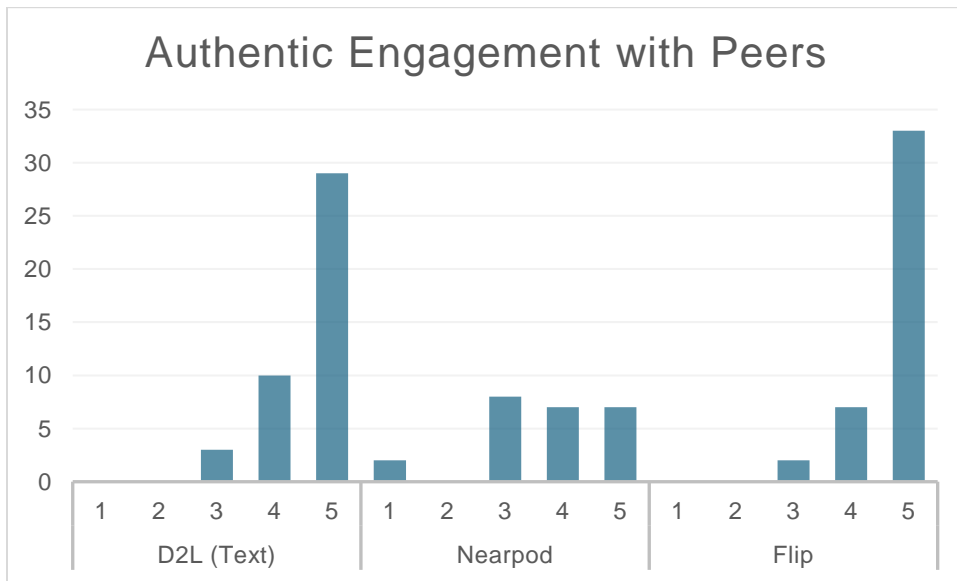
Figure 5

Student survey feedback regarding Engaging Platform for Responding to Texts
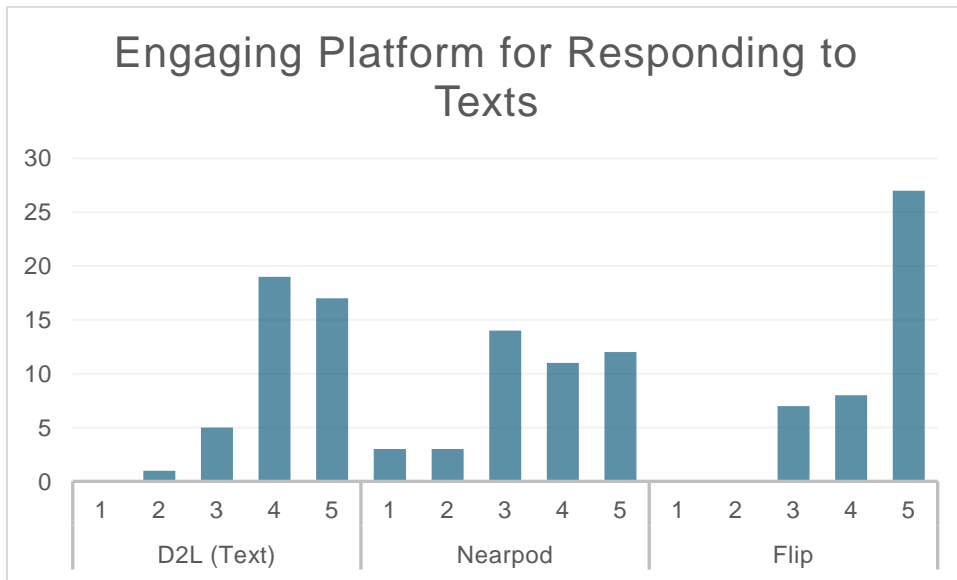
As Figures 2-5 demonstrate, students rated Flip the highest for each of the four criteria, with D2L text discussions second. Student ratings for Nearpod were very mixed on all four criteria. The survey's results demonstrate a preference for Flip for students.

In the students' comments on the survey, four themes emerged regarding their feelings and preferences about the platforms: gathering and expressing thoughts, familiarity, building community, and authenticity of expression.

Gathering and Expressing Thoughts

One key issue for students in their preferences among the discussion types was the extent to which the platform allowed them to gather their thoughts and express their ideas. When compared to in-person discussions, all of the discussion types in this course offered this to some extent; even the video discussions could be re-recorded until the student was happy with it and chose to share it. For some students, though, they felt like the text-based discussion was most conducive to this, as it was easy to continue editing their words until they were exactly as they wanted to share them. One student explained, "I like the [text] discussions posts because I am able to clearly type out my thoughts." Another said, "I am able to get my thoughts out when I type it into the discussion board."

Familiarity

Students' levels of familiarity with the platform and the discussion type also played an important role in students' feelings about each discussion type. Students tended to prefer platforms that they had prior experience with. Learning to navigate a new platform, regardless of how user-friendly it was, added to the demands placed on students, and for that reason, many students preferred sticking to the platform they were most familiar with, which in this case was the text-based discussions in D2L.

One student explained, "I think most people are used to (text) discussion boards, and they are already on D2L so they check it more often, which leaves room for more exposure to what the class is saying." Having prior experience with text-based discussions or being "used to" them

was a positive mark in this student's opinion for the text-based discussions in D2L. In addition to the familiarity issue, this student also raised the issue of exposure, explaining that D2L was an environment students already had to access regularly, whereas the other platforms were external to the course and required checking another place to read peers' responses.

Another student expressed, "I honestly preferred discussion boards because it was what I was most familiar with. It's very hard to create authentic means for text response virtually, so this seemed to be the best method in my opinion." This student's preference for the text discussion was based mostly on her level of familiarity, despite it not being particularly authentic. However, she argued that none of the online discussions felt especially authentic in her opinion, so the lack of authenticity did not sway her from this preference.

Building Community

Several students emphasized the importance of discussions to build community in online courses. It is interesting that students recognized this outcome of online discussions, since it is key factor in many instructors' decisions to include online discussions in their courses. For these students, they preferred the platform that offered the best community-building experience, which they argued was Flip. One student said, "I really enjoyed Flip and being able to put a picture to everyone's name," and another agreed, "You could put a face to the person speaking with Flip."

A third student took this issue of community-building a step further. She articulated, "I enjoyed Flip because thoughts were accompanied by a face. Suddenly my peers' names belonged to a person along with their opinions. While taking an online class, computerized names can make you feel alone, but a face helps you know that you are not." This feeling of isolation associated with online classes is not something we had considered, but it helped to explain why so many students expressed that they enjoyed being able to see their peers in the Flip

discussions. This platform was most conducive to getting to know their peers, because they were not just reading their thoughts, but they could see them and hear them (voice and tone) as well. Because these students were in a mostly face-to-face program, some of these students already knew one another from other courses, and yet, the ability to see and hear their peers was still a key issue in their preferences regarding discussion types. We hypothesize that this would be increasingly the case in completely online programs, where students may never meet their peers. Thus, Flip was the clear frontrunner in terms of community-building in these courses.

Authenticity of Expression

Most students raised the issue of authenticity in their comments on the survey. Generally, students tended to feel like Flip offered the highest level of authenticity, while the text-based D2L discussion was the least authentic. One student said, "I liked how with Flip I was able to listen to my classmates talk about their text responses. It felt more authentic than other online interactions." Another student agreed, "I felt that Flip was the most engaging platform based on the ability to see one another and hear each other's responses. I think the ability to see one another made each response that much more impactful because we could hear the tone in each other's voices and see the reaction on each other's faces when speaking." A third student explained that it is "easier and more realistic to express my thoughts through a video rather than typing."

The consensus among students was that the text discussion boards felt the least authentic. One student stated, "The least authentic platform to me was the discussion boards. I feel that the requirements for the discussion boards somewhat forces a response that is not always as authentic as it could be. Additionally, just typing to one another doesn't really convey the excitement or passion about the content as much and just seems less engaging overall." A second

student explained, "I think with any online platform it will always feel less authentic as a means for text response… the discussion boards were probably the least engaging for me because I've done so many." A third student described the responses on the text discussion boards as "robotic and cold."

It is interesting to note that while most students agreed that the text-based discussion boards were the least authentic, several students still indicated a preference for this discussion type because of their familiarity with it. So, for some students, the issue of familiarity outweighed the issue of authenticity.

Zoom Discussions

As previously mentioned, the Zoom discussions were the only synchronous discussions used in the course. The instructors and students agreed that the discussions in this environment were the most authentic and organic of all the discussions included in the course; conversations could develop and flow more freely as they were taking place in real time. The Zoom discussions also promoted more active engagement and turn taking among students; more back-and-forth discussion occurred in this setting than in any of the other discussions. It was the Zoom discussions that most closely replicated in-class discussions.

However, a few concerns arose with the Zoom discussions. First, the instructors and students encountered issues with planning and scheduling. Because the online class was not scheduled for a particular day and time each week, finding appropriate times to meet that would work for all students was a challenge. Second, multiple students arrived at the Zoom sessions unprepared for discussion (having not read or not prepared for discussion); this was less likely to occur in the other discussion types because in those, students could elect when to come to the discussion and when to participate, but in the Zoom discussion, students had to arrive and

participate at the assigned time. During the Zoom discussions, students engaged in small groups using breakout rooms, and the instructors would move among groups observing clips of their discussions. Based on observation and discussion with students, it appeared that the discussions were much more active when an instructor was present; this hints at a need for more structure, planning, and modeling leading up to these Zoom discussions.

Implications

The implications drawn from the findings encompass several key aspects crucial for effective online learning environments. Firstly, recognizing students' familiarity with different platforms or discussion types underscores the importance of providing adequate support and training to ensure their proficiency and comfort. Clear directions, expectations, and modeling, along with illustrative examples, become essential to guide students in navigating these platforms effectively. Moreover, leveraging discussions to foster class community emphasizes the need for intentional facilitation and structured activities aimed at promoting interaction and collaboration among peers. Additionally, prioritizing authenticity in discussions entails creating environments that feel real and natural, fostering genuine exchanges and meaningful connections among students. Incorporating these considerations into instructional design and implementation can significantly enhance student engagement, learning outcomes, and overall satisfaction in online learning experiences.

Next Steps

Moving forward, it is imperative to continue implementing discussions that have demonstrated efficacy and positive outcomes based on previous observations. However, it is equally important to revise discussion requirements with careful consideration of student feedback, ensuring that their perspectives and preferences are taken into account. This iterative

process of refinement and adaptation allows for the creation of more tailored and engaging discussion experiences. Additionally, ongoing analysis of student performance on various types of discussions provides valuable insights into their effectiveness and informs future instructional decisions. Beyond current practices, there is a need to explore alternative platforms and diverse formats of discussions to offer students a broader range of interactive learning experiences. By embracing innovation and flexibility in discussion methods, educators can enhance student engagement and foster deeper levels of understanding and collaboration in online learning environments.

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Can Digital Game Based Learning Increase Student Motivation?

by

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The development of technology as well as the aspect of motivation has been thought to thoroughly influence academic achievement in students today. DGBL (digital game-based learning) has been considered as an option to increase motivation among students of all ages. This study includes a literature review that discusses the correlation between academic motivation, educational technology, DGBL, and intrinsic motivation. An experimental study was completed to determine if DGBL can increase student motivation. A sample of 53 fifth-grade students in Texas completed a digital game-based activity and were given a seven-question intrinsic motivation survey. This survey has been deemed valid and effective in previous research. Results from this study show that this DGBL activity resulted in heightened levels of intrinsic motivation among the participants. Overall, the findings of this study offer valuable insights into the potential of DGBL as a tool to enhance student motivation and improve academic achievement. By leveraging the benefits of technology and game-based learning, educators and researchers may be able to develop more effective and engaging learning experiences for students of all ages.

Keywords: digital game-based learning. student motivation, academic motivation, benefits of technology

For many decades, researchers have correlated increased motivation with increased engagement, enhanced performance and higher achievements (Ryan, 2000). Student academic motivation is one of the most powerful contributors to their academic achievement. Students must be allowed to learn in an environment in which motivation can be created and will thrive (Safitri, 2022). For educators, understanding this positive effect of increased motivation can be fundamental in creating an environment. Motivation can and will strengthen and intensify each student's individual learning potential.

The widespread use of digital technology and the cultural shift towards digitization in the 21st century have resulted in a constant demand for technology in education. The developing

digital culture has created new learning scenarios that are changing the way educators must deliver their subject matter (Yanez, 2015). The COVID-19 pandemic exponentially increased the necessity for digital competence and technology use in the classroom (Garcia-Holgado, 2022) the critical importance of digital technology for effective teaching and learning. This has accelerated the integration of technology in education and highlighted the need for educators to develop digital competencies to ensure effective use of technology in the classroom.

Additionally, there have been a diverse array of studies that discuss whether games enhance student motivation and knowledge acquisition. Results from these studies show games can improve motivation and conceptual understanding of learned content (Byusa, 2022; Pesare, 2016).

Based on research correlating motivation with academic achievement, an increased necessity for digital components in education, and the effects of gaming on motivation, this research proposes the following question:

- Can digital game-based learning increase student motivation?

The objective of this study is to contribute additional research on digital game-based learning. This added research will explore and propose further insights to researchers and educators concerning the effects of game-based learning. The emphasis of the study is on student motivation and academic outcomes.

Literature Review

Academic Motivation

Motivation plays a crucial role in academic achievement as it impacts the amount of information students acquire from a learning activity and the extent to which they apply it. (Safitri, 2022) The objective of motivational theories is to understand the driving force behind an individual's engagement in activities. (Pintrich, 2003) Motivation encompasses energy, direction, persistence, and equifinality, which are all essential components of activation and intention. The concept of motivation has been a fundamental and long-standing topic in the field of psychology as it underlies biological, cognitive, and social regulation. Moreover, in practical terms, motivation holds great significance due to its outcomes as it leads to productive results. As a result, individuals in positions that involve motivating others to take action, such as managers, teachers, religious leaders, coaches, healthcare providers, and parents, consider motivation as a top priority. (Ryan and Deci, 2000)

Achievement motivation is not a singular entity, but rather encompasses a diverse range of constructs, including ability self-concepts, task values, goals, and achievement motives. (Steinmayr, 2020) Thus, the study of academic achievement on motivation can become quite challenging.

In terms of different kinds of motivation, self-determination theory is the most conventional differentiation, which categorizes motivation into intrinsic motivation, extrinsic motivation, and demotivation. Intrinsic motivation propels an individual's actions based on their true personal interests and gratification, while extrinsic motivation entails engaging in an activity for a separate outcome rather than inherent enjoyment (Camacho-Sánchez, 2022).

Chia-Chen (2021) stated the impact of emotional state and social support on learning performance is not direct. However, these factors can influence learning performance indirectly through self-efficacy and motivation to learn. This validates that learning motivation and self-efficacy are crucial to academic achievement.

Educational Technology

Technological integration today is widely accepted and replacing currently non-technological aspects of society and education at a progressively higher rate. The swift progress in computer and telecommunications technologies is transforming the way we work, gather information, and communicate with the world. Technology has the potential to broaden opportunities for students, enabling them to enhance their skills, optimize their potential, and prepare for the demands of the 21st century (Progress, 2000). Although written in 2000, the previous statement could not be true today. From a young age, digital technology has been an integral part of the lives of modern-day children. However, various forms of digital inequalities persist in our society, which may impact on the younger generation's digital futures. Today's students may not be adequately equipped to navigate a technology-rich society, therefore necessitating significant digital transformation in education and universities. This transformation will enable the student to meet the demands of today's generation while preparing them for the fully digitized world they will inhabit (Akour, 2022).

Today's students grow up in a technologically rich society devoid of a properly distinguishable educational counterpart. Rudhumbu (2021) suggests that technological resources and practices could be adopted more efficiently if teaching support and staff were highly trained. He also suggests government policies be put into place to portray technological advances in a more positive manner to ensure students are adequately supported. Considering the fact

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technology is generally beneficial, society needs to create systems to encourage people to become more tech-savvy and simplify technology usage. This can be achieved by enhancing the agility of the education system and constantly improving its curriculum (Page, 2021; Progress report on educational technology: state-by-state profiles. [electronic document]. (2000). This research theorizes mimicking technology that today's students observe and recognize frequently in everyday society may possibly increase student engagement or motivation.

Current Research on DGBL (Digital Game-Based Learning) & Motivation

According to Umamah (2022), the adoption of digital games in the education setting, what we call digital game-based learning (DGBL), has extensively increased along with the massive use of digital games by student gamers. Digital game-based learning (DGBL) and Gamification are innovative strategies in education that are gaining popularity. (Camacho-Sánchez, 2022) Conventional board games have been utilized to enable game-based learning activities in both informal and formal learning settings, while modern technology has further provided the means for the emergence of technology-enhanced board games (TEBG) in which part or all the board gaming content and materials are supported by the use of technology. (Yeh, 2017)

For the purposes of this research, information and data has been compiled from published articles from around the globe, including South Africa, Spain, Taiwan, Italy, Japan, Indonesia, Finland, Norway, Germany, Sweden, and Israel. Studies have included over 900 elementary students (Han-Yu, 2012; Tiede, 2022; Vidergor, 2021; Safitiri, 2022), 600 junior high students (Chia-Chen, 2021), almost 1,500 university students (Yeh, 2017; Comancho-Sanchez, 2022; Jaaska, 2022), and an accumulation of lecturers and professors (Armstrong, 2022). The consolidation of this research shows a high correlation between DGBL and motivation. All of the

above studies showed increased motivation due to the application of DGBL in a classroom setting.

In a study by Camacho-Sánchez in 2022, the data concluded digital game-based learning contributed to a "high level of intrinsic motivation in students." Chia-chen (2021) concluded learning motivation increased with the use of digital game-based learning. Yeh (2017) concluded DGBL motivated students to participate more actively in small group activities. Han-Yu (2012) noted students who are matched with learning games in their preferred learning style show an increase in motivation. The data from the study Armstrong (2022) conducted established that although lecturers resisted using DGBL in their classrooms, most lecturers agreed the use of DGBL could increase motivation and engagement in learners. This compilation of data consistently presents a positive relationship between DGBL and motivation.

 Each study expressed the implementation of digital educational games can also increase student academic interest. Therefore, if implemented correctly, educators can utilize and develop this digital game technology to increase student achievement (Safitri, 2022). DGBL has the ability to improve education by means of motivation to promote student engagement in a variety of learning environments, with a diverse array of skills while boosting their confidence and enhancing interest in learning. (Armstrong, 2022)

Intrinsic Motivation Inventory

As stated above, DGBL and motivation have been previously researched together with areas of increased motivation. These analyses did not incorporate the use of the Intrinsic Motivation Inventory (IMI) created by Richard Ryan and Edward Deci in 2000. The Intrinsic Motivation Inventory (IMI) is a measurement tool that evaluates the subjective experience of participants in

laboratory experiments related to a specific activity. It comprises several dimensions and has been utilized in various experiments exploring intrinsic motivation and self-regulation. The interest/enjoyment subscale is recognized as the self-report measure of intrinsic motivation. Therefore, while the questionnaire is referred to as the Intrinsic Motivation Inventory, it is only the one subscale that measures intrinsic motivation. (Intrinsic, 2023) Considering the experiments in this article that discovered substantial evidence to validate it, this research will use the interest/enjoyment subscale of the IMI as its method of measurement to assess student intrinsic motivation. (Intrinsic, 2023)

Experimental Design

This research addresses the focus on student motivation by introducing the relevant data sources through the following metrics and sample descriptions:

Design Method

This research uses quantitative and qualitative data collected using a survey. A questionnaire was given using a Likert scale of seven options, where 1 was "not true at all," and 7 was "very true." This study used a questionnaire instrument (Google Forms) to collect data. The Google Form was distributed to 53 students. Data obtained will be analyzed using descriptive analysis.

Table 1

Intrinsic Motivation Rating Criteria

Intrinsic Motivation Rating Criteria	
Likert Scale	**>50%**
1+2+3	decreased motivation
4	average motivation
5+6+7	increased motivation

Statements for the survey were taken from the IMI (Intrinsic Motivation Inventory) created by Richard Ryan and Edward Deci in 2000. "The

interest/enjoyment subscale is considered the self-report measure of intrinsic motivation." (Intrinsic, 2023). As a result, the seven statements were provided from the interest/enjoyment subscale. Two statements were reverse scored and an average of all items on the scale was calculated. The Intrinsic Motivation Rating Criteria listed in Table 1 was utilized to assess whether there was an increase from average motivation levels.

Participants and Setting

A total of 53 students participated in the Escape Room in this study. All students were enrolled in a fifth grade Science classroom at a Title-1 public elementary school in Texas. Age Range: 10-11 years; 16 students were aged 10 (30%) and 37 students were age 11 (70%). 20

participants were male (38%) and 33 were female (62%). The activity was required. However, participation in the survey was voluntary.

Materials

Students used school-issued Chromebook to access a digital escape room on circuits created by Two Teaching Taylors in their Google Drive. Two Teaching Taylors are science educators who create educational tools and share their resources through an online store called TeachersPayTeachers.

A google form was used to collect and analyze data.

Procedure

Students were assembled in groups of three or four to participate in a DGBL activity to review electricity TEKS (Texas Essential Knowledge and Skills): 5.6B: Demonstrate that the flow of electricity in closed circuits can produce light, heat, or sound, for the upcoming state STAAR (State of Texas Assessment of Academic Readiness) test. The DGBL activity was a digital escape room that consisted of four sections, where each section featured three review questions. Students who completed each section earned a code to unlock part of a secret message. When they completed each of the four sections, the secret message was complete. Completion and accuracy of each section was a prerequisite for progressing to the subsequent section. The teacher understood that students who completed the secret message were able to 100% accurately answer all questions in the escape room activity.

At the end of the activity, students were asked to complete a google form survey which was not mandatory by rating the following statements:

- I enjoyed doing this activity very much.

- This activity was fun to do.

- I would describe this activity as very interesting.

- I thought this activity was quite enjoyable.

- While I was doing this activity, I was thinking about how much I enjoyed it.

- I thought this was a boring activity. (Reverse Scored)

- This activity did not hold my attention at all. (Reverse Scored)

Based on the results from the google form, the data was collected in Table 2.

Table 2

Total Number of Students Responses per Statement on Likert Scale

Statement	1	2	3	4	5	6	7
I enjoyed doing this activity very much.	2	0	1	5	6	16	23
This activity was fun to do.	2	1	0	3	5	13	29
I would describe this activity as very interesting.	2	0	1	3	9	15	23
I thought this activity was quite enjoyable.	1	0	2	2	7	14	27
While I was doing this activity, I was thinking about how much I enjoyed it.	2	2	2	10	6	8	23
I thought this was a boring activity. (Reverse Scored)	1	2	0	1	3	13	33
							32

T The choices were 1-7 with one being the least and 7 being the most satisfactory.

Research Findings/ Results

Table 3

Percentage of Occurrences on Likert Scale

Likert Scale Rating Occurrances
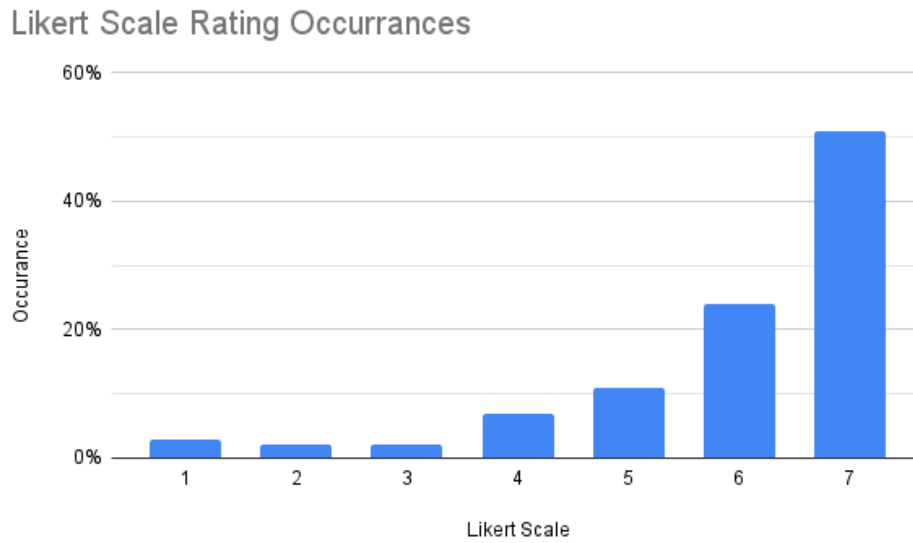
Table 3 shows that there was an increase of occurrences at higher ratings.

Table 4

Percentage of Occurrences on Likert Scale (Consolidated)

Occurance vs. Likert Scale
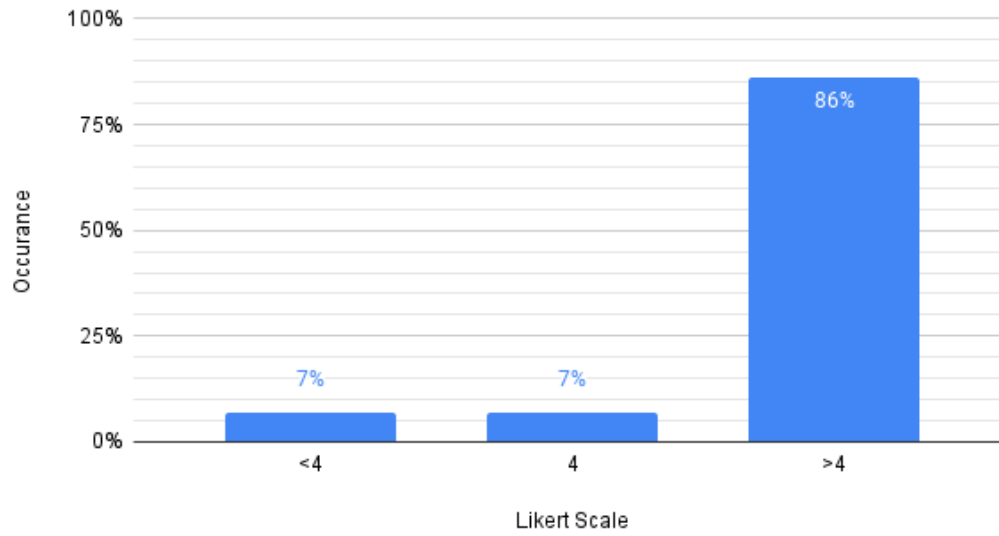
Table 4 Consolidates data for ease of use with Table 1.

Table 5

Average Scores of Statements on Likert Scale

Statement	Mean	Standard Deviation
I enjoyed doing this activity very much	5.89	1.44
This activity was fun to do.	6.08	1.47
I would describe this activity as very interesting.	5.91	1.40
I thought this activity was quite enjoyable.	6.09	1.27
While I was doing this activity, I was thinking about how much I enjoyed it.	5.49	1.73
I thought this was a boring activity. (Reverse Scored)	6.28	1.34
This activity did not hold my attention at all. (Reverse Scored)	6.11	1.49

Table 5 shows an average score for each item on the Likert Scale.

Table 6

Percentage of Total Responses on Likert Scale

Total Responses on Likert Scale
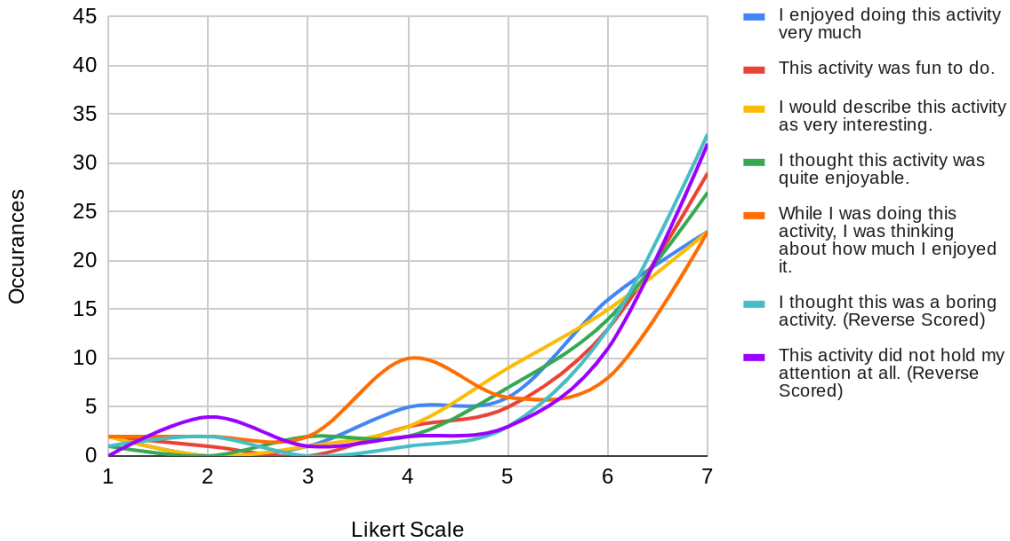
Table 6 shows an increase in above average motivation responses.

On a scale from 1 (not true at all) to 7 (very true), students rated all 7 items above the neutral value of 4 (Table 5), thus showing an overall agreement with all items. By utilizing the information presented in Table 4 and referring to the rating criteria outlined in Table 1, the results of this study indicate that the implementation of a digital escape room as a DGBL activity resulted in heightened levels of intrinsic motivation among the participants.

Discussion

This study was designed to determine an answer to the question: Does digital game-based learning increase student motivation?

The impact of digital technology on education has been a widely discussed topic in recent years. With the rise of digital tools, educators have been exploring ways to incorporate technology into their teaching methods to make it more engaging and effective for students. One such way is through the use of digital games, which have proven to be a popular and effective tool for engaging students in the learning process. Through the literature review, it has become apparent that digital games are an effective way for educators to bridge the gap between students and educators. This is because digital games are something that students today enjoy being a part of, and by incorporating them into the classroom, educators can increase their connection to their students. This increased connection can then lead to an increase in motivation in students, which in turn has been shown to lead to increased academic achievement. Therefore, the value of research into increased motivation in the classroom cannot be overstated. By exploring the impact of digital games on student motivation, educators can gain valuable insights into how to

make the learning experience more engaging and effective for students. This can lead to more effective teaching methods, and ultimately, improved academic outcomes for students.

The topic of student motivation has been an area of great interest in educational research, and this study adds to the growing body of literature on this topic. The researchers focused on gathering quantitative data using a survey given to a group of 53 fifth-grade students in Texas. The survey employed a Likert scale with seven options, and the statements were taken from the interest/enjoyment subscale of the Intrinsic Motivation Inventory.

The aim of the experiment was to determine whether a digital escape room on circuits could increase student motivation. After the students had completed the activity, they were asked to rate their enjoyment of the activity using the aforementioned survey. The data collected was analyzed using descriptive analysis.

The results of the experiment are significant, indicating a noticeable increase in intrinsic motivation levels among the participants. This is demonstrated by the fact that all seven items on the survey were rated above the neutral value of 4, indicating overall agreement. This is a strong indication that the digital escape room on circuits was successful in increasing student motivation levels.

The implications of these findings are important for educators who are looking for ways to enhance student motivation in the classroom. It suggests that the use of digital games, specifically escape rooms, can be an effective tool in increasing student motivation, which in turn can lead to improved academic achievement. This study is a valuable contribution to the literature on student motivation and highlights the importance of further research in this area.

Effectiveness/ Validity of the IMI

The effectiveness and validity of this research have been bolstered by the previous research that has examined the usefulness and credibility of the intrinsic motivation inventory (IMI). McAuley, Duncan, and Tammen conducted a study that confirmed the validity of the IMI, providing strong support for its reliability. (Intrinsic, 2023)

Limitations

Research on digital game-based learning (DGBL) and its impact on student motivation has several limitations. Many studies have been conducted in highly specific contexts, such as limited age groups, subject areas, or specific types of games, making it challenging to generalize results to larger populations. Additionally, most studies rely on quantitative measures of qualitative measures of motivation, such as self-report surveys, which may not adequately capture the complexity of student motivation. Moreover, there has been limited attention given to game design, which design features contribute to motivation, and which do not. Lastly, the absence of control groups in this and other studies limits the ability to establish causal relationships between DGBL and increased motivation levels.

Future Research

It would be valuable to conduct additional experiments to examine the relationship between DGBL and motivation. Future research should include control groups with and without DGBL, as well as other treatment groups featuring different types of games in diverse contexts. By considering the backgrounds and motivational profiles of students in future studies, it may be possible to identify which types of students are more likely to benefit from DGBL. Additionally,

research should investigate both short-term and long-term effects of DGBL on motivation, as well as whether increased motivation leads to improved academic achievement.

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The Intelligent Learning Environment: Benefits and Challenges of AI in Education

by

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With the evolution of information technology in the digital world that we live in has come the frequently discussed Artificial Intelligence (AI). AI has become integrated into our daily lives in ways we may not consciously notice. What exactly is AI? Should we trust AI technology? These and many other questions surrounding the use of AI have become the center of hot debate. As artificial intelligence (AI) has become integrated into everyday life, its involvement in education is no exception. Though there are challenges and valid risks to its use, the benefits of utilizing AI in education far outweigh the potential drawbacks. AI will be described and analyzed, incorporating a discussion of the benefits and challenges of using AI in education. The goal of this study is to explore and share the ways in which AI can and could be used to benefit the educational society. The Challenges faced as a result of using AI in education will also be scrutinized.

Keywords: AI (Artificial Intelligence), AI in Education, Technology in Education, Benefits of AI, Challenges of AI

What exactly is AI and how has it developed so rapidly? Mon et al. (2023) explain that the recent "boom" is the result of "accessibility of huge amounts of big data, the development of faster computer processors, and advancements in computing methods." Because of the advancements in technology over time, it has increasingly developed into faster, more intelligent software. As far as how it works, rapid information processing and analyzing occurs. According to Tapalova & Zhiyenbayeva (2022), "'AI simulates human listening (machine translation, speech recognition), speech (speech synthesis, human-computer dialogue), observation (computer vision, recognition images, text recognition), thinking (theorem proving), learning (machine learning, intelligent adaptive learning) and action (robotics.)" Through rapid processing of data, AI can be used in a vast range of fields both professionally and personally. It

can simulate the thinking, language, and actions of people and can therefore be harnessed for endless purposes. Analyzing data in seconds that would take a human hours to do the same task, using virtual or augmented reality in training simulations, virtual assistants, smart homes and cars, online shopping, and language translations are just a few examples of how AI is used in everyday life.

In this paper, how AI is utilized in the field of education, specifically, will be examined. AI can be used in administrative tasks and is already being used in classrooms worldwide. Ghita & Stan (2022) provide pertinent examples of AI programs currently in use in education for students and teachers alike. Some examples commonly leveraged by students include: "ChatGPT [a] language-based AI [that] generates responses, Essaybot, Wolfram Alpha, Mathway, Cognii, Hemingway Editor, WriteLab, [and]Ref-N-Write." These programs are used for assistance in writing, math, and reading. While some AI programs generate entire written compositions (Chat GPT Essaybot, Ref-N-Write), others are used for editing or asking math questions (WriteLab and Mathway), that generate intuitive responses. Some examples specifically used by teachers are: "Turnitin, Grammarly, SAGrader, Readable, [and Brainly" (Ghita & Stan, 2022). These specific programs are mainly used by teachers to detect plagiarism or the use of AI to complete assignments, an increasingly common issue. On a salient note, utilizing AI does not necessarily equate to illegitimate or fraudulent use. Many programs are being used to help students as well as teachers that are aiding the learning process and improving the education experience. For example, Wardat et al. (2024) mention, "online learning platforms like Khan Academy and Courser [that] offer educational courses that leverage artificial intelligence techniques to guide students and provide accurate assessments of their progress." AI enables individualized data driven instruction, immediate feedback, differentiated content, increases learner motivation,

promotes resource sharing among teachers, aids teachers in simple tasks, prepares students for

the digital age, and improves accessibility to educational resources.

Benefits of AI in Education

Across literature on the topic, a principal benefit of integrating AI into the classroom is

individualized instruction at the learner's level. As Mon et al. (2023) point out, "teachers have

many learners to manage. AI helps create curriculum at the individual learner's level." In the

primary school setting, teachers instruct and monitor the progress of anywhere between 20-100

students. In secondary and beyond, teachers may be responsible for well over 100 students. This

makes it challenging to meet the unique needs of each student, which is currently expected of

educators. AI has the ability to analyze an individual's data quickly and accurately and will

develop content according to the individual's performance. In their article investigating the hype

surrounding AI, Humble & Mozelius (2022) state AI programs put "the learners in the center and

tailor the learning according to their needs and preferences. Previous research has also suggested

that AI systems can be effective tools for supporting students with neurodevelopmental disorders

to address challenges in learning and to personalize education." Because AI has the ability to

listen to and observe the learner, as well as analyze performance data, programming is based on

the individual's current level rather than the expected level of achievement. This is ideal for all

students, especially those with disabilities that may be performing below typical levels. Further,

"speech generation and translation of text can be performed by software-controlled AI assistants

with NLP [natural language processing] algorithms (Goksel & Bozkurt, 2019) NLP can also

support students in learning and work life-training by recording speech, provide feedback, and

order and suggest steps of action" (Humble & Mozelius, 2022). For example, some AI reading

programs listen to students read, and if the reader mispronounces a word, the program will teach

the correct pronunciation and prompt the student to try again. Fluency, accuracy, and comprehension are monitored, and passages are selected based on the student's current performance. AI driven programs monitor student progress and can provide various growth measures. In this way, the content is tailored to the individual's level. Such individualization is not possible without this advanced technology when teachers have a multitude of students. In their research on personalized learning pathways with AI, Tapalova and Zhiyenbayeva (2022) explain that "the research identified key advantages to creating personalized learning pathways such as access to training in 24/7 mode, training in virtual contexts, adaptation of educational content to personal needs of students, real-time and regular feedback, improvements in the educational process and mental stimulations." Students cannot access their teacher around the clock; however, they can access their personalized learning applications so long as they have internet connection, essentially 24/7. This means they can engage with content at their individual level around the clock which improves their progress. Being that it is "smart," the real-time feedback is specific to performance. Feedback provided are not generic automated messages, they are based on what the AI is sensing and retrieving. The output then, is timely and individualized. In a traditional classroom setting, students only receive personal feedback when they are one-on-one or in a small group setting with the teacher, likely less than 30 minutes a day of individualized feedback as the teacher must address the needs of a vast number of students. Conversely, the intelligent learning environment maximizes personalized feedback to improve student progress and enhance growth measures.

Tailoring content to an individual's level requires programs to provide accurate and immediate feedback which AI delivers. In his article on the impact of AI in education, Rahayu (2023) shares that, "especially in the field of assessment, [AI] can provide the ability to increase

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the accuracy, validity and reliability of assessments. In addition, it can help reduce bias from individual human judgment. AI can also have adaptive assessments that can be tailored to individual needs." Rahayu makes multiple critical points here. Because AI is more objective than a human with prejudice or bias (conscious or not), when used to assess students, AI is likely to be more accurate, valid, and reliable. Due to the advanced computer processing described previously, that makes AI possible, AI can evaluate students rapidly and objectively. This evaluation limits human error and minimizes subjective judgment and/or preconceived notions; plus it is incomprehensibly faster. Through data analysis, these programs can make comparisons across hundreds of assessments and individuals instantaneously which ensures accuracy, validity, and reliability of various assessment instruments.

Far beyond a textbook's ability to engage students, AI engages and increases motivation through challenging students and offering interactive games and activities. In their article on AI from mathematics' teachers' perspectives, Wardat et al. (2024) shared that AI in the classroom "increased motivation for learning, [by] encouraging challenge, competition, and suspense among students and considering their differences." The pencil and paper approach is outdated and becoming obsolete due to advances in technology. A textbook simply cannot compete with an interactive game on an iPad, tablet, or computer. When students can learn through playing academic games in a fun, interactive way, they are more engaged and motivated to learn. Many programs reward students' participation and progress in lessons with digital rewards or games that encourage students to keep playing, and learning. These programs are aligned with academic standards so teachers can monitor which standards are being met, how long students are taking to master a given objective, areas of weakness, and more because of the data that comes from these programs. Even more engaging is the use of virtual reality technology explored by Hu et al.

(2023). "Extended Reality (XR) technologies, represented by Virtual Reality (VR), Augmented Reality (AR), and Merged Reality (MR), combine and merge virtual and real worlds in various ways in different educational and teaching scenarios, which can enhance the learning experience and provide more possibilities for solving complex problems." (Hu et al., 2023). Imagine learning to fight fires, operate on an animal, build a skyscraper through augmented or virtual reality experiences. Extended reality simulations make virtual and real-world experiences come together for the most hands-on and engaging learning experiences ever. This incredible, advanced technology helps individuals learn to problem solve in a real way, as if they are really "on the job." "Enlightened by AI courses, students can solve practical problems by using programming and computational thinking, develop the core quality of disciplines, and improve their abilities of problem-solving and higher-order thinking, which has become an important way to promote digital survival and adapt to the development of future intelligent society" (Hu et al., 2023). Not only is AI highly engaging, it helps students solve real world problems and prepares students for the digital world that we live in. Teaching using pencil-to-paper, textbook-memorizing methods is not engaging, nor does it effectively prepare students for the digital, technologically advanced society that we live in. Education must prepare students to be active participants in society, and being proficient in technology is a prerequisite skill for any sector. Classrooms today, like society at large, are "intelligent" meaning knowledge is widely accessible and technology highly advanced. Therefore, utilizing AI in education enhances digital proficiency and adequately prepares students to be a part of society. As Malik. and Gangopadhyay (2023) stated, "AI-driven technology for the education sector is gradually becoming a practical necessity globally." There is no escaping the prevalence of AI; it is widely

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accessible and increasingly integrated into nearly every aspect of life and every field, or discipline. We must prepare students to participate by effectively utilizing AI in education.

Not to be overlooked is AI's ability to automate simple tasks, allowing teachers to spend more face time with students. "Previous research suggests that AI-systems should focus on assisting concrete pedagogical tasks that for a human teacher would be perceived as exhausting and time-consuming, for example assisting in constructing grade responses" (Humble & Mozelius, 2022). Teachers can get bogged down in countless tasks that while necessary, take up valuable time and energy. Such tasks as grading, progress monitoring, and various documentation, lead to teacher burnout. Exhausted teachers not only lack the time, but also the energy to build relationships with students, a critical part of a student's educational experience. If there is a way to lighten the heavy workload on teachers and save them time, why wouldn't we harness that power? "AIEd provides the most immediate benefits of automating simple tasks such as assessments, digital asset classification or scheduling. AIEd helps teachers to save time usually spent on routine tasks and devote more time to communicating with students." (Tapalova & Zhiyenbayeva, 2022). Grading/evaluating programs, virtual assistants, programs to assist in scheduling, progress monitoring software, etc. save teachers valuable time and energy that can be better used to develop meaningful relationships with students. Education is more than content; it entails more than academics and must provide the opportunity for social-emotional development. Supplying teachers with time and resources to do more than the necessary, yet tedious, tasks is beneficial to both students and teachers.

Another benefit of AI technology is that it promotes intelligence and resource sharing. Shuliar et al. (2023) explain that "the integration of complex software-hardware systems into the educational process lies in incorporating big data analytics, robotics, neural networks, and

artificial intelligence. The objectives of reforming the educational system require corresponding changes in teaching methods, as well as in higher education, through informatization and digitalization. This has led to the emergence of open education which allows for unrestricted access to educational resources." Because the integration of information technology and artificial intelligence in education requires a reform in teaching methods, teachers must answer the call to learn how to incorporate it into their teaching. Open education allows for open access to countless digital resources for educators. Hu et al. (2023) write that AI promotes the transfer of teachers' intelligence and the sharing of teaching resources and plays the role of "connector to share the high-quality content resources of education" and "multiplier to enlarge the scale of education services." Information sharing is easier than ever, and teachers can take advantage of this to improve their teaching. Teachers do not have to create content independently and can easily access quality resources online through open access libraries. AI can even assist teachers in finding the content and resources they are looking for. Digital media and resources for a given topic can be created, discovered, and shared with ease. Open access is useful not just to teachers, but students, administrators, professors, etc. The range of material openly accessible to the public is wide and allows for the distribution of knowledge and resources.

Improved accessibility of high-quality education is another benefit of the development and advancement of information technology and artificial intelligence (Humble, N. & Mozelius, 2022). While many students, parents, and educators were forced to undertake a crash course in eLearning during the Covid-19 pandemic, online learning started well before then. When online learning was once an optional path, the pandemic caused it to become the sole option for a period of time. This increased the pressure on digital course creators and programmers to vastly improve usability and quality. Additionally, it opened the eyes of many as to how much AI can

do for teachers and students. Shuliar et al. (2023) explain that "online education can be obtained without leaving home, either for free or at significantly lower costs than traditional education. This tackles the problem of social disparity and equal opportunities as those with limited funds can still study at top universities around the world. Moreover, education becomes accessible regardless of the place of residence, age, health status, elite status, or financial condition." Learning online has become increasingly common due to its convenience and low cost. Because education can be accessed at a low cost from virtually anywhere, AI has leveled the playing field and promoted equal opportunity to education.

Challenges of AI in Education

Much of the literature on the topic suggests that the main challenges of utilizing AI in education surround data security and privacy, accountability for students and teachers, undermined interpersonal relationships, and programmer bias. While these present valid risks, improvements in data security are already advancing and other measures can be put into place to mitigate these risks. Using AI to assist with or complete assignments can negatively impact accountability for students. Reliance on intelligent technology could affect the work, drive, and motivation of students. "When every question has an easily accessible answer, why should students make any effort to seek information from sources beyond the easiest one?" (Ghita & Stan, 2022). Every time we talk to Alexa, Google, or Siri, for example, we are using AI to ask any question that comes to mind, and an answer is instantly at our fingertips. With the advancement of technology including software and devices, children and youth are fully immersed in technology and are growing up with a virtual assistant in their pockets. This begs the question, why would students be motivated to seek knowledge on a deeper level when a sufficient answer comes up first? This is a valid risk of using AI and while educators cannot

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control what students use at home, most schools have policies or procedures in place to limit students' use of personal devices during instruction unless it is a program being used in class. Additionally, schools can monitor and restrict access to many websites on school, district, or private network Wi-Fi-connected devices. If not connected to Wi-Fi, connectivity may be limited on these premises. Therefore, while on campus, students are only on devices and websites that are permitted and would not be able to use AI technology to complete their work. If teachers suspected the use of AI on assignments that students completed at home, there are programs to check that it is original work. Come assessment time, students are not permitted to use technology, or if completing them online, they can be on a locked browser and must possess the previously taught knowledge and skills to perform well. If students were acing homework assignments that were completed at home and then failing assessments, that could be an indicator that they are using AI or other technology to assist them in their work apart from their own knowledge. In this way, accountability is still very much required of students. A decrease in accountability is not only a concern for students, but teachers as well if they become overly dependent on AI to monitor the progress of students. The incredibly advanced AI driven programs described previously can track and monitor progress, but educators must not be overly reliant on these programs to be the sole progress monitor of the student. Teachers can be held accountable by administrators by having regular meetings, regarding students' progress. The progress on any given learning application or program would represent one piece of data and the progress of the whole child requires many pieces of data. It is not likely a teacher would make it without adequately and appropriately monitoring student progress.

"AI is now an essential, pervasive, and inescapable component of our daily lives, even though it is frequently hidden. In fact, ironically, the more integrated it is, the less we tend to

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consider it to be artificial intelligence" (Mon et al., 2023). AI is frequently hidden, it is listening in your pocket, it analyzes Google searches to provide personalized ads, and when it answers those frequent questions, it captures your voice, language, search history etc. While we are using it (intentionally or not), our data is on the internet. A major concern of utilizing AI in education is data security and privacy. After all, AI works by analyzing the actions, language, search history, etc. of a given individual. Keeping students' personal data confidential is a legitimate concern. Under federal law, students' data must be kept private and using AI which analyzes these data could potentially be leaked or stolen. AI driven programs and applications contain information like students' names, identification numbers, voice, face, and other private information that must remain confidential. It will be imperative for educators and schools to implement proper precautions for ensuring these data remain secure. The technology that has evolved into AI is the same technology that has evolved its security measures and privacy practices. As such, users can accept or decline data analytic cookies and must read and accept privacy agreements when entering confidential information. Public and private education institutions can, and must, maintain the most up to date standards to protect students' data.

A less obvious but significant downfall of technology is that it could potentially undermine important social interactions and relationships between students and teachers. Referencing Vygotsky's theory of cognitive development, Ghita and Stan, A. (2022) warn that AI may undermine "important social interactions and collaboration between students and teachers." Reliance on technology inevitably leads to more technology time than face to face time. As mentioned previously, a part of educating students is social emotional learning in which important personal relationships, communicating, and collaborating are essential. If students are spending too much time on technology devices and less time collaborating with peers and

working with the teacher, their progress in social emotional areas, as well as academic areas may be impaired. Rahayu (2023) shares the perfect response to over-reliance on AI in education. Regarding accountability, and interpersonal relationships alike, it is important to remember "however, [that] AI technology itself is only a tool in the learning process where the final decision is in human hands. Therefore, the use of AI technology in the world of education must be done wisely to develop the world of education for the better." AI is a remarkable tool that can be leveraged in education for its many benefits, but we must remember it is a tool in the educator's toolbox and should be treated as such. It should supplement instruction, not replace it. It can help the teacher and the student, but it cannot replace human to human interaction and the need for personal relationships.

The final challenge of the intelligent learning environment is perhaps the least discussed and least obvious: programmer bias. Humble and Mozelius (2022) expound:

> With the rise of artificial intelligence in education, the systems implemented in educational contexts is and will be built by people. Algorithms that are developed to process data are created by programmers with potential biases in the code (Nichols & Holmes, 2018). Moreover, training data and models used for machine learning are corrected and evaluated by humans (Namugenyi et. al., 2019). Since there are no definite guidelines for ethics in either AI or AI-applications in education (Nichols & Holmes, 2018), the weaknesses of AI-systems may have real consequences for education due to the increased attention that AI researchers, product developers, venture capitalists, and advocates for educational technology are putting on the educational market (Namugenyi et. al., 2019). The consequences of potential biases in AI-systems for education are further amplified by the marketing efforts to present AI-algorithms as value-neutral and

objective to the public. The use of AI-systems and technological solutions in education raises the question of "who sets the agenda for teaching and learning" (Humble & Mozelius, 2022).

We tend to think of AI as not real, after all it is computer based, and more commonly associated with an emotionless robot. However, as explained here, the systems' algorithms are created by humans. Humans with prejudices and biases. Further, the models and training data used are also evaluated and corrected by humans with opinions of their own. As the authors have pointed out, given the more recent timeline of AI in education, there is not a set of ethics guidelines being followed so the educational market is full of resources subject to its programmer's bias. While marketed as objective, any human has opinions as well as conscious or subconscious prejudices which have the potential to impact the codes and algorithms of programmers. Who hires the programmers? What is their agenda? These are important questions when examining the objectivity of an AI driven application or program. Administrators and directors must select programs that are evidence based and driven by research. Additionally, it is critical to examine the research behind the programs to ensure the population of students is represented in the research and is an appropriate choice. Programmer bias is a risk, but educational institutions can find and utilize only the programs proven to be effective by research.

Conclusion

Less of a choice, and more an expectation to keep up with current trends (Wardat et.al. 2024), AI driven technology is inevitably becoming integrated into classrooms today. Intelligent learning environments can come with risks, however. Utilizing AI brings data security and privacy concerns, potential accountability issues, threats to interpersonal relationships and

possible programmer bias. Despite this, there are measures that can be exercised and implemented to mitigate these risks. With policies, procedures, and best practices in place to reduce these risks, the benefits of AI driven technology in education can be unleashed. "AI technology helps teachers understand teaching tasks more clearly, teach content accurately, choose teaching keys, and make a scientific assessment of learners' study life. Hence, AI technology plays an important role in promoting the development of learners" (Lin, 2022). AI enables individualized data driven instruction, immediate feedback, differentiated content, increases learner motivation, promotes resource sharing among teachers, aids teachers in simple tasks, prepares students for the digital age, and improves accessibility to educational resources.

The research for this study was very intense and yielded approximately five thousand peer reviewed articles. Carefully selected articles bequeathed the revered information found in the study. Although there are challenges, the benefits of AI in the intelligent learning environment clearly outweigh the potential challenges.

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Social Media Use (SMU) Intensity and its Influence on Well-being

by

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Given the popularity and increase in social media use (SMU), concerns have increased about the influence of social media on well-being (Ostic et al., 2021). More recently, a call to issue social media warning labels was proposed (New York Times, 2024) due to social media's link to mental health issues (Boer et al., 2020; Miller, 2023). These concerns make this topic a critical issue to investigate. This research examined the relationship between SMU intensity and well-being. The risk factors associated with SMU and well-being, including social comparison, fear of missing out, cyberbullying, digital hoarding, and SMU addiction were explored. Additionally, the outcomes of SMU and the relationship between social media engagement levels and well-being were investigated. Research is mixed on whether social media is conducive to well-being. Findings confirm that the relationship between SMU intensity and well-being is a complex phenomenon due to various intervening factors such as: SMU frequency, how social media is used (Clark et al., 2018; Verduyn et al., 2020), individual differences, whether SMU problems such as social comparison are considered (Boer et al., 2021), emotional connectivity, and engagement levels (Roberts & Davis, 2022).

Keywords: social media, well-being, mental health

Social media is extremely popular in contemporary society. Examples of social media include such social networking sites as Facebook, Twitter, TikTok, Instagram, LinkedIn, YouTube, Snapchat, Reddit, WhatsApp, and Pinterest. In the United States social media use (SMU) grew rapidly across the decades. SMU grew most rapidly in the last decade (Jiang & Ngien, 2020) with most young adults using Facebook and Instagram (Spitzer et al., 2023). Rausch & Haidt (2024) reported that by 2015, one in five teenagers in the United States (specifically girls) used social media more than 40 hours a week. By 2023, it is estimated that more than forty-six (46) percent of teenagers were online most of the time (Rausch & Haidt, 2024). Additionally, it was reported that eighty-four (84) percent of active social media users are

between the ages of 18-29 in the United States (Calvello, 2022). More specifically, social media usage is reported to be quite common among college students worldwide (Alshalawi, 2022).

Figure 1

Social media logos

Figure 1. Retrieved from https://www.hdwallpaperslife.com/social-networking-media-logos-full-hd-wallpapers.html

The American Psychological Association (APA) 2019 Opinion Poll reported that Americans had a more negative view about the influence of social media on one's mental and emotional well-being. Thirty-eight (38) percent of Americans in this poll perceived social media as a negative influence while only five (5) percent of Americans (in this poll) perceived that social media was a positive influence (APA, 2019). More recently, the 2024 American Psychiatric Association poll indicated that Americans tend to be more neutral on whether social media is harmful or helpful to their mental health. However, it was perceived that social media has likely helped them personally (APA, 2024).

Research confirmed that SMU may pose a risk to mental health (Boer et al., 2020; Miller, 2023). Social media may especially pose a risk for those adolescents who engage in social media over three hours daily, especially as it relates to internalizing problems that they experience in

their everyday lives (Riehm et al., 2019). Adverse risk factors such as depression, low self-esteem, and poor body image have been linked to adolescents and children who engage in higher levels of SMU (Annie E. Casey Foundation, 2023). Due to social media's link to mental health issues, a call to issue social media warning labels was proposed in the United States (New York Times, 2024). These concerns make this topic a critical issue to investigate.

The purpose of this research was to examine the relationship between SMU intensity and well-being in contemporary society. This investigation also examined the adverse risk factors which may influence SMU intensity and well-being, including social comparison, fear of missing out, digital hoarding cyberbullying, and SMU addiction. The positive and negative outcomes of SMU along with the relationship of social connectivity and SMU were also explored.

This research augments the literature on the relationship between SMU intensity and well-being. It provides insight on the complexity of SMU intensity and well-being, including the adverse risk factors associated with SMU and well-being, the positive and negative outcomes associated with SMU, and the influence of social media engagement levels on well-being. This research has implications for making community partners (i.e., parents, educators, and administrators) aware of the influence of social media on well-being. Understanding the complex influence of SMU intensity on well-being can inform one about the positive and negative outcomes of SMU and its influence on well-being, including one's mood, thoughts, and feelings. Suggestions on how to mitigate the potential harmful risk factors of SMU were also discussed.

Background

More recent research (Rausch and Haidt, 2024) reported that an international mental health crisis exists due to the surge of SMU among today's youth which was precipitated by the loss of play-based childhood events. According to Rausch and Haidt, mental health issues

including school loneliness occurred worldwide due to the decline of children engaging in play and children spending less time with each other. As a result of this, play-based childhood events were overtaken by phone-based events, creating an unidentifiable childhood experience which precipitated the advent of mental health issues among children.

The young adulthood stage is a vulnerable developmental period for the advent of mental health challenges and well-being in general (Thai & Davis, 2023). Children and young adults with a history of trauma are especially susceptible to the effects of social media (Nothaft, 2023). Research confirmed that mental health outcomes have worsened, especially for adolescents, due to a range of factors during the COVID-19 pandemic lockdown, including isolation and a rise in substance abuse (Choi, 2023).

The National Alliance on Mental Illness (NAMI) confirmed "that social media can make things more difficult emotionally" which may potentially intensify mental health problems (NAMI, n.d., p.1). Research confirmed that while the routine use of social media is associated with positive health outcomes, one's emotional connection to SMU can be associated with negative health outcomes relative to well-being and mental health (Bekalu et al., 2019).

The more prominent risk factors for anxiety and depression are associated with one's activity on social media including the amount of time spent on social media and addiction (Karim et al., 2020). Sperling (2023) termed the age that we live in with social media as the "Digital Age of Vulnerability".

Mental health outcomes, including depression and suicide pose a serious public health concern (Choi, 2023). According to Twenge et al. (2018) adolescents who spent more time on social media were more likely to report mental health issues compared to adolescents who spent more time on non-screen activities such as homework, in-person social interaction, and religious

services. Increasingly the evidence shows that there is a link between SMU intensity and mental health outcomes, including depression (Miller, 2023).

Overall, researchers agree that the influence of SMU on well-being is complicated (Karim et al., 2020, NAMI, n.d.; Nothaft, 2022; Sadagheyani & Tatari, 2021; Weigle & Shafi, 2024; Yap & Lim, 2024). While many studies (Nothaft, 2023; Karim et al., 2020; Sherrell, 2021; Sultan et al., 2018; Trifiro & Prena, 2021) have been conducted on the multifaceted nature of SMU intensity and its association with well-being, there is a lack of evidence that SMU intensity causes mental health consequences such as depression or anxiety (Miller, 2023; Walsh, 2022). Excessive SMU may be linked to harmful mental health outcomes such as depression, anxiety, and feelings of isolation (Ortiz-Ospina and Roser, 2019; Sherrell, 2021). More recently, the Siongers and Spruyt (2024) study demonstrated that more intensive SMU is associated with more negative emotions, less overall life satisfaction, and less satisfaction with mental health.

Social Media: Positive and Negative Outcomes

A review of the literature confirmed that social media can have both positive and negative influences on well-being (APA, 2023a; Boer et al., 2021; Roberts & David, 2022; Sadagheyani & Tatari, 2021; Sherrell: 2021; Silmi et al., 2020). On one hand, SMU can be greatly beneficial. Social networking allows individuals to learn about the opinions, attitudes, and lives of others (Burbach et al., 2020). Social media allows one to share information with others, including messages and ideas. One may also secure information on diverse topics in society (Firmansyah, 2022) and build social development skills (APA, 2023b). Social media can also be a conduit for finding community and serve as an outlet for creativity (Calfas, 2023). Additionally, social media provides one the opportunity to bond and connect with others and

may reduce the fear of isolation (Nothaft, 2023; Johnson, 2022). Increased social support has been associated with reducing loneliness and increasing life satisfaction (Yue et al., 2024).

Although research confirmed that young adults with high SMU appear to feel more socially isolated than individuals with lower social media use, it is possible that social media may provide one the opportunity to enhance social isolation rather than increase the fear of social isolation (Primack et al., 2017). However, when SMU comes at the expense of in-person interaction, loneliness and isolation may pose a risk factor for well-being. Loneliness and isolation have been identified as a public health threat due to its association with physical and mental health consequences (Nirappil, 2023).

Risk Factors associated with SMU

SMU has been linked to a range of negative outcomes, such as social comparison, fear of missing out (FOMO), digital hoarding, cyber bullying, and social media addiction. Given the popularity of social networking sites, SMU can serve as a mechanism for social comparison, which can have both positive and negative outcomes. The outcome of social comparison depends in part on who uses the social media networking site and whether one uses social media passively or actively. Social comparison outcomes may create an increase or decrease in social well-being. Upward social comparisons (when one compares oneself to others) have been associated with negative outcomes (Verduyn et al., 2020). When one engages in upward comparison, there is the opportunity to feel that one may not measure up to others, which may influence one's mood, self-perception, and self-esteem (Fioravanti, 2021; Vogel, n.d.).

The Spitzer et al. (2023) study confirmed that there was a positive relationship between negative social comparison and suicidal ideation (thinking about or planning suicide) for college students who used Instagram. Social comparisons based on online SMU have also been linked to

appearance related activity (e.g., looking at photos of friends) for adolescents and body dissatisfaction for adolescent girls. According to Scully et al. (2023), body dissatisfaction was significantly related to the amount of time that one spent in social comparisons with female participants while online.

Fear of missing out (FOMO) is another potential negative outcome of SMU (Li et al., 2024). FOMO describes the anxiety that one might feel when there is a perception that others are experiencing more rewarding experiences on social media. Individuals who are more sensitive to social comparisons may feel the negative impact of SMU the most (Vogel, n.d.). Research confirmed that there is a positive correlational relationship with FOMO and depression, anxiety, and neuroticism (Fioravanti et al., 2021).

Digital hoarding behavior (accumulating digital files which results in stress) has also been linked to FOMO. Results of the Wang et al. (2023) study revealed that social comparison increased one's digital hoarding behaviors and that FOMO mediated this effect. In conjunction with the frequent use of social media worldwide, cyberbullying has become pervasive (Margolis & Amanbekova, 2023), especially for teenagers (Alim, 2016). Cyberbullying is also considered a major issue for college students as well. The Abaido (2020) study reported that ninety-one (91) percent of the study's sample confirmed the existence of cyberbullying on social media. Nevertheless, social media has been associated with both positive and negative outcomes. A summary of the positive and negative outcomes of SMU follows in Table 1.

Table 1

The Positive and Negative Outcomes of Social Media

Positive Outcomes	Negative Outcomes
Provides the opportunity to learn about the opinions, attitudes, and lives of others	Social media addiction, including problematic social media outcomes (excessive use of social media)
Allows one to share information, including messages and ideas	Fear of Missing Out (FOMO)
Allows one to secure information on diverse topics in society	Digital Hoarding
Builds social development skills	Body dissatisfaction and low self-esteem (self-perception)
Serves as a conduit for finding community.	Social Comparison
Provides an opportunity for bonding and connectivity	High SMU may trigger feelings of alienation rather than social connection
Enhances social isolation	Depression and poor well-being outcomes
May promote high self-esteem	May promote low self-esteem
Promotes creativity outlets	

SMU and Addiction

The adolescent period is a crucial developmental stage as the brain is still developing.

The brain areas important for self-control do not fully develop until early adulthood. During this

period, adolescents are more vulnerable to addiction symptoms (Peris et al., 2020). Also, during

adolescence, the brain areas associated with a desire for attention from peers becomes increasingly vulnerable. Given this, there is the possibility that SMU may exploit one's desire for attention (APA, 2023b).The more that one performs habitual behavior, the more likely one will persist in repeating the behavior especially as it pertains to social connectivity and social competition (Griffiths, 2018).

Social media may have negative consequences on one's well-being due to physiological effects on the brain which affect the dopaminergic pathways of the brain and mental health, especially for adolescents (Johnson, 2022). Physiologically, SMU activates the brain's reward center by releasing dopamine, a neurotransmitter that is linked to pleasurable activities, which can potentially pave the way for social media addiction (Ferrer, 2023). It is possible that when SMU is discontinued, the addicted individual may experience negative psychological and physiological symptoms such as withdrawal. This may lead to a relapse which can restore the problematic behavior (Kuss & Griffiths, 2017).

Over the last two decades there has been an increase in adolescent depression and suicidal behavior which coincides with the widespread use of social media (Vidal et al., 2020; Weigle & Shafi, 2024). Wang et al. (2018) reported that social networking site addiction has a direct relationship with depression. For adolescents, depression has been linked to the development of online social networking addiction. Online social networking may also contribute to increased levels of depressive symptoms (Li et al., 2018).

Findings from the Shannon et al. (2022) study indicated that there is a direct relationship between problematic social media outcomes and negative mental health outcomes such as depression, anxiety, and stress among adolescents and young adults. Problematic outcomes are defined as excessive use of social media (Peng & Liao, 2023) that lead to negative consequences

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psychologically and socially (Cataldo et al, 2022). Kircaburun (2016) found that depression was linked to self-esteem and the daily use of social media. Factors such as body self-esteem and personality traits may influence adolescent SMU and internet addiction (Peris et al., 2020).

A more recent study, Leggett-James and Laursen (2023) confirmed that higher initial SMU for children was associated with greater subsequent decreases in body satisfaction and physical activity especially for children who were highly susceptible to peer pressure. These findings demonstrate how important it is to monitor children who begin to use social media at an early age and highlight the risks of SMU relative to peer conformity.

Presently, researchers are still debating whether SMU is addictive. A more recent study on SMU and addiction found no evidence of withdrawal-like effects associated with problematic social networking site (SNS) use. Findings from this study however did find that there were subtle effects on mood associated with SMU (Wadsley & Ihssen, 2023).

SMU Intensity and Outcomes

The association between SMU intensity and well-being is a complex phenomenon as a range of factors influence this relationship, including: the type of social media activity that one engages in; individual differences; and whether SMU problems such as social comparison are considered (Boer et al., 2021). SMU intensity includes both active and passive use of social media. Active SMU refers to the creation of content and communication on social media outlets while passive use of social media pertains to viewing someone else's social media content without actively engaging with the content owner (Boer et al., 2021).

Relative to passive engagement, the Roberts and David (2022) study found that passive engagement was associated with less social connection and lower well-being while high passive engagement was associated with lower perceived social connection and higher stress. Active

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social media users may experience better psychosocial well-being but more harmful outcomes, while passive users may experience significantly lower levels of perceived social media benefits and social connectedness while also reporting less problematic SMU and social media stress (Keum et al., 2022). On the other hand, the Sala et al. (2024) umbrella review of social media engagement confirmed that moderate SMU is linked to greater well-being, social support, and improved social relationships.

Research shows that the ways in which young adults engage with online content influences how they feel about themselves afterwards. For example, the Trifero and Prena (2021) study found that the more intense users engaged with Instagram, the higher their perceived self-esteem. Relative to the WhatsApp mobile based application, which is also popular with college students, findings indicate that time spent on this application was beneficial and enhanced student's psychological well-being (Bano et al., 2019). High social media intensity was associated with a negative influence on social connection when used passively and a positive influence when used actively (Roberts & David, 2022).

Table 2

Social media engagement and well-being outcomes

Active Engagement	Low to Passive engagement	Medium (moderate) Engagement
More social connection	Less social connection	Improved social relationships
Higher psychosocial well-being	Lower psychosocial well-being	Greater well-being

Potentially, more harmful outcomes, including risk of addiction	High to low stress and less problematic SMU outcomes	

Social Connectivity, SMU, and Well-being

Social connectivity is one of the most powerful predictors of one's health and well-being (Abrams, 2023; Winstone et al., 2021). Social connection is also necessary for well-being (Chari, 2022). Human beings are highly sociable and have a basic social need for social interaction. Research confirmed that many people feel a sense of loneliness in the United States and the world. Additionally, the isolation period of the COVID-19 pandemic exacerbated feelings of loneliness (Abrams, 2023).

Loneliness is a type of distress that can occur when one does not feel that one's needs for social connection is satisfying or if there is a discrepancy between the quality of one's social relationships based on the type of social relationship that one has or that one wants (Rogers, 2023). For some people, loneliness may be considered a public health epidemic. Furthermore, it is possible that the increased use of SMU may trigger greater feelings of alienation rather than social connection (Greenblatt, 2023). However, social media can be an especially useful tool for individuals to maintain social connectivity during times of crisis (Yue et al., 2024).

Social networking sites can be beneficial when used to promote meaningful connections, however, they can be harmful when negative factors such as social isolation and social comparison develop (Clark et al., 2018). On one hand, *s*ocial media sites may provide an avenue for adolescents and young adults to connect instantaneously and in a repetitive fashion (Griffiths,

2018). Sharing one's social experiences online can be beneficial to promote social connectivity (Winstone et al., 2021).

On the other hand, social connectivity relative to SMU has been associated with harmful effects on well-being (Adorjan & Ricciardelli, 2023). Research confirmed that individuals who have higher social media addiction have a higher risk of experiencing mild depression (Sujarwoto et al., 2023). Increased rates of depression due to social connectivity may leave one feeling socially isolated (Miller, 2023).

Discussion

This research has implications for making community partners (i.e., parents, educators, and administrators) aware of the influence of social media on well-being. Understanding the complex influence of SMU intensity on well-being can inform individuals about the positive and negative outcomes of SMU and its influence on one's well-being, including mood, thoughts, and feelings.

SMU has implications beyond mental health and well-being concerns, extending to national security. More recently in March 2024, the U.S. House of Representatives voted to either have TikTok banned in the United States or force its owner to sell the application (Maheshwari et al., 2024). The outcome of the vote in the United States Senate is still unclear.

One of the first steps to enhance one's well-being is to recognize when social media is excessive and to create a plan of action to minimize usage (Johnson, 2022). Research suggested that limiting social media usage to approximately 30 minutes daily may enhance well-being (Hunt et al., 2018; Sherrell, 2021). A more recent study, Brailovskaia et al. (2023) found that the less time that one spent on one's smartphone, the more positive one's well-being and lifestyle

was perceived. Abstinence was, however, not necessary to increase well-being and a healthy lifestyle.

The Faulhaber et al. (2023) study on self-monitoring reiterated the value of limiting one's daily use of SMU. Participants in this study either limited their social media usage to 30 minutes a day or used social media as usual. After two weeks of limiting SMU, the group who limited SMU demonstrated significant improvements in psychological well-being with negative outcomes such as depression, anxiety, fear of missing out, loneliness, and negative outcomes decreasing and positive outcomes increasing. For teens, in addition to monitoring SMU, strong parental relationships can be instrumental in reducing the risk of mental health problems (APA Monitor, 2024).

Chen and Li (2017) highlighted the unique opportunities that the smart phone offers relative to quality-of-life perception and the positive benefits of mobile SMU. Social media networking sites may be usable, supportive, and engaging for mental health interventions, given that young adults are already using them for social support and mental health support interventions (Ridout & Campbell, 2018). Likewise, Coe et al. (2022) emphasized that social media engagement can facilitate finding mental health support and connectivity. Social media has revolutionized health communication by providing a rapid platform for the dissemination of health information and public health advocacy (Muhtar et al., 2024). Consequently, SMU has increased health awareness for many individuals.

An APA Panel (2023a) recently proposed a call to action to promote healthy socialization via social media literacy training and screening for problematic online behaviors to ensure that youth have the literacy skills to maximize social media experiences. The APA intends to promote literacy training which will include specific instructions on how to safely use

social media (APA 2023b) to ensure that users have developed the necessary competencies and skills to maximize opportunities for safe, meaningful, and balanced SMU (APA, 2023c).

Future research should focus on examining the mechanisms that influence the positive and negative outcomes of social media for active and passive social media users (Keum et al., 2022). It would be important to explore not only how to alleviate the negative effects of social media but to better understand how the negative outcomes of social media can be prevented. A more proactive way to study social media would be to engage in studies that help in understanding how social media can be optimized to enhance well-being (Gudka (2022). Another consideration for future research would be to explore the differences in SMU intensity outcomes based on the social media platform that one uses. It would also be important to study the protective factors of SMU so that the effects of SMU can be mediated. Lastly, Popat and Tarrant (2023) highlighted the need to consider studying younger participants who use social media, adolescent views on social media improvements, and the impact of COVID-19 on social media.

Summary

Research is mixed on whether social media is conducive to well-being. Researchers confirmed that SMU may pose a risk to mental health (Boer et al., 2020; Miller, 2023). Findings confirmed that the relationship between SMU intensity and well-being is a complex phenomenon due to various intervening factors such as: SMU frequency, how social media is used (Clark et al., 2018; Verduyn et al., 2020), individual differences, whether SMU problems such as social comparison are considered (Boer et al., 2021), emotional connectivity, and engagement levels (Roberts & Davis, 2022).

Relative to SMU intensity, active social media users may experience better psychosocial well-being but more harmful outcomes while passive users may experience significantly lower levels of perceived social media benefits and social connectedness while also reporting less problematic SMU and social media stress (Keum et al., 2022). High social media intensity was also found to have a negative impact on social connection when used passively but a positive impact when used actively (Roberts & David, 2022). More recently, the Sala et al. (2024) umbrella review of social media engagement pointed out that moderate SMU was linked to greater well-being, social support, and improved social relationships.

A review of the literature confirmed that SMU can have both positive and negative impacts on well-being (APA, 2023a; Boer et al., 2021; Roberts & David, 2022; Sadagheyani & Tatari, 2021; Sherrell: 2021; Silmi et al., 2020). On one hand, SMU can be beneficial as it imparts knowledge to individuals on the thoughts, lives, and opinions of others, promotes sharing of knowledge, fosters social connectivity and bonding, and potentially minimizes social isolation. On the other hand, social media can influence negative well-being outcomes including anxiety and depression, negative self-perceptions, social isolation, and SMU addiction. Adverse risk factors such as social comparison, fear of missing out, digital hoarding, and cyber bullying were linked to SMU. Presently, researchers are still debating whether SMU is addictive.

While there is a great deal of research on adolescent social media usage, more research is needed to determine the overall influence of SMU intensity on well-being among individuals in society including children and young adults (Calfas, 2023) given the complexity of SMU and its relationship to well-being.

Given that technology has swiftly evolved, and social media plays an instrumental part in the lives of youth, adolescents, and young adults, researchers face both opportunities and

challenges in assessing the influence of social media on mental health and well-being (Nesi,

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Near-Peer Mentoring: Empowering Underrepresented Students for Graduate Education

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This program evaluation examined a near-peer mentoring experience designed to increase diversity in graduate education, specifically exploring the types of support provided to underrepresented undergraduate students receiving mentorship from graduate students. First-generation, low-income (FGLI) college students and underrepresented minority (URM) students participated in near-peer mentoring and submitted reflections following mentoring meetings. Mentoring reflections were analyzed, and five types of mentoring support were identified: social-emotional support, technical coaching support, cultural sensitivity support, exposure to ideas and experiences support, and promoting self-reflection support. The relationship between enrollment in graduate school and the number of different types of mentoring support (p<.05) was statistically significant, as was the presence of social-emotional support (p<.05). Recommendations are provided on best practices to support peer-mentoring.

Keywords: mentoring; underrepresented students; graduate school enrollment

Diversity gaps persist in graduate education. The lack of diversity can affect the quality, breadth, and depth of intellectual contributions in a field and creates a social injustice when barriers are present that prevent access to study a field of interest at advanced levels (Shultz and Stansbury, 2022). A ten-year effort to increase diversity in graduate education produced small gains (Okahana, H., Zhou, E., & Gao, J., 2020). Enrollment of underrepresented minorities remains a small percentage of the graduate school population in all fields with slight to negative change in first time enrollment for Black/African Americans (0.3%), American Indian/Alaska Natives (-3.1%), and Native Hawaiians/Other Pacific Islanders (-2.2%) (Okahana et al., 2020). Additionally, first-generation college students enrolled in graduate education at a significantly lower percentage (38%) compared to their peers whose parents attained a 4-year degree (51%) (NCES, 2021), and are far less likely than their peers to earn a graduate degree, and even far less

likely to earn a doctoral degree (The Pell Institute for the Study of Opportunity in Higher Education, 2021). Additional support is needed to ensure the pursuit and successful completion of graduate degrees by this population.

Underrepresented students were more likely to face obstacles to successful matriculation due to lacking a sense of belonging (Cahalan et al., 2021). According to Benisek (2022), those most different from their peers, such as first-generation, low-income and underrepresented minority students, are more likely to experience impostor syndrome, which is perpetuated when underrepresented students are unable to see their identities reflected in the academic community. The data shows that the majority of professors are from privileged backgrounds and more likely to have highly educated parents (Schultz & Stansbury, 2022). Among full-time professors, 51% were White males; 28% were White females; 2% were Black males; 2% were Black females; 2% were Hispanic males; 2% were Hispanic females; 8% were Asian/Pacific Islander males; 4% were Asian/Pacific Islander females; and <1% were American Indian/Alaska Native (National Center for Education Statistics, 2022). Lack of representation in academia can create feelings of being less capable than others or fearing overestimation of their ability, then being exposed as a fraud. This may prevent one from taking on new challenges or engaging fully in learning environments.

Underrepresented students often lack access to informal networks and information needed to be successful in their academic and professional lives in which they are underrepresented (Thomas et al., 2007). A study conducted by Thomas et al.(2007) reported that underrepresented graduate students had to make their way through their studies without a mentor to serve as an advocate or support system. Compounding the issue, most minority students are likely to be mentored by someone who is racially and/or culturally different from them, and this

poses an issue in academia where there may be pressures for faculty to reproduce themselves. Mentors who lack cross-cultural competence and awareness of differences across race and socio-economic status or who are culturally insecure may create dysfunctional mentor-mentee relationships. When there were more similarities in cultural, ethnic, and socio-economic experiences and values between mentors and mentees, the mentoring relationship was more productive (Haeger & Fresquez, 2016). Furthermore, holistic mentoring that provides social-emotional support and culturally relevant mentoring, in addition to skills-based training, can assist marginalized populations in overcoming barriers that historically prevented underrepresented students from enrolling and persisting in graduate school (Edgcomb et al., 2010).

According to Haeger & Fresquez (2016), when graduate students worked with peer mentors, they discussed issues they faced while embarking on their graduate educational experience beyond the technical components of graduate study, for example how to navigate academia with the unwritten rules and politics. Zaniewski & Reinholz (2016) concluded that when underrepresented students engaged in mentoring relationships addressing common challenges alongside a positive role model, students increased their sense of belonging.

However, Gershenfeld's (2014) review of undergraduate mentoring programs revealed that while the research literature reports on the different mentoring programs that lead to positive results, descriptions of the primary mentoring program components were absent in 75% of studies which made replication difficult. Additionally, Zaniewski & Reinholz (2016) concluded that what is even less well known is the nature of the mentoring relationships with consideration of both mentor and mentee characteristics.

In this article, we provide an evaluation of a near-peer mentoring experience where underrepresented undergraduate students (referred to as "scholars" going forward) were matched with graduate students from the same demographic background toward supporting enrollment and completion in graduate studies.

Research Questions

1) What types of mentoring support exist, if any, in near-peer mentoring between underrepresented undergraduate scholars and graduate student mentors?

2) What is the relationship, if any, between the types of support received in near-peer mentoring and graduate school enrollment?

Description of the Near-Peer Mentoring Experience

The near-peer mentoring experience described in this paper was executed in the context of a host educational opportunity program. The host opportunity program requires supervised faculty mentoring for all participants, largely focused on a mentored research project. However, a scholar's Faculty Research Advisor may or may not provide mentoring beyond the research project itself, and in addition, may or may not have the experience of being an underrepresented student / have an understanding of the unique challenges that underrepresented students must navigate in higher education. Therefore, a near-peer mentoring experience was added and evaluated as an additional layer of support. The graduate student mentors were charged with supporting undergraduate scholars in meeting the four educational opportunity program goals: (1) participation in research or scholarly activity, (2) enrollment in graduate programs, (3) continued enrollment in graduate study, and (4) doctoral degree attainment.

The design of the near-peer mentoring experience includes several elements of engagement: recruitment, selection, compatibility evaluation, matching, training, and support and ongoing engagement. (See Figure 1).

RECRUITMENT. Interested graduate students were invited to apply to become near-peer mentors. Invitations to apply were distributed through the campus's graduate student organizations (especially those with a mentoring component), professional development programs (e.g., graduate teacher training), and graduate academic advisors. In addition to biographical data, applicants were asked the following questions: (1) "Have you participated in an educational opportunity program in the past? If yes, in what capacity?" (2) "Why are you interested in serving as a mentor for underrepresented students?" and (3) "What experiences will you draw on in your mentoring to support underrepresented undergraduate students?"

SELECTION. Criteria for selecting applicants into the role of graduate mentor included undergraduate major, field of graduate study and research area to ensure that mentors represented fields of study related to the current cohort of scholars. Applicants were also selected based on their perceived ability to relate to and support underrepresented students. Alumni of educational opportunity programs and applicants who identified as first-generation/low-income or underrepresented in higher education were prioritized. Also readily accepted were applicants who communicated an understanding that the pathway to graduate school is not always clear and especially difficult to navigate for students whose family/social network is not highly integrated into the higher education system. Other evaluation criteria included the applicant's perceived ability to provide well-reasoned and accurate instruction in key areas and the applicant's description of their past (positive) mentoring relationships.

COMPATIBILITY EVALUATION. All graduate student applicants who met the selection criteria were invited to participate in a mentor/mentee "meet and greet" event. Generally, the number of graduate student mentors at the event outnumbered the number of scholars. Prior to the event, mentors submitted their bios, which were distributed to scholars. Upon reviewing bios, every scholar selected three mentors whom they wished to meet at the event. Mentors were assigned to tables (or breakout rooms for virtual events) while scholars rotated between tables during the event. The 1-hour event consisted of three sessions, which allowed scholars to meet the three mentors they selected. Since multiple scholars and multiple mentors were seated together during each session, mentors had an opportunity to meet each other, and scholars had the opportunity to interact with mentors whom they may not have originally selected.

MATCHING. Following the "meet and greet" event, scholars were invited to provide their preference (first, second and third choices) regarding mentors to be matched with. Matches were created based primarily on scholar preference; however, in cases where multiple scholars preferred the same mentor, matching was based on staff perception of the match between a scholar's needs and the mentor's strengths. Mentors and scholars were notified of their match by email and invited to begin the meeting.

TRAINING. All mentors who were matched with a scholar were required to attend a 2-hour training session prior to meeting with their assigned scholar for the first time. Mentor training provided an overview of the educational opportunity program's goals to ensure that mentoring aligned with the goals set for scholars. Mentors who were alumni of an educational opportunity program were invited to share about their experience as a scholar so that the entire cohort of mentors could better understand both the need and impact of these programs. All

mentors were invited to introduce themselves and share about the nature and impact of their past mentoring experiences, with specific focus on the elements of their past mentoring experience that created significant impact in their academic/career development. Mentors were then given mentoring scenarios to discuss in small groups before a large-group discussion of potential approaches to each scenario. Finally, mentors were instructed in promising mentoring practices.

SUPPORT AND ONGOING ENGAGEMENT. To support the quality of the mentoring experience, both mentors and scholars were supported by staff throughout the mentoring relationship. The cohort of mentors was connected via a Slack channel so that they could discuss topics/scenarios that arose for them. In addition, both mentors and scholars completed summaries/reflections after each meeting. Scholars were also asked to provide topics that they were wanting to discuss in their next meeting with their mentor. Beyond meeting with their mentee, mentors were included in other program events throughout the academic year. For example, mentors were invited speakers and/or panelists during monthly program meetings, mentors hosted drop-in help sessions where they provided feedback on graduate program application materials, conference presentations, and CVs, and mentors participated in weekly drop-in sessions designed for connection among scholars, mentors and staff.

Methods

To determine the types of mentoring support that existed in near-peer mentoring between undergraduate scholars and graduate student mentors, a program evaluation using mixed-methods was conducted. The population consisted of 39 undergraduate scholars who submitted written reflections regarding each of their near-peer mentoring meetings as part of a non-credit course during the academic years of 2018 through 2022. The reflections prompted scholars to describe (1) their mentoring meeting with focus on something new learned about graduate school

not known prior to meeting with the graduate student mentor; (2) how the meeting positively or negatively influenced their outlook on enrolling in graduate school; and (3) discussion points in preparation for their next mentoring meeting. The study protocol was granted an exemption from formal review and identified as a program evaluation.

Using qualitative content analysis of these reflections, the authors identified the types of support provided through the mentoring experience. Scholar reflections were downloaded, uploaded to an Excel document, and de-identified. The authors segmented data from the student reflections using both a priori and emergent codes around types of mentoring support described. Discussion between the authors was used to reach consensus on a list of the types of mentoring support evidenced in the reflections. Five types of mentoring support were identified, and quotes were selected as documentation for each type.

Next, the authors independently reviewed each reflection and determined which types of mentoring were described within it. For the 5 types of support, reflections were scored at 0 for no evidence or 1 for evidence. The authors then compared ratings and discussed any difference until a full consensus reached. Using these ratings, the authors quantified how many types of mentoring support each scholar experienced. A score was computed for each scholar (Range 0-5), where a score of 5 indicates that all 5 types of mentoring were experienced by that scholar during their mentoring relationship.

Each scholar was also assigned a score based on graduate school enrollment: 1 for no graduate enrollment; 2 for master's program; and 3 for doctoral program. A Pearson Product Moment Correlation was conducted to examine the relationship between the types of mentoring support received and graduate school enrollment. Statistical analyses were performed using SPSS Version 28.

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<center>**Findings**</center>

Population

Thirty-nine undergraduate scholars (female=23; male=16) participated in the near-peer mentoring between the academic years of 2018 and 2022. Of those, 82% (n=32) of the scholars identified as a first-generation college student and 18% (n=7) identified as a continuing-generation college student; 77% (n=30) met the U.S. Department of Education low-income threshold and 23% (n=9) did not meet the low-income threshold; 79% (n=31) identified as a member of an underrepresented minority group (Black or African American, Hispanic or Latino, Native American or Alaska Native, Native Hawaiian or other Pacific Islander); and 72% (n=28) were both low-income and first-generation college students. Eighty-two percent (n=32) of the students were STEM majors; 18% (n=7) were Social Science majors. (See Table 1).

A total of 127 reflections were submitted and analyzed for scholars who graduated with a bachelor's degree between the academic years of 2018 to 2022. Both reviewers independently identified the types of mentoring support documented in each scholar's reflection. Inter-rater reliability was established by determining agreement regarding the type(s) of support evident in each reflection. Of the 127 reflections reviewed, an 89% inter-reliability was determined, indicating strong reliability. Ratings that differed were discussed until a 100% consensus reached.

Findings related to RQ1

The qualitative study found that five types of mentoring support are evident in the scholar's reflections: social-emotional support; technical coaching; cultural sensitivity; providing exposure to ideas and resources; and facilitating self-reflection.

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SOCIAL-EMOTIONAL SUPPORT was defined as experiencing acceptance, reassurance, encouragement, and/or praise from their mentor. For example, this mentor took inventory and praised the scholar's past and present achievements. *"[My mentor] celebrated what had been accomplished in the last four years with me, and reminded me to take some time to appreciate."* Scholars also frequently reported that discussions with their mentor helped them develop confidence that they would be successful in graduate school. *"[My Mentor] has made me feel more confident in my application decisions and more confident in my abilities to succeed in graduate school."*

Discussions of doubts and belonging were also identified as social-emotional support. Scholars reported being validated and encouraged following discussions with their mentor about their doubts that they will be successful in graduate school. "*This meeting has positively influenced my outlook on grad school by showing me that difficulties I am facing now are real, and many people experience them. There are also practical ways to overcome these challenges.*" The scholar was reassured by their mentor that they were not alone in experiencing challenges. The mentor also shared examples of how others have addressed challenges and experienced subsequent success.

Another topic commonly addressed in mentoring meetings was the scholar's assumptions about the expectations they would need to meet in graduate school. Scholars often reported relief that the expectations they imagined they would need to meet were higher than the expectations their mentor reported experiencing. For example, this scholar imagined that they would need to fully develop a research project on their own. The mentor provided relief by explaining that graduate students work in partnership with their Research Advisor to develop a research project. *"I learned that it's okay to not fully understand the ins and outs of what your research project*

may look like going into your first year of grad school." The scholar explained how this information eased doubts about *"having to come up with a whole project on my own."* Another scholar imagined that graduate students and faculty were characterized by certain attributes. It appears that the scholar feared that if they didn't "fit the (imagined) mold," then they would not belong in graduate school. Interaction with their mentor appeared to dispel this way of thinking. *"It was very relieving in my meeting to find out that [my mentor] likes to play video games just like me and that I was able to just have a comfortable conversation with somebody at that level of education."*

TECHNICAL COACHING SUPPORT was defined as receiving guidance from their mentor regarding how best to accomplish tasks and activities that the scholar was actively engaged in as an undergraduate student. Applying for undergraduate research opportunities, preparing CVs, designing presentations for research conferences, and selecting graduate programs were common activities involving technical coaching from mentors. Common statements included, "*[My mentor] gave me a lot of information on how to apply ... and what the process looks like."* Additionally, mentors and scholars discussed how to improve personal statements and most specifically, "*we discussed how to upset the expected format so that my statement would stand out from others."* Last, these examples demonstrate how the mentor gave advice on talking to other graduate students as potential graduate schools. One scholar stated, *"I learned that it's very important to talk to the graduate students before choosing a school because the school or advisor might have a big name but might not be as good at mentoring."* Another scholar stated, *"[My mentor] helped me figure out questions to ask other graduate students in the department I'm interested in attending."*

CULTURAL SENSITIVITY SUPPORT was defined as discussions of unique perspectives and experiences related to being first-generation, low-income and/or underrepresented students in higher education. Within this category of support, scholars reported discussions around their experience and their mentor's experience in higher education. For example: *"[My mentor] is a fellow person of color in a field not so different from my own so it's always good to hear his own methods of navigating academia/college campuses."* This scholar's statement highlights the significance of connecting undergraduate scholars with graduate student mentors of similar backgrounds.

In the next example, the scholar benefited from learning about their mentor's experience of leaving home for the first time to pursue their graduate degree. The scholar reported being inspired and bolstered in pursuing this next stage of their education and life: *"I asked my mentor what it was like for her to leave her home behind to go off and study for a PhD in a totally new environment. This is something that has been on my mind for the longest time… never being more than an hour drive away from friends and family. She told me about her experience, and now I am even more excited to be able to start mine!"* This example also highlights the significance of connecting undergraduate scholars with graduate student mentors of similar backgrounds.

In the last example, the scholar experienced support and reassurance regarding their desire to balance educational decisions with their value for family. It appears that - prior to speaking with their mentor - the scholar believed that considering family in their graduate program selection was somewhat unique to them. *"It positively affected my outlook on graduate schools because [my mentor] told me it's okay to choose a graduate school that works best for my personal and family needs which is important to me."* This example highlights the

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significance of connecting undergraduate scholars with graduate student mentors of similar backgrounds.

Providing exposure to ideas and experiences support was defined as providing exposure to new ideas and experiences related to what it may be like to be a graduate student. For example, one scholar stated, *"I didn't understand a lot of the true dynamics of being in a PhD program ... [my mentor] has shared his experience"* and another scholar stated *"[I learned] more about what graduate school looks like on a day-to-day basis."*

Beyond descriptions of their lived experiences as graduate students, many mentors also provided opportunities for scholars to experience first-hand what it is like to be a graduate student. Scholars wrote about touring their mentor's research lab *"to show me what she does as a graduate student"*. Another scholar shared how they "*learned [about] ... the process of how graduate students go through publications for a conference. My mentor was able to let me shadow her meeting with her advisors and meet her fellow Ph-D students."* Another scholar shared how they observed milestone assessments related to completing a PhD: *"I learned ... I would have to give a presentation to a board of faculty members in my graduate study to be able to advance to candidacy... I got a first-hand look at how I could organize my presentation to convey the results of my research as a graduate student for this panel of faculty members."*

Exposure to these ideas and experiences translated to the scholar seeing themselves as graduate students in the future. One scholar stated, *"Explaining what she did gave me a good outlook on the future of the things I could be doing."* Another scholar shared a similar sentiment in this statement: *"My mentor introduced me to... what she does on a daily basis and how she manages her research with her other schoolwork. This gave me a good picture of how things will be in the near future."*

Even more striking was that scholars expressed confidence that their experience as a graduate student would be positive because their mentor's experience has been positive. *"My mentor seemed to be very happy with her research and was confident in what she is doing so it made me think that good times are ahead!"* One chief concern among scholars included whether graduate school would be enjoyable in addition to being rigorous. *"I've imagined that it would be difficult to find the time for fun, and so hearing [my mentor] talk about her experience gets rid of some of my worries."*

Other areas of great concern for scholars were whether graduate school allowed for healthy work-life balance, and whether graduate students can accomplish financial stability while pursuing their degree. One scholar stated, "*As an undergraduate, I've always worked during all 4 years but I have learned that being a graduate student in of itself is a job and the compensation typically allows for students to not need to find additional employment.*" One scholar stated how mentoring has had a positive impact on their perspective on graduate school because "it *made me realize that I will be able to find ways to make sure that I will financially be okay during it."* Misconceptions in any of these areas could become a deterrent to pursuing graduate studies; however, as evidenced by these quotes, scholars' concerns were reduced or alleviated by the descriptive and first-hand exposure provided by their mentors.

Facilitating self-reflection support was identified when students re-analyzed their priorities and goals because of meeting with their mentor. Self-reflection was also identified when students changed their view of/outlook on their potential to be successful in graduate school because of meeting with their mentor.

After speaking with their mentor, this scholar self-reflects regarding their priorities in selecting a graduate program, specifically that the priority they have been placing on an

institution's competitive ranking may not be the most important selection criteria for them to rely on: *"[My mentor] definitely stressed the importance of making finding a good department and PI a priority. I think I've fallen into the trap of applying to certain programs because of prestige. It was good to have someone's personal input on this."*

Other areas of reflection included priorities in a future career, specifically noting that they have become confident that the work that they will accomplish as a graduate student and beyond will be fulfilling and impactful. One scholar stated, *"I genuinely love the idea of giving my entire life into research in engineering and science…the research process really satisfies my desire to do something that positively affects the world, since I can actively see my progress."*

Self-reflection regarding potential for success in graduate school was also common specifically as it related to positive mentor affirmation. The next statements suggest the recognition that scholars experienced increased self-confidence in their abilities to be successful in graduate school when they remember that others have confidence in their abilities. One scholar stated, *"The meeting with [my mentor] positively affirmed my outlook on grad school because it's good for me to see how much other people I've worked with believe in me. I forget sometimes."* Another reinforced this idea with this statement, *"Meeting with my mentor …helped me see just how much control I have over my situation and that I can do anything with the right drive and mindset. Can't wait to meet with him again!"*

This scholar self-reflects regarding their potential for success in graduate school, specifically recognizing that they will be successful because of their effort and the faculty support they will receive when struggles arise. Example: *"I feel like I have had more than my share of failures, perhaps even too many, so I was wondering if someone like me would even be able to succeed in graduate school if admitted. She assured me that if I get admitted, if would be*

because they felt as if I could do it. She told me that they want you to succeed. So to me, this kind

of just showed me that I shouldn't be as worried as I am about being a graduate student because

even though graduate school is going to be tough, as long as I keep up that drive and motivation

to want to succeed, I'll be able to find someone who can help me."

The self-reflection evident among scholars highlights the profound effect that our

interactions with others can have on our decision-making and view of ourselves, both of which in

turn shape our personal and professional trajectories.

Findings related to RQ2

Seventy-seven percent of scholars enrolled in graduate school. Table 2 provides

disaggregated data regarding the demographics of scholars who enrolled in a doctoral program,

enrolled in a master's program, or did not enroll in a graduate program.

Table 3 provides quantitative data regarding how many types of mentoring support

scholars experienced (min = 0; max = 5). Scholars who enrolled in doctoral programs reported

the highest number of different types of mentoring support used (n=16, M=3.37, SD=1.02),

followed by those who enrolled in master's programs (n=14, M=3.14, SD=.770). Scholars who

did not enroll in a graduate program reported the fewest types of mentoring support (n=9, Mean

Score (M)=2.33, SD=1.41). The overall mean for all scholars was 3.05 (n=39, SD=1.09).

Table 4 provides quantitative data regarding the percentage of scholars experiencing the

five types of support. Forty-four percent of scholars reported evidence of social-emotional

support. Support in this area was reported by 56% of students who enrolled in doctoral programs,

50% of students who enrolled in master's programs, and 11% of students who did not enroll in a

graduate program.

Sixty-seven percent of scholars reported evidence of technical support. Support in this area was reported by 75% of students who enrolled in doctoral programs, 64% of students who enrolled in master's programs, and 56% of students who did not enroll in a graduate program.

Three percent of scholars reported evidence of cultural support. Support in this area was reported by 6% of students who enrolled in doctoral programs and 0% of students who enrolled in master's programs or did not enroll in a graduate program.

Forty-nine percent of scholars reported evidence of exposure/experiences support. Support in this area was reported by 50% of students who enrolled in doctoral programs, 64% of students who enrolled in master's programs, and 22% of students who did not enroll in a graduate program.

Thirteen percent of scholars reported evidence of self-reflection support. Support in this area was reported by 6% of students who enrolled in doctoral programs, 14% of students who enrolled in master's programs, and 22% of students who did not enroll in a graduate program.

Correlation coefficients presented in Table 5 indicated a significant relationship between the number of different types of support and graduate enrollment with an r value of .353 (p=.02). Additionally, a significant relationship existed between social-emotional support and graduate enrollment with an r value of .328 (p=.04). No statistically significant relationships were found to exist between graduate enrollment and the following types of support: technical coaching had a r value of .163 (p=.32); cultural sensitivity had a r value of .171(p=.29); exposure to ideas and experiences had a r value of .170 (p=.30); and promoting self-reflection had a r value of -.187(p=.25).

Discussion

According to this program evaluation, graduate student near-peer mentors provided five types of support for scholars: social-emotional; technical coaching; cultural sensitivity; providing exposure to ideas and resources; and facilitating self-reflection. Scholars consistently reported the positive impact the mentoring support had on their perspective on graduate school enrollment.

Recommendations based on the literature review and the findings of this evaluation suggest the following best practices for facilitating an impactful near-peer mentoring program. (See Table 6). First, recruit mentors based on mentee similarities in background (ethnicity, race, culture, identities, experience of being an educational opportunity program participant), and field of study. Thomas et al. (2007) believed the benefit of pairing mentors from similar backgrounds was that underrepresented students could benefit from increased informal networks to enhance success in their academic and professional lives. When training graduate student mentors, ensure their understanding of program goals and welcome them as partners in meeting those goals. Edgcomb et al. (2010) found that near-peer mentors provided a larger network of collaborators when needing feedback and may be more accessible and approachable than faculty.

Continue to support mentors to provide examples of the different types of support mentors can offer with a focus on asset-based mentoring where strengths are identified, understood, and nurtured to strengthen self-efficacy, resilience, and belonging. According to Benisek (2002), those most different from their peers, such as first-generation, low-income, and underrepresented minority students are more likely to experience impostor syndrome often preventing a sense of belonging. Feelings of not being capable as others with fear of others overestimating their ability and being exposed as an impostor may prevent one from taking on

new challenges or engaging fully in learning environments. Another recommendation is to encourage graduate student mentors to share their stories as a model of the value they bring in a diversity-valued environment. Edgcomb et al. (2010) discussed the importance of holistic mentoring, including social-emotional, cultural relevancy, and skills-based training, to support students in overcoming barriers to matriculation. Last, use reflections as a key assessment in progress monitoring the value of the mentoring relationship.

Limitations of this evaluation include the use of self-reported data. Participants may respond in a way that they believe is desired or expected. Findings are limited to the specific population of this evaluation and are non-generalizable. Because the intent of this study was to evaluate student perceptions of supports provided in the near-peer mentoring and how those supports influenced scholar outlook on graduate school enrollment, changes in student perceptions could not be determined. Additional mentoring meetings may have occurred without a reflection submitted to document the meeting. Finally, other factors were involved in influencing participant enrollment in graduate school, including faculty mentoring, other scholars in the program, program services, conference attendance, graduate school visits, and other activities beyond the scope of the program.

Future studies should investigate the value of near-peer mentoring in other educational opportunity programs from other universities to compare findings with this evaluation. Future studies could also investigate the influence of near-peer mentoring with scholars pursuing graduate studies to provide insight into long-term outcomes of the mentoring and include survey data from both the graduate student mentors and scholar mentees to provide a more comprehensive understanding of the influence of the near-peer mentoring on both the mentor and mentee. Finally, the impact of near-peer mentoring on professional identity could be examined to

identify best practices in designing near-peer mentoring training to improve intentionality in the

development of a positive professional identity as a scholar.

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Figure 1

Design of the Near-Peer Mentoring Experience
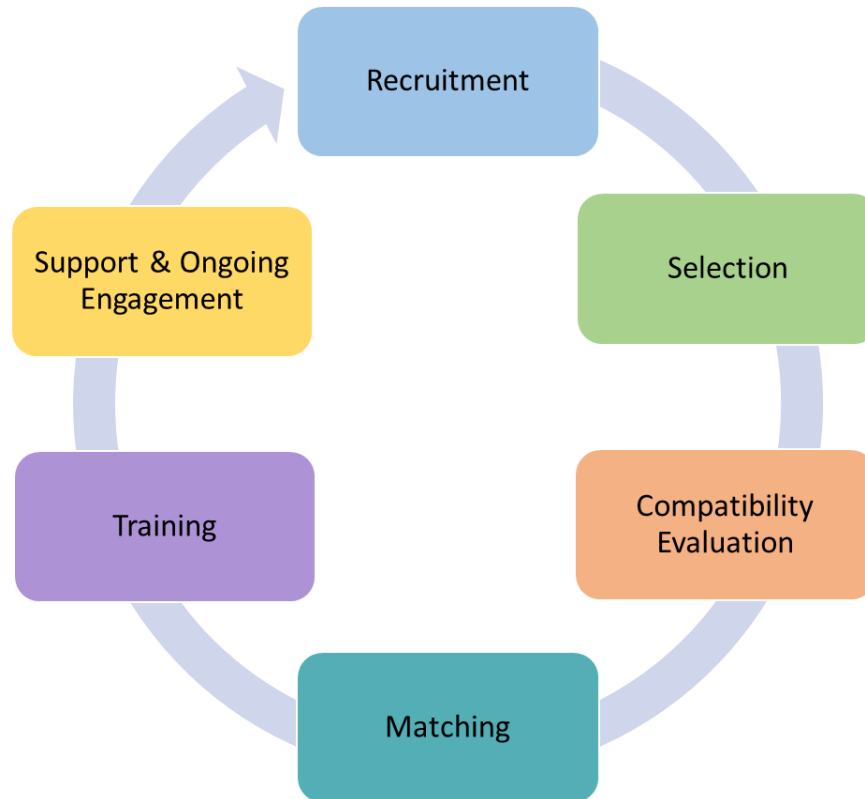
Table 1

Descriptive Statistics of Scholar - Data, 2018 - 2022 (n=39)

	Percentage	n
Gender		
Female	59%	23
Male	41%	16
Program Eligibility		
Continuing-Generation	12%	7
* First-Generation	82%	32
Does not meet Low-Income Threshold	23%	9
Meets Low-Income Threshold	77%	30
Does not identify as an Underrepresented Minority	21%	8
Underrepresented Minority	79%	31
Asian	5%	2
Black/African American	10%	4
Hispanic or Latino	64%	25
Native American or Alaska Native	3%	1
Native Hawaiian or other Pacific Islander	0%	0
White	18%	7
Major Field of Study		
Social Science	18%	7
STEM (Science, Technology, Engineering & Math)	82%	32

*Notes. *First-Generation Classification defined as neither parent earned a bachelor's degree,*

and Continuing Education Classification defined as either parent earned a 4-year bachelor's

degree.

**Low-Income Threshold defined as family taxable income did not exceed 150 percent of the

poverty level amount. The family poverty levels are established by the Census Bureau for

determining poverty status and are published annually by the U.S. Department of Health and

Human Services in the Federal Register

(https://www2.ed.gov/about/offices/list/ope/trio/incomelevels.html).

Table 2

Percentage of Scholars' Graduate Enrollment Based on Demographics

Demographic	No Enrollment	Masters	Doctoral	Total
Overall	23%	36%	41%	100%
Gender				
Female	13%	25%	21%	59%
Male	10%	10%	21%	41%
Program Eligibility				
Continuing-Generation	2%	8%	8%	18%
*First-Generation	21%	28%	33%	82%
Not Low-Income	8%	5%	10%	23%
* Low-Income	15%	31%	31%	77%
Not Underrepresented Minority	8%	8%	6%	21%
*Underrepresented Minority	15%	28%	36%	79%
Major Field of Study				
Social Science	5%	13%	0%	18%
STEM	18%	23%	41%	82%

n=39

Table 3

Mean Scores of Types of Mentoring Supports Based on Graduate Enrollment

Enrollment	n	M	SD
Number of Different Types of Support			
Did not enroll	9	2.33	1.41
Enrolled in Master's Program	14	3.14	.770
Enrolled in Doctoral Program	16	3.37	1.02
Overall	39	3.05	1.09

Number of Different Types of Support Range (0-5).

Table 4

Percentage of Students Reporting Each Type of Mentoring Support Based on Graduate Enrollment

Enrollment	n	%
Social Emotional Support		
Did not enroll	9	11%
Enrolled in Master's Program	14	50%
Enrolled in Doctoral Program	16	56%
Overall	39	44%
Technical Support		
Did not enroll	9	56%
Enrolled in Master's Program	14	64%
Enrolled in Doctoral Program	16	75%
Overall	39	67%
Cultural Support		
Did not enroll	9	0%
Enrolled in Master's Program	14	0%
Enrolled in Doctoral Program	16	6%
Overall	39	3%
Exposure/Experiences Support		
Did not enroll	9	22%
Enrolled in Master's Program	14	64%
Enrolled in Doctoral Program	16	50%
Overall	39	49%
Self Reflection Support		
Did not enroll	9	22%
Enrolled in Master's Program	14	14%
Enrolled in Doctoral Program	16	6%
Overall	39	13%

N=39

Table 5

Relationship Between Types of Mentoring Support Provided and Graduate Enrollment

Scale	1	2	3	4	5	6	7
1. Number of Types of Support	–						
2. Graduate Enrollment	.353*	–					
3. Social Emotional Support	.435**	.328*	–				
4. Technical Support	.033	.163	-.146	–			
5. Cultural Support	.291	.171	.185	.115	–		
6. Exposure/Experiences Support	.238	.170	-.029	-.181	.336	–	
7. Self-Reflection Support	-.089	-.187	-.182	-.108	.062	-.220	–

*p<.05. **p<.01.

Table 6

Recommendations on Best Practices to Support Near-Peer Mentoring

Near-Peer Mentoring Elements	Recommendation
Recruitment	● Self-selected mentor-mentee matches based on similarities: background (ethnicity, race, culture, identities), experiences (educational opportunity program participant), field of study ● Important to screen mentors and understand their motivation for wanting to mentor
Training	● Encourage the use of the different types of support and the importance of including multiple types of support in mentoring ● Move away from deficit thinking where excuses are tolerated; instead focus on asset-based mentoring where strengths are identified, understood and nurtured to strengthen self-efficacy, resilience, and belonging + cultural capital is highlighted (example: I can do hard things and I can do this based on being able to do hard things in the past) ● Transparent discussions about impostor syndrome to normalize the feeling that one doesn't belong and to share different strategies that work to overcome this in difficult moments
Mentoring	● Provide opportunities for mentor:/mentee meetings, but also provide additional opportunities for mentoring to occur in different environments (panel discussions, working meetings, informal group conversations, etc.) ● Encourage all to share their story toward appreciating the uniqueness and value that one can bring to an environment + understand one's ability to make contributions in the way that only you can make.
Evaluation	● Progress monitoring to ensure mentors are reporting positive effects of mentoring ● Reflections to support mentees in pursuing their needs and continually analyzing their goals and experiences ● Check-ins by program staff to keep mentors/mentees accountable to meeting and reflecting.

Artificial Intelligence in Language Education: A Mixed-Methods Study of Teacher Perspectives and Challenges

by

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As artificial intelligence (AI) increasingly intersects with educational domains, its impact on language learning and teaching methodologies has become a pivotal area of investigation. This mixed-methods study addressed AI class assistance, challenges, and emerging themes in the implementation of AI in the language learning classroom. Utilizing a mixed-methods approach, it examines the implementation of AI in the language classroom, focusing on AI class assistance and related challenges. Data was collected from 59 English language teachers in 14 countries through a survey distributed on social media, encompassing demographic information, trustworthiness, skepticism, and AI assistance. The results show a general positive attitude towards AI, especially in lesson preparation, but also reveal skepticism about AI's social context understanding and privacy concerns. "Regression analysis indicates that perceptions of AI's trustworthiness and class assistance with AI influence its adoption more than skepticism, indicating that building confidence in AI's capabilities and demonstrating its practical value in the classroom are key to its broader acceptance and effective use in language education. The study also highlights benefits such as language improvement and personalized learning, while noting challenges like cultural bias and ethical issues, pointing towards the necessity of responsible AI integration in education.

Keywords: artificial intelligence, English language education, English language learners, educational technology, second language education

Educational technology is constantly evolving, and the incorporation of Artificial Intelligence (AI) presents myriad opportunities for educational development (Sharadgah & Sa'di; 2022); nevertheless, there are a wide range of challenges and reservations about the use of AI for instructional purposes. AI is quickly becoming a significant part of the learning experience (Kushmar et al., 2022; Sharadgah & Sa'di, 2022), and it is crucial to more holistically understand how English language teachers perceive and use AI tools.

AI is gaining significant traction in the realm of educational research, particularly in the area of English language learning (ELL). Defined as a machine-based system capable of making predictions, recommendations, or decisions, AI is broad and encompasses various technologies like machine learning and natural language processing. Due to its rapid advancement, AI has become an integral component of daily life. In education, AI is recognized as a breakthrough, redefining how learning and teaching are perceived and conducted. Notably, in English as a Foreign Language (EFL) and English as a Second Language (ESL) instruction, AI tools such as intelligent tutoring systems, automated evaluation systems, and neural machine translation tools play a crucial role. These tools serve as both tutors and monitors, significantly enhancing the language learning process for students.

In the realm of language learning, AI plays a crucial role by simulating authentic communication scenarios in English, incorporating hands-on training in language skills, and integrating educational games centered on language development (Kushmar et al., 2022). Additionally, AI tools enable learners to engage in language skill exercises and receive valuable feedback. AI can also aid language learners through assistance in reading comprehension, machine translation, and automatic speech recognition to evaluate pronunciation (Radwan, 2017). In the context of evolving language learning technologies, it is imperative to explore English language teachers' perceptions of AI as well as their experiences with AI integration. There is a paucity of research that explores AI among English language teachers on a global level. Since English is a global language, it is important to compare how AI is being used by and perceived among English language teachers in various educational contexts around the world. This study aims to address this gap by delving into the perceptions and experiences of English language teachers worldwide. By exploring their demographic background, attitudes towards AI,

and specific concerns or reservations, this research aims to explore valuable insights that can inform the development of AI technologies tailored to the unique needs of language educators. The outcomes are anticipated to not only address the current research gap but also serve as a foundational resource for educators, researchers, and policymakers navigating the integration of AI in the international English language teaching landscape.

The purpose of this convergent mixed method study is to explore experiences and perceptions regarding artificial intelligence, especially focusing on trust, AI class assistance, and skepticism, among English language teachers. The following research questions guided the study:

Research Questions

1. What are English language instructors' levels of trust, AI class assistance, and skepticism regarding the use of AI in language education?

2. How do levels of trust, AI class assistance, and skepticism influence intention to use AI in English language education?

3. Based on thematic analysis, what themes emerge from teachers' reports on trust, AI class assistance, skepticism, and actual use of AI in English language education?

<p align="center">**Literature Review**</p>

Theoretical Framework

From an foreign language (FL) teacher's perspective, the integration of AI into language education aligns with Vygotsky's sociocultural theory (1978) and the concept of the Zone of Proximal Development (ZPD). ZPD is the space where learners can comprehend knowledge or achieve learning objectives beyond their current abilities with the aid of a more knowledgeable guide. AI tools can serve as a guide, delivering individualized support and challenges tailored to

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each student's unique learning stage. The tasks positioned within the ZPD present an optimal level of challenge, requiring no external assistance (Schnotz & Kürschner, 2007). In addition to enhanced learning, being situated within the ideal range of the ZPD can result in increased cognitive interest (Trif, 2015). This involves gaining a deeper understanding of topics and developing a greater interest. Moreover, it is expected to foster increased engagement (Hamari et al., 2016) and enjoyment (Kim, 2018). Depending on the learner's proficiency at a given learning moment, adjustments can be made to adjust to a learner's proficiency level, providing guidance for simplification or introducing extra challenges for complexity. In a virtual environment, where navigation efficiency is crucial, inefficient navigation can impede learning by adding unnecessary cognitive load. AI tools not only interact with students but also produce and adapt content to match each learner's comprehension level. Language teachers can harness AI to design exercises that are precisely challenging enough to facilitate growth without causing frustration. This ensures that students are engaged and progressing effectively through the curriculum. Moreover, AI's ability to personalize learning experiences mirrors educational goals within the ZPD – continuously adapting to and promoting the development of the linguistic skills of each student. AI represents a powerful tool in the educational process, enabling educators to offer a more student-centered and responsive language learning environment. It extends our pedagogical reach, allowing us to cater to diverse learning needs and support our students in achieving their language acquisition goals.

AI Class Assistance in Language Education

Research on AI has been explored in various educational contexts in the last several decades. In the language teaching context, studies have focused on the role of AI in supporting integrated language skills or the four skills, which include listening, reading, writing, and

speaking (Bia & Mandal, 2019; Obari & Lambacher, 2019; Sun et al., 2021; Zou, 2017).

Research has also explored specific skills such as grammar (Kim, 2019), writing (Zhao & Sun, 2016), listening (Hu, 2021), reading (Xiao & Hu, 2019), and speaking (Junaidi et al., 2020; Muhammad et al., 2020). For example, Ahmed-Ali (2020) examined the effectiveness of AI in improving elementary students' ($n = 40$) speaking and listening skills in the Egyptian context and found that for students in the experimental group, AI had a positive impact on their language development. In the South Korean university context, Kim (2019) found that chatbots helped to improve English grammar skills of university students ($n = 70$). Studies on AI in language teaching contexts have provided valuable insights into its multifaceted impact, especially in terms of its role in supporting the improvement of specific language skills.

AI can also be used to support personalized teaching to ensure that lessons match the needs of individual learners (Huang et al., 2021). AI can tailor lessons based on the academic needs and levels of students, which can be beneficial for students who are struggling with language development (Gao, 2021). Yang (2020) found that AI can provide a wide range of language support including evaluation, modeling activities, and analysis of language abilities. In more recent years, a popular area of interest is the use of chatbots to support language development through oral and written interactions with learners (Shin et al., 2021). Chatbots can be used for individual instruction and can also provide a personalized learning system for students (Luo & Cheng, 2020). AI can also aid in translating language (Fu et al., 2017) and has been used as a speech recognition tool (Kannan & Munday, 2018). With the sudden advance in technologies, further exploration of uses and perceptions of AI in language education is warranted.

Trusting AI

Scholars have highlighted the critical role of trust in systems reliant on artificial intelligence (European-Commission, 2019; Garcia & Lopez, 2018; Hengstler et al., 2016; Zarifis et al., 2019). According to Dwork and Minow (2022), "social distrust of AI stems in part from incomplete and faulty data sources, inappropriate redeployment of data, and frequently exposed errors that reflect and amplify existing social cleavages and failures" (p. 1). Dwork and Minow (2022) propose increasing trust in AI by engaging diverse stakeholders in decisions about the uses of AI, data, and predictors. They recommend allocating resources to develop recourse mechanisms that align with the potential risks of errors and bias and advocating for regulatory frameworks that encourage competition to fortify trust. Developing trust in AI necessitates a comprehensive strategy that addresses the challenges related to data reliability and the potential for bias in the realm of artificial intelligence.

In the educational context, Qin et al. (2020) examined trust in AI-based educational systems in China and reiterated the importance of ethics when adopting AI. They conducted interviews with 16 participants, seven of whom were students, and three were teachers. In terms of perceptions of AI, trust issues were discussed. Individuals who had a positive experience with AI in the past were more likely to trust it; however, some participants were more fearful with one stating, "I worry that it will betray me, just as stories in movies, such as *Passengers*" (Qin et al., 2020, p. 12). Exploring the dynamic realm of trust in AI-related language learning, research has delved into students' perspectives, providing insights into diverse viewpoints and addressing key concerns related to the incorporation of AI in educational settings. In the language learning context, Kushmar et al. (2022) examined university students' perceptions of AI in English language learning and specifically asked if the students ($n = 418$) are fearful of AI in language

learning. A primary concern indicated by students is the likelihood of cyber-attacks happening and compromising their personal information. As researchers navigate the evolving role of AI in education, these findings prompt a deeper understanding of the multifaceted nature of trust and fear. Such insights are essential for fostering a conducive and secure environment for the integration of AI in educational settings.

Working Alongside AI in Language Education

Examining the collaborative space between AI and language education, researchers encounter a complex interplay of benefits and challenges. As AI becomes increasingly integrated into English language teaching, a significant concern arises from a widespread lack of understanding regarding its capabilities. Although AI is becoming more common in the English language field, there are still problems with a lack of understanding of what it can do. A qualitative study by Anugrah (2018) in the Indonesian English Language Teaching (ELT) context found that students ($n = 10$) may not understand the capabilities of AI. This study was limited to one geographic context and had a limited sample of only 10 participants. Alternatively, a study in the Ukrainian ELT context, reported that students ($n = 418$) had a very high level of understanding of how AI is used in language learning. Another mixed method study conducted by Enzelina et al. (2023) in the Indonesian ELT context explored how instructors ($n = 6$) and students ($n = 211$) perceives AI. Perceptions of AI-based applications were viewed as positive overall; however, when implementing AI, results highlight the importance of carefully considering the motivation of students, pedagogical competence, and technological awareness. Also, instructors indicated that they want to ensure that students are not solely relying on AI for learning. These studies highlight the evolving nature of AI integration into language education,

emphasizing the importance of addressing challenges related to understanding, motivation, and pedagogical considerations to create a balanced and effective educational environment.

While there is a growing body of research about the role of teacher motivation regarding the integration of AI in education; notably, limited research exists on the language learning classroom (Baez et al., 2024). Recent research (Baez et al., 2024) evaluated the role of teacher and student motivation in 15 primary and lower secondary schools in German-speaking Switzerland. The study employed a survey approach to gather data, wherein both students and teachers were invited to evaluate their beliefs. Responses were elicited through a Likert scale, allowing participants to express their perspectives on the subject with a range of nuanced responses. The findings of this study indicate that teacher motivation to integrate technology is positively correlated with student motivation ($\beta = 0.71$, $p < 0.01$). Additionally, teacher self-efficacy impacted teacher self-motivation to integrate AI ($\beta = 0.86$, $p < 0.001$). This study highlights the need to expand current research on AI to incorporate teacher perceptions and motivations and the reciprocal nature of teacher motivation and student motivation to integrate AI.

Methodology

A convergent mixed method design was chosen for this study (Creswell & Plano Clark (2017). By integrating qualitative and quantitative data, researchers can capture a more complete and multifaceted view of the research topic. Furthermore, a convergent mixed method approach allows for a deeper exploration of the complexities. This study was conducted in late fall of 2023. A closed and open-ended survey was administered through Qualtrics and posted on various social media sites including LinkedIn, Facebook, X (formerly Twitter) Reddit, and Quora pages that focus on English language education. Participants included 59 English

language teachers from 14 countries. Inclusion criteria for the study included employment as FL instructor with some experience using AI for language teaching (e.g., curriculum development, assessment, and/or virtual learning partners).

Questionnaire Development

The design of this survey was informed by both the researchers' practical research and insights from prior research, particularly those of Ifelebuegu et al. (2023) and Nazaretsky et al. (2022a, 2022b). The questionnaire was divided into three sections. The first section gathered demographic information, such as the country of teaching, teaching experience, and education level. The second section comprised three categories of closed-ended questions, aimed at evaluating perceptions of class assistance, trustworthiness, and skepticism of AI in Education. A single item was added to investigate intentions to use AI in English language education. Using a single item to measure a psychological construct, like attitudes towards the use of AI in English education, can ensure clarity and focus, directly targeting the specific dimension of interest without the confounding variables that multi-item scales may introduce. Moreover, a single, well-designed question can significantly reduce survey fatigue, thereby increasing response rates and the likelihood of obtaining genuine and reflective answers from participants. The third and final section consisted of five open-ended questions. To ensure comprehensive analysis, the open-ended questions in the questionnaire were designed to complement the closed-ended scales, specifically addressing trustworthiness, assistance, and skepticism concerning the use of AI in education. The development of the questionnaire items was an internal process, undertaken by a team of English language teaching professionals, all of whom hold graduate degrees in language education. To validate the questionnaire, a pilot test was conducted with a group of English language teaching educators. Following this pilot test, any items that were found to be vague or

poorly articulated were refined for greater clarity. The closed-ended items were assessed using a 5-point Likert scale, ranging from "Never true of me" (scored as 1) to "Always true of me" (scored as 5).

Data Analysis

Open-ended surveys were qualitatively coded using thematic analysis (Creswell & Poth, 2018). Thematic analysis is a qualitative research method that involves identifying, analyzing, and reporting patterns or themes within data. It is a flexible approach that allows researchers to explore and interpret rich textual information. Initial coding was conducted manually to explore commonalities in the data. Through manual coding, researchers can explore commonalities in the data by looking for repeated concepts, ideas, or quotes. This helps in identifying the most prominent and relevant themes emerging from the responses. Initial manual codes were compared to codes generated through the computer assisted qualitative data analysis software, Dedoose.

For quantitative analysis, the study employed SPSS version 28 for the computation of descriptive statistics, including mean scores and standard deviations for questionnaire items. Reliability and validity of the four identified scales—trustworthiness, skepticism, AI assistance, and intention to use AI in English language classrooms—were established via Cronbach's alpha and content validity assessments, respectively. Further, Pearson correlation analyses were conducted in SPSS to elucidate the relationships between these scales and various demographic factors.

Results and Discussion

The findings of this study are organized into three distinct sections, each addressing a specific aspect of the research. The first section presents a mean score analysis of the survey

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items, providing a quantitative evaluation of students' experiences, perceptions, and attitudes toward AI in English language education. The second section examines the correlation among variables of interest and regression of trustworthiness, AI class assistance, and skepticism on actual use – examining how the variables of interest influence the use of AI in English language education. Finally, the third section offers a thematic analysis of responses to open-ended survey items, exploring the opportunities and challenges (e.g., skepticism), and teachers' recommendations for effectively integrating AI into English language education.

Research Question One

Table 1 displays mean scores for individual and overall category scales for AI assistance, trustworthiness, skepticism, and actual use. Regarding class assistance with AI in English language education, teachers reported predominantly favorable attitudes. Among seven items measuring AI assistance, five scored an average above the mean of 3.50, indicating a general positive perception. The most highly rated aspect was AI's capability in aiding teachers to prepare lessons and activities, with a mean score of 4.27 (SD = 0.97), suggesting strong approval for this feature.

Other notable AI assistance features that received positive responses include saving time through automation systems (item 2, M=3.75, SD=0.99), the use of intelligent agents such as chatbots for learning support (item 3, M=3.68, SD=1.11), AI's role in formative assessment (item 4, M=3.59, SD=1.16), and its effectiveness in identifying language skill gaps in students (item 5, M=3.56, SD=1.07). These findings indicate that teachers value AI's role in enhancing efficiency and providing custom, student-centered, educational support in English language classrooms. The high regard for AI in lesson preparation and its perceived utility in various instructional aspects underscores its growing significance in English language education.

Skepticism was a notable variable among FL instructors in the context of AI's role in SLA education. Despite recognizing AI's benefits in class assistance, instructors expressed considerable skepticism. Similar to the findings in Class Assistance, five of the seven items on the skepticism scale scored above the 3.50 level, indicating a significant level of concern. The most prominent skepticism was directed towards AI algorithms' inability to comprehend social context (item 9, M=4.07, SD=1.06) and the history of language learners beyond their programmed context (item 10, M=3.97, SD=1.08).

Other areas that influenced increased levels of instructors' skepticism included discrepancies between AI's and teachers' assessments of student performance (item 11, M=3.78, SD=0.89), a lack of transparency in AI decision-making processes (item 12, M=3.69, SD=0.93), and concerns over data usage and privacy risks (item 13, M=3.64, SD=1.14). These findings reveal that while FL instructors appreciate the practical benefits of AI in class assistance, they remain cautious about its broader implications in SLA education. The high skepticism scores particularly regarding AI's understanding of social and learner-specific contexts, along with concerns about assessment accuracy, transparency, and data privacy, highlight critical areas for future development and ethical consideration in AI educational tools.

In the evaluation of trustworthiness related to AI in English language education, this scale registered the lowest scores compared to AI class assistance and skepticism. This indicates a more cautious or reserved attitude from instructors regarding their trust in AI systems for language education. Among the items on this scale, two approached the higher range of 3.5-5.0. These items focused on the correlation between increasing knowledge about AI systems and the subsequent rise in trust (item 15, M=3.44, SD=1.07), and the belief that a greater volume of training data could enhance trust in AI systems for SLA education (item 16, M=3.37, SD=1.11).

Educators' trust in AI appears to be directly influenced by their familiarity with the technology and the robustness of the AI's training data, underscoring the importance of transparency and education in the deployment of AI tools in educational settings.

A single item was used to measure behavioral intention or intended use of AI in SLA education, 'I will use AI tools for personalization of language lessons in my class when and if they will be available to me' (item 19) received a mean score of 3.73. This suggests that teachers are generally open to integrating AI tools for personalizing language lessons in their classrooms. The score above the mid-range indicates a positive inclination towards utilizing AI for enhancing the individualized learning experience. This readiness to use AI systems is leveraged by a degree of caution, as reflected in the responses to the skepticism scale. The apprehensions highlighted there suggest that while teachers see the potential value in AI for personalized education, they also maintain a critical perspective on its limitations and challenges. This balanced view underscores the importance of addressing these concerns to fully realize the benefits of AI in language education. The next step in this study entailed identifying the influencing factor AI class assistance, skepticism, and trustworthiness have on behavioral intention to use AI in SLA education.

Table 1

Teachers' Perceptions on AI in Foreign Language Education

		M	SD
	AI assistance in second language education		
1	AI can assist English language teachers in planning tasks such as preparing lessons and activities before class time.	4.27	0.96
2	AI can assist in the development of automated systems for assigning individualized learning paths for students' self-learning in the English language.	3.75	0.99

#	Statement		
3	AI can assist in creating intelligent agents (robots or software) that may serve as learning pals or teaching assistants that aid in language development.	3.68	1.11
4	AI can assist in formative assessment of complex tasks (e.g., open questions, quality of scientific reasoning), and suggest personalized language related feedback in real-time (AI makes diagnosis + action).	3.59	1.16
5	AI can assist in diagnosing students' language difficulties to help teachers assign personalized tasks that match individual needs (AI makes the diagnosis, the teacher decides intervention).	3.56	1.07
6	AI can improve teacher professional training, especially related to language, for example using AI-based avatars to simulate and practice teaching scenarios.	3.24	1.09
7	AI can assist teachers with in-class management activities, such as identifying students who are struggling or off-task (AI focuses on management rather than direct learning).	2.95	1.07
Skepticism with AI in second language education			
8	AI algorithms do not understand social, emotional, and motivational factors that are very important in English language education.	4.07	1.06
9	AI algorithms do not know the history and context of English language learners outside the system.	3.97	1.08
10	There are discrepancies between the AI diagnosis and the teacher's assessment of English language knowledge.	3.78	0.89
11	Lack of transparency in how AI makes decisions particularly in the context of English language development.	3.69	0.93
12	Use of data raises risks to teachers and learner privacy.	3.64	1.14
13	AI-developers lack nuances of English language.	3.42	1.23
14	Removes autonomy and control from English language teachers to AI.	2.92	1.1
Trustworthiness with AI in second language education			
15	The more I know how an AI-based tool makes decisions, the more I will be able to trust it.	3.44	1.07
16	The more data is available for AI-based tools, the more I will be able to trust its insights.	3.37	1.11
17	As they become more prevalent, AI-based tools for personalized learning for language support will gain my full trust.	3.05	0.97
18	I fully trust using AI-based personalized learning tools in my English language classroom.	2.71	1.03
Actual use of AI in second language education			
19	I will use AI-based tools for personalization of language lessons in my class when and if they will be available to me.	3.73	1

Results from the initial research question shed light on FL educators' beliefs towards AI in English language teaching, emphasizing their attitudes towards AI classroom assistance, trustworthiness, skepticism, and actual use. The findings, derived from a combination of mean score analysis, regression, and thematic analysis, suggest that AI is perceived as a trustworthy and effective tool for class assistance, aligning with existing literature (Bin & Mandal., 2019; Garcia & Lopez, 2018; Hengstler et al., 2016; Zarifis et al., 2019). While there is a generally positive view of the situation, there's also a significant amount of skepticism. This skepticism is partly because of a lack of transparency, a point that aligns with extant literature (e.g., Dwork & Minow, 2022).

Research Question Two

The second research question investigates how AI class assistance, AI trustworthiness, and AI skepticism affect the use of AI in English language education. Initially, a Pearson correlation analysis was performed. To better understand these relationships within the context of English language education, demographic variables including education level and teaching experience were included in the analysis. Table 2 presents these relationships, along with the mean scores and standard deviations for each variable. It was found that education level and teaching experience were significantly correlated with each other but not with the perception scales. For the perception variables, all showed significant relationships with one another, indicating their relevance for inclusion in the regression model. At the bivariate level, AI class assistance and AI trustworthiness were positively correlated, while skepticism showed a negative correlation with both trustworthiness and class assistance.

Table 2

Correlation and Means Scores for Study's Variables

	1	2	3	4	5	6
Education Level						
Teaching Experience	.242[*]					
AI Class Assistance	.052	-.0182				
AI Trustworthiness	-.03	.132	.627[**]			
AI Skepticism	-.033	-.043	-.467[**]	-.263[*]		
AI Actual Use	-.024	.088	.666[**]	.754[**]	-.266[*]	
M	1.74	2.50	3.58	3.14	3.64	3.73
SD	0.66	1.185	0.75	0.84	0.74	1.00

Note. $\alpha = .05$ ([*]$p < .05$), $\alpha = .01$ ([**]$p < .01$). Education level is coded as: 1 = Bachelors, 2 = Masters, 3 = Ph.D. Experience is categorized as: 1 = 1-5 years, 2 = 6-10 years, 3 = 11-15 years, 4 = 15+ years.

For Research Question 2, a regression analysis was conducted to examine the combined effects of AI class assistance, AI trustworthiness, and AI skepticism on the use of AI in English language education. The results revealed a significant regression equation ($F(3, 58) = 31.384$, $p < .001$) with an adjusted R^2 of .611. This indicates that the model accounts for 61% of the variance in the intended use of AI for English language learning. The equation for participants' use of AI in English language education is use = -.112 (constant) + .447 (AI class assistance) + .654 (AI trustworthiness). This suggests that for every one-point increase in AI class assistance, there is a .447 increase in the use of AI and a .654 increase for every one-point increase in

trustworthiness. However, AI skepticism did not show a significant effect on the intended use of

AI in SL education, suggesting its limited impact in this context. The specifics of this regression

model, including the calculated coefficients for each variable, are detailed in Table 3

Table 3

Regression Analysis on Intended Use of AI Technology in FL Education

	B	SE	Beta	t	p	F	R^2	Adj. R^2
Constant	-.112	.775		-0.144	0.886	31.384	.631	.611
AI Class Assistance	.447	.153	.336	2.923	0.005 **			
AI Trustworthiness	.654	.124	.554	5.261	0.000 **			
AI Skepticism	.050	.126	.037	0.400	0.691			

Note. $\alpha = .05$ ($^*p < .05$), $\alpha = .01$ ($^{**}p < .01$).

Interestingly, the Pearson correlation analysis revealed that teachers, irrespective of their

educational background or experience, exhibited similar attitudes towards AI, as evidenced by

the absence of significant correlations at the bivariate level. This echoes recent studies, which

also report that instructors at varying levels of education and experience share comparable views

on AI in education (Enzelina, et al., 2023). Findings from regression analysis indicated that

positive beliefs, particularly regarding AI class assistance and trustworthiness, are significant

predictors of actual AI usage. In contrast, negative beliefs, such as AI skepticism, did not

significantly predict use. This supports previous research suggesting a general openness among

instructors to integrate AI tools into their teaching practices (Kushmar, et al., 2022).

Research question Three

Pertaining to Research Question 3, thematic analysis of open-ended items resulted in several items falling within the framework of the study's objectives. Specifically, the following themes emerged from the open-ended surveys: perceived benefits with learning and class assistance, challenges and skepticism, and future use of AI in English language education.

Perceived Benefits of AI

A major theme that emerged is the use of AI to support English language learning. The following subthemes highlight the essence of the participants' perceptions and experiences about AI support for language learning. These subthemes include language improvement, lesson plan development, translation support, and personalized learning support.

Language Improvement

Participants highlighted the use of AI to support language improvement. Participants noted developments in students' language learning including better sentence structure and vocabulary. For example, one participant indicated, "It has helped students define sentence structure more accurately, in addition to improving vocabulary knowledge." Another participant noted that "Several students shared stories of using AI to generate at-level phrasebooks and study materials for self study."

Personalized Learning Support

Participants discussed the personalized learning support that AI can provide. Specific examples include providing chat features that mimic conversations, generating practice texts, identifying language deficits, giving feedback faster than a teacher, providing real-life examples, creating activities based on students' backgrounds, culture, and personal characteristics, and making specialized lesson plans and vocabulary lists. Although examples of personalized

learning support were provided, some participants indicated that AI does not support personalized learning. For example, one participant indicated, "I do not think it makes language learning more personalized. I think the teacher does that. As it is the teacher who inputs the information into the AI and directs the way that makes its output useful." Another response included "AI is by design a product to remove individuality from the classroom and drive conformity for the benefit of private institutions selling AI software." These findings indicate mixed feelings among the teachers surveyed.

Lesson Plan Development

Participants mentioned the benefits of using AI for targeted lesson plan development. Specific examples of activities generated in lesson plans include gap fill exercises, paraphrasing examples, grammar explanations, examples, sentence fluency lists, vocabulary explanations and word lists, and complex texts for different proficiency levels. One participant indicated, "AI has helped my students learn indirectly through making it possible for me to generate targeted materials, activities, and lesson plans that I would not have been able to create in a reasonable time frame on my own." A more detailed description of how AI supports lesson plan development was provided by another participant, "I have used AI to generate business English simulation content because the materials previously available was lacking in quality and does not generate interest from my students."

Translation Support

Participants also discussed the use of AI for various educational support including automatic transcription and translation. Participants have used AI to give feedback and provide instructions to students in their native languages. One participant stated, "Some AI tools can automatically transcribe and even translate what is being said in a video or what is being said by

a teacher or lecturer." Another mentioned the value of speech-to-text to "see transcripts and possibly correct versions."

Challenges with AI in English Language Education

Cultural Bias

Another theme that emerged is cultural bias that exists in AI tools. Participants indicated a concern about the inherent bias in AI towards Western cultures, particularly US culture. For example, one participant noted, "AI must become less white western-based, must take into account ELF and world Englishes as well as other languages." A similar respondent stated, "So far, it has an inherent bias towards US culture and thinking." Suggestions for improvement include making AI less white Western-biased, considering English as a Lingua Franca (ELF) and world Englishes, and acknowledging the need for understanding semantics, pragmatics, and discourse based on different cultures and contexts. One participant noted,

> A concerted effort needs to be made to gather data from a wide variety of languages and cultures. Key to this is providing technological infrastructure, education on using technology and widespread access to devices that allow people to contribute to data sets.

Another example provided is, "It would need to understand how language is used and what is meant (semantics, pragmatics, discourse, etc.) based on different cultures and contexts."

AI Concerns and Problems

The final theme that emerged from the data is AI concerns and problems with the following subthemes being underscored in the responses: reliability and accuracy, issues with misuse and lack of understanding, and privacy, bias, and ethical concerns. The following section expands on these subthemes.

Reliability and Accuracy

Teachers expressed concerns about relying on AI without thorough checks for accuracy, depth of content, and alignment with tasks. The fear is that if not used responsibly, it may erode analytical and critical thinking skills, as well as hinder the ability to produce language spontaneously. Mistakes in information provided by AI and the need for accuracy checks are highlighted. One participant provided an in depth response:

> My biggest concern is the temptation to rely on AI without checking for accuracy, depth of content, and alignment of production with tasks requested. If not used responsibly, it can lead to erosion of analytical and critical thinking skills, along with the ability to produce language spontaneously.

Issues with Misuse and Lack of Understanding

Concerns were raised about the potential misuse of AI, particularly by less experienced teachers who may mistakenly believe that AI-generated lesson plans are viable without the necessary discernment. There is an emphasis on the need for teacher training to understand the capabilities and limitations of AI systems. The worry is that teachers may jump on the bandwagon without recognizing that AI, while having book knowledge of pedagogy, may lack the understanding required for effective application in the classroom. Participants also recognize that students may rely heavily on AI. For example, one participant stated, "They can get A's on papers now they have GPT." Another participant stated that AI has not helped their students learn better and said, "If anything, AI is a tool my students use to avoid putting in the effort they need to learn." A detailed description of the pitfalls of AI was provided by one respondent:

> AI has hindered my students' learning. For example, I gave a rather easy essay assignment and several students used AI to generate a response. The response was clearly not correct (full of factual errors) and was clearly not at their level (too complex grammar

and vocabulary). Not only did the students fail the assignment, by using AI it robbed them of the opportunity to actually learn.

A similar response was noted by another participant:

I'm concerned that some less experienced teachers will make the mistake of thinking that AI generated lesson plans are viable, as they do not have the experience to discern a good lesson plan from a bad one. AI cannot as yet be used in this way, but a lot of teachers are jumping on the bandwagon thinking that all they need to do is give the AI a few parameters and what it comes up with will be viable. However, it is well-known that AI makes a lot of mistakes and cannot take the nuances of language into consideration.

Trust: Privacy, Bias, and Ethical Concern

Privacy issues, potential bias in AI systems, and ethical concerns related to the nature of AI technology were expressed by participants. The worries include the potential for AI to be abusive and dishonest technology, with concerns about privacy, plagiarism, and the misuse of AI to train software without compensating individuals. Ethical considerations also extend to controlling AI training models for biased information and ensuring culturally responsive instruction, as well as refraining from compromising privacy through data harvesting.

In summary, the identified themes—AI to Support Language Learning, Cultural Bias, Determining AI Tools to Use, and AI Concerns and Problems–highlight the multifaceted nature of integrating AI in language teaching, reflecting both its potential benefits and the challenges that necessitate careful consideration and responsible use.

Future Use of AI in English Language Education

The process of determining which AI tools to use in the classroom involved two key subthemes: trial and error-based decision-making and tool selection based on specific learning needs. The next section centers on these two themes.

Trial and Error Based Decision-Making

Respondents indicated the importance of trial and error based decision making in trying out different AI tools until the teacher finds one that best meets their and their students' needs. Participants discussed experimentation and testing to determine the most effective tools for specific tasks. For example, one participant indicated that they learn about AI by "trying out different tools until I find one that best meets mine and my students' needs."

Selecting Tools Based on Learning Needs

Participants noted that they select AI tools based on the learning needs of students. For example, one participant stated, "I look at what they have to offer, how they cite sources, and ease of access." Another stated that AI tools are selected to "structure lesson plans and create some teaching materials." Participants also discussed the aim of the task and language level of students. A few participants mentioned using the free version of ChatGPT.

Research Question 3 focused on identifying themes through thematic analysis of teachers' feedback concerning their trust, perceived advantages, skepticism, and actual utilization of Artificial Intelligence in the context of English language education. The thematic analysis of open-ended questions revealed several significant themes. These findings corroborate the results of the first and second research questions, highlighting three key areas: the advantages of using AI for classroom support, the challenges stemming from skepticism towards AI, and future intentions for AI utilization. Notably, instructors frequently mentioned specific benefits of AI in enhancing language skills and assisting in English class preparation. These include marked

improvements in sentence construction accuracy and broader use of vocabulary, aligning with

the findings of previous AI in education research (Bia & Mandal, 2019; Obari & Lambacher,

2019; Sun et al., 2021; Zou, 2017). Another critical observation was the positive impact of AI on

personalized learning, particularly in terms of providing tailored feedback, designing lesson

plans, and building vocabulary lists. This aligns with the research by Huang et al. (2021). Such

personalized learning approaches are consistent with the theoretical framework of the ZPD,

suggesting that AI in education can be effectively adapted to match different learning levels.

Conclusion

This study demonstrates the perceived benefits and challenges of teachers of English

regarding the integration of AI. The benefits of AI integration in language teaching signal a

promising and evolving landscape where educators can provide personalized instruction

incorporating student language and reduced planning time. However, the challenges pertaining to

the integration of AI raise serious ethical and moral concerns germane to misuse, data

management, and accuracy. Thus, the educational system must undergo transformative change

that provides a framework for the ethical integration of AI.

Pedagogical Implications

Building on these findings, it is crucial to recognize the evolving role of AI in language

education and its potential to reshape traditional teaching methodologies. Educational institutions

must proactively adapt their curriculum and policies to integrate AI effectively, ensuring that

educators are not only familiar with these technologies but are also proficient in using them. To

leverage the full potential of AI in language education, it is essential to provide comprehensive

digital literacy training for educators. This training should focus on developing the skills

necessary for critical analysis of AI tools, ensuring that the information and resources provided

by AI are reliable and appropriate for the classroom setting. Moreover, addressing the highlighted skepticism and trust issues requires a clear policy framework that considers privacy, ethical use, and the potential for misuse. Such policies should guide the responsible implementation and use of AI in educational settings, safeguarding against biases and ensuring that the technology is used in a manner that is beneficial to both students and educators.

Additionally, the findings suggest that while educators recognize the utility of AI in lesson planning and personalized learning, there remains a need for greater transparency and understanding of AI systems. Educational institutions should prioritize the development of AI tools that are not only effective but also transparent in their operation and decision-making processes. This will help in building trust among educators and alleviate concerns over privacy and data misuse. Moreover, integrating AI into the curriculum should go beyond mere tool usage; it should encompass a broader understanding of the technology's capabilities, limitations, and ethical considerations. This shift towards AI-assisted language education requires a multifaceted approach that includes curriculum development, policy revision, and comprehensive educator training. By addressing these areas, educational institutions can ensure that AI is not only a tool for enhancing language learning but also a catalyst for innovative and ethical educational practices.

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Limitations and Future Direction

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In terms of limitations of the study, the study's sample size of 59 English language teachers from 14 countries may limit the generalizability of findings to a broader population of language educators worldwide. The study was conducted in the late fall of 2023, and the rapidly evolving role of AI in education may pose limitations on the long-term implications of the findings. Additionally, the study lacked in-depth qualitative responses. Future research could

extend beyond English language educators and include foreign language educators of other languages. Comparative analysis across different countries could provide valuable insights as well as determine any commonalities or diversions across cultural and geographic contexts. To obtain more detailed qualitative data, interviews could also be employed to further delve into participants' perceptions and usage of AI in language education. Finally, it would be beneficial to explore how cultural differences may impact teachers' attitudes towards and adoption of AI in language education, recognizing the potential influence of cultural nuances. In conclusion, this study provides an examination of English language teachers' perceptions of AI in language education. As technology continues to evolve, ongoing research endeavors will play a pivotal role in guiding effective and adaptive integration strategies of AI. To address these limitations, future research should consider longitudinal studies to capture the evolving impact of AI in language education and include interdisciplinary approaches for a deeper understanding. Additionally, expanding the focus to diverse languages and conducting comparative cross-cultural analyses could reveal significant insights into the global applicability and cultural dynamics of AI in language teaching.

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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

by

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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. Many Belizean higher education administrators had the arduous task of navigating their institutions through the disruptive social and economic impacts of the pandemic for the past two years. 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 the crisis migration of these higher education institutions' crisis response migration methods and how these methods will shape the future of higher education in Belize, and more specifically, how the ways in which the crisis was addressed 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 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-CO-V-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 20th, 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 the use of 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 uncertainties that accompanied it. 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 can 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, use of various teaching platforms, and technological aids.

Emergency remote education was implemented as a short-term solution during the COVID-19 requirements for isolation and social distancing. However, this solution did not allow for adequate training of faculty, staff, and students' orientation to distance learning. It was evident 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.

<center>**Literature Review**</center>

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 (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 which 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, with the exception of University of Belize whose student numbers were not reported. This data is further disaggregated as follows: 4,237 full time students 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 of the institutions were focused solely on delivering in-class learning and face-to-face instruction. Administrators employed best efforts to manage the pandemic in the absence of a structured framework for preparation, capacity, and support to navigate the education sector during this crisis phase of the pandemic. Whilst operating in crisis mode and collaborating with the Ministry of Education (also a member of ATLIB), this approach allowed for commonalities of impacts, potential solutions and challenges to be identified, and the promotion of mechanisms that led to enhanced collaborations amongst the institutions. Belize, like many other countries, viewed "e-learning, distance education and correspondence courses

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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 has added to the motivation for online learning since the beginning of the millennium, but 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 went further to refer to online education during this pandemic as "emergency remote teaching" because the latter is in contrast 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, faced with the task of meeting the educational needs of its student population, including the vulnerable student population in remote locations with limited or 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 the unplanned and rapid transition of our education sector, 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 was 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 exhausted their options to secure reliable internet and devices to their more vulnerable student population, which could have long-term ramifications. It is yet to be determined whether the urgency within which schools closed impacted ongoing learning for students.

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; Vlachopoulos, 2020; Jena, 2020). Teaching methodology was transformed in 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 completely dependent on technological devices and internet connectivity, and this dependency created great challenges for the institutions. Ribeiro (2020) justifiably stated this digital transformation of instructional delivery came with several logistical challenges and attitudinal modifications.

Many institutions had 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 strong 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 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 of remote learning that has occurred as far back as the 1980s (Abad-Segura et al., 2020). The preceding decades have provided maturation time for online education, and online education has regularly been viewed from the perspective as a good-to-have alternative but not a serious-mission model to guarantee 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 these 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

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designed by external corporate bodies or organizations into their personal online learning

platforms, such integrated applications are Big Blue Button, 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 Abaidoo, 2015). Contemporary students and some faculty

members are digital natives (Adedoyin & Soykan 2020), which will create greater comfort with

the online migration than those who are less comfortable. In addition, the motivation of the

student, as well as the 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 situation of 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 transitioning 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 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 COVID-19 pandemic?

6. How did the COVID-19 impact enrollment numbers?

Rationale and Significance of Study

Currently, there are few studies in the country of Belize that helps to 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 a total of twenty-one questions (8 open-ended questions and 13 closed-ended questions). Finally, as means of further triangulation of 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, later transcribed and thematic areas from the response were utilized to buttress 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 13-member institutions of ATLIB. These institutions were selected because they provided predominantly traditional face-to-face, in class learning and teaching. For 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 upon the pilot study, and it was administered online to all 11institutions 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 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 Deans of four of the institutions. 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 geographic distribution of the institutions across the entire country.

Data Collection Methods and Procedures

To respond to the research questions and achieve the stated objectives, a sequential mixed methodology was utilized with two distinct research stages. 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 buttressed 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.

<div align="center">**Research Instrument**</div>

The questionnaire consisted of four sections. Section I requested demographic information of each institution. Section II featured 6 questions on general assessment of COVID-19 impact on the institution. Section III posed 4 questions in an attempt to identify the general 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.

<div align="center">**Results**</div>

What were the modalities of online teaching adopted by higher education institutions in Belize during 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 completed closed. Seven of the institutions indicated that they received some government support to continue providing services to students.

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, which means that 55% had not. The schools who

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 information on vaccines).
- 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 in order 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 put in place to address the above issues of exams?

81.8 percent of institutions did not have online courses prior to COVIS-19 pandemic. In fact, of the 18.2 percent that indicated that they had online courses prior to COVID-19 pandemic; five of the institutions that indicated that they did not have online courses prior to COVID-19

still indicated that they had <= to 14 percent of their courses online and 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 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 several them. We had collaboration with those that were tech savvy, and those that 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 your institution's plan to deliver online/hybrid after COVID pandemic. The thematic quotes are listed below.

Institution 1: "To outline our plan to deliver hybrid classes, we brought in a schedule whereby we created shifts. We did Tuesday, Wednesday, 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 the 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 students who work. Our evening division (mostly business program), still uses our period 1 & 2 style of classes. These students take less courses at a time. What we have learned from COVID has been applied to our evening programs. We are trying to make sure our mobile platform and website is polished properly. We began with an online registration, but that 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 at the moment…Even if we come back online, all classes after 4pm 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 is 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 COVID-19 pandemic?

Numerous challenges were experienced by the institutions: Exams were a major challenge during the COVID-19 closure. According to the responses, the qualitative data revealed several disruptions experienced by institutions because 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 to teachers.

7. One of the major disruptions was the transitioning 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 whilst 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 that 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 [southern-most 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 definitely did not decrease." Another institution, experienced fluctuation in student enrollment, where one semester there was an increase and in another there was a decrease, indicated, "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 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 make the choice 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 now can transition to remote learning, inclusive of hybrid and online learning and teaching modalities in an effort to avoid abdication of individual

institution's responsibility to provide education for its students in a safe and healthy environment.

Implementation of online teaching-learning in HEI's. 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 the teaching and learning processes of tertiary education (Misra et. al., 2020). 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 are inclusive of 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 transformation of pedagogical practices and delivery of content.

Enhance Responsive Governance and Leadership

Policymakers, higher education administrators, teacher educators and educators can lead the development of innovative techniques to steering 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 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 anxiety and depression they experienced during COVID-19 pandemic can be instructive for 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 main experiences of students and faculty.

Conclusion

The entire pandemic experience has taught us that in education we do not necessarily have the ability to 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 definitively behave with certainty and continue following a predictable pathway. 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 but there exists great potential for tertiary institutions to play a critical role in developing robust curriculum and uniform online learning models that would be sustainable beyond national and global crises.

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Educating for Tomorrow With AI: Transforming Traditional Social Studies Teaching for

an AI-Enhanced World

by

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The rapid advancements in artificial intelligence (AI) have created a pressing need for education in social studies to adapt and transform to prepare students for the challenges and opportunities of an AI-driven world. This article explores the limitations of traditional teaching methods, which often rely on teacher-centered lessons and passive learning, in equipping students with the critical thinking, problem-solving, and collaboration skills necessary for success in an AI-integrated society. The authors argue that educators must adopt new strategies and approaches that foster active inquiry, real-world application, and informed civic engagement to ensure that students are prepared to navigate the complexities of an AI-enhanced world. The article discusses the demands of an AI-driven world, the role of educators in the transformation process, and the strategies for implementing a modern educational framework, such as project-based learning, collaboration, and the integration of AI tools in the classroom as a major paradigm shift. The benefits of transforming social studies education are highlighted, including preparing students for success in college and careers, fostering informed and active citizenship, and contributing to the development of a thriving, equitable, and civically engaged society. The authors conclude that by embracing the challenge of transformation and working collaboratively to develop innovative, student-centered approaches to social studies education, educators, policymakers, and community stakeholders can help ensure that all students are prepared to thrive and contribute meaningfully to an AI-enhanced society.

The rapid advancements in artificial intelligence (AI) are transforming the global landscape, impacting various aspects of our lives, including education, workplaces, and society as a whole (Marr, 2020). As AI continues to reshape the way we live and work, it is crucial for education to evolve and adapt to prepare students for the challenges and opportunities of an AI-enhanced world (Gleason, 2019). Traditional social studies teaching methods, which often rely

on teacher-centered lessons and passive learning, may no longer be sufficient in equipping students with the skills essential for success in this new era (Chen & Xing, 2021). To address this issue, educators must transform their approach to social studies education, fostering active inquiry, critical thinking, and the ability to apply knowledge in diverse situations (Levitt & Grubaugh, 2023). This article explores the limitations of traditional teaching methods, the demands of an AI-driven world, and the strategies for implementing a modern educational framework that prepares students for active and informed civic participation in an AI-integrated society.

The Limitations of Traditional Teaching Methods

Traditional social studies teaching methods often rely on teacher-centered lessons and passive learning, which may not adequately prepare students for the challenges of an AI-driven world and the skills necessary for informed and active civic life (Chen & Xing, 2021). These methods tend to emphasize uniformity in language and basic knowledge acquisition, rather than fostering the development of critical skills such as creative problem-solving, decision-making, and the ability to separate facts from fiction (Darling-Hammond, Flook, Cook-Harvey, Barron & Osher, **2020).**

In an era of political divide, where politicians, candidates and political activists can impact the curriculum and/or use AI to develop deep fakes and other misinformation disguised as facts, students must gain the skills to identify misinformation, distinguish facts from opinions, and remain informed (Kahne & Bowyer, 2017). Traditional teaching methods may not provide students with sufficient opportunities to develop these critical media literacy skills, which are essential for navigating the complex information landscape shaped by AI technologies (Vosoughi, Roy & Aral, (2018).

Moreover, informed and active civic engagement requires students to learn how to identify and solve problems in their communities. Service-learning projects can provide students with valuable opportunities to develop these skills while making a positive impact on society (Celio, Durlak, & Dymnicki, 2011). However, traditional teaching methods often fail to incorporate such experiential learning opportunities, limiting students' ability to apply their knowledge in real-world contexts and developing a sense of agency in shaping their communities (Westheimer & Kahne, 2004).

To participate effectively in the democratic process, students must also learn how to become informed voters and engage in elections. Traditional teaching methods may not adequately prepare students for this crucial aspect of civic life, as they often focus more on abstract concepts than on practical skills such as researching candidates, understanding ballot measures, and navigating the voting process (Niemi & Junn, 2005). By failing to provide students with the knowledge and skills necessary to participate in elections, traditional teaching methods can contribute to low voter turnout and a lack of civic engagement among young people (Syvertsen, Flanagan, & Stout, (2009).

Furthermore, traditional teaching methods may not provide students with sufficient opportunities to develop their voice and work collaboratively with others to solve problems. Engaging in activities that promote student voice and agency can help students understand their power to make positive changes in the world and develop the skills necessary to work effectively with others towards common goals (Mitra, 2004). However, teacher-centered approaches often prioritize individual achievement over collaborative problem-solving, limiting students' ability to develop these essential skills (Johnson & Johnson, 2009).

Finally, the proliferation of social media and the increasing influence of AI technologies on information dissemination have made critical thinking skills more important than ever. Students must learn to separate truth from misinformation and evaluate the credibility of sources in an age where platforms like TikTok, Instagram and the next "it" social media platform can be used to spread untruths and biased information (McGrew, Ortega, Breakstone, & Wineburg, 2017). Traditional teaching methods, which often rely on textbooks and lectures as the primary sources of information, may not adequately prepare students to navigate the complex and often misleading information landscape of the digital age (Wineburg, McGrew, Breakstone & Ortega, (2016).

The Demands of an AI-Driven World

The advent of AI has brought about unique challenges and diverse viewpoints that require innovative problem-solving and informed decision-making skills (Marr, 2020). As AI systems become more integrated into various aspects of society, including workplaces, healthcare, and governance, individuals must be prepared to navigate the complexities and ethical implications of these technologies (Gleason, 2019). This necessitates a shift in educational priorities, placing a greater emphasis on developing students' critical thinking, creativity, and adaptability (Claude AI, personal communication, April 26, 2024).

In an AI-driven world, workplaces are undergoing significant transformations, with many tasks being automated or augmented by AI systems (Kozma & Roth, 2012). This shift requires individuals to possess a combination of technical skills, such as data analysis and programming, as well as soft skills, such as effective communication, teamwork, and emotional intelligence (Darling-Hammond et al., 2020). To succeed in this new landscape, students must be equipped with the ability to collaborate with AI systems, interpret and apply data-driven insights, and

make informed decisions based on a holistic understanding of the social, economic, and ethical implications of AI (Marr, 2020).

Furthermore, the widespread adoption of AI technologies has the potential to exacerbate existing social inequalities and create new forms of discrimination (Gleason, 2019). To mitigate these risks and ensure that the benefits of AI are distributed equitably, it is crucial for students to develop a deep understanding of the social and ethical dimensions of AI, as well as the skills necessary to actively participate in shaping the development and governance of these technologies (Chen & Xing, 2021).

Transforming Social Studies Education

To prepare students for the demands of an AI-driven world, social studies education must undergo a significant transformation. This transformation should focus on fostering active inquiry and critical thinking skills, enabling students to analyze complex issues, evaluate evidence, and construct well-reasoned arguments (Levitt & Grubaugh, 2023). By engaging students in authentic, problem-based learning experiences, educators can help them develop the ability to apply their knowledge in diverse situations and adapt to the rapidly evolving challenges of an AI-enhanced society (Chen & Xing, 2021).

Moreover, social studies education must emphasize the importance of active and informed civic participation in an AI-integrated world (Gleason, 2019). As AI technologies increasingly shape public policy and decision-making processes, it is essential for students to understand the political, economic, and social implications of these technologies and to develop the skills necessary to engage in meaningful civic discourse and action (Kozma & Roth, 2012). This can be achieved through the integration of real-world case studies, simulations, and

community-based projects that allow students to explore the complex interplay between AI, society, and governance (Marr, 2020).

In addition to fostering critical thinking and civic engagement, transformed social studies education must also focus on developing students' skills to navigate and succeed in an AI-integrated world (Chen & Xing, 2021). This includes providing students with opportunities to collaborate with AI systems, interpret and apply data-driven insights, and develop a deep understanding of the ethical and social implications of AI technologies (Darling-Hammond et al., 2020). By integrating these skills into the social studies curriculum, educators can help students develop the adaptability and resilience necessary to thrive in a rapidly evolving, AI-driven society (Gleason, 2019).

Strategies for Implementing a Modern Educational Framework

To effectively transform social studies education, educators must adopt a range of strategies that foster student-centered learning, collaboration, and real-world application (Chen & Xing, 2021). One key approach is the incorporation of project-based learning, which engages students in authentic, interdisciplinary problem-solving experiences that mirror the complexities of an AI-driven world (Levitt & Grubaugh, 2023). By designing projects that require students to investigate real-world issues, collaborate with peers, and develop innovative solutions, educators can help them cultivate the skills and mindsets necessary for success in an AI-integrated society (Kozma & Roth, 2012).

Another essential strategy is the encouragement of collaboration and teamwork, both among students and between students and AI systems (Marr, 2020). By providing opportunities for students to work together on complex projects and engage in meaningful discussions,

educators can help them develop the communication, negotiation, and problem-solving skills that are crucial in an AI-driven workplace (Gleason, 2019). Additionally, by introducing students to collaborative AI tools and platforms, educators can help them develop the technical skills and understanding necessary to work effectively with AI systems (Chen & Xing, 2021).

The integration of technology and AI tools in the classroom is another critical component of a modern educational framework (Darling-Hammond et al., 2020). By incorporating AI-powered learning platforms, data analysis tools, and simulation software into the social studies curriculum, educators can provide students with hands-on experience in working with AI technologies and help them develop a deeper understanding of their potential applications and implications (Marr, 2020). However, it is essential for educators to approach the integration of AI tools thoughtfully, ensuring that they are used to enhance, rather than replace, human interaction and critical thinking (Kozma & Roth, 2012).

Finally, providing real-world context and relevance is crucial in transforming social studies education for an AI-driven world (Chen & Xing, 2021). By connecting course content to current events, societal challenges, and emerging technologies, educators can help students understand the practical implications of their learning and develop a sense of agency in shaping the future (Gleason, 2019). This can be achieved through the incorporation of case studies, guest speakers, and community-based projects that expose students to the real-world applications and impacts of AI technologies (Darling-Hammond et al., 2020).

The Role of Educators in the Transformation Process

Educators play a crucial role in the transformation of social studies education for an AI-driven world. To effectively prepare students for the challenges and opportunities of this new

era, educators must adapt their teaching methods and materials to foster the development of critical skills and mindsets (Chen & Xing, 2021). This requires a shift from traditional, teacher-centered approaches to more student-centered, inquiry-based learning experiences that emphasize active engagement, collaboration, and real-world application (Darling-Hammond et al., 2020).

To facilitate this shift, educators must embrace their role as guides and facilitators, rather than sole dispensers of knowledge (Kozma & Roth, 2012). This involves designing learning experiences that encourage students to take ownership of their learning, ask questions, and explore multiple perspectives (Gleason, 2019). By creating a supportive and inclusive classroom environment that values diverse viewpoints and encourages respectful dialogue, educators can help students develop the critical thinking, communication, and collaboration skills necessary for success in an AI-integrated society (Marr, 2020).

Moreover, educators must continuously engage in professional development to stay current with the latest advancements in AI and their implications for education (Chen & Xing, 2021). This includes attending workshops, conferences, and online courses that provide insights into the technical, social, and ethical dimensions of AI, as well as strategies for integrating AI tools and concepts into the social studies curriculum (Darling-Hammond et al., 2020). By staying informed and adapting their practices to the evolving needs of an AI-driven world, educators can ensure that they are providing students with the most relevant and effective learning experiences (Kozma & Roth, 2012).

Ultimately, the success of the transformation process depends on the commitment and collaboration of educators, administrators, policymakers, and community stakeholders (Gleason,

2019). By working together to develop and implement a shared vision for social studies education in an AI-enhanced world, these stakeholders can create a supportive ecosystem that empowers educators to drive meaningful change and prepare students for the challenges and opportunities of the future (Marr, 2020).

The Benefits of Transforming Social Studies Education

Transforming social studies education to meet the demands of an AI-driven world offers numerous benefits for students, educators, and society as a whole. By equipping students with the critical thinking, problem-solving, and collaboration skills necessary for success in an AI-integrated society, transformed social studies education can help prepare them for success in college and careers (Chen & Xing, 2021). As the job market continues to evolve in response to AI-driven automation and augmentation, students who possess these adaptable skills will be better positioned to navigate the changing landscape and secure meaningful employment (Marr, 2020).

Moreover, by fostering informed and active citizenship, transformed social studies education can contribute to the development of a thriving, AI-integrated society (Gleason, 2019). As AI technologies increasingly shape public policy and decision-making processes, it is crucial for individuals to possess the knowledge and skills necessary to engage in meaningful civic discourse and action (Darling-Hammond et al., 2020). By providing students with a deep understanding of the social, economic, and ethical implications of AI, as well as the tools to actively participate in shaping the development and governance of these technologies, transformed social studies education can help ensure that the benefits of AI are distributed equitably and that potential risks are mitigated (Kozma & Roth, 2012).

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In addition to these societal benefits, transforming social studies education can also have a positive impact on student engagement and academic achievement (Chen & Xing, 2021). By providing students with authentic, relevant learning experiences that connect to real-world issues and challenges, educators can help increase student motivation, retention, and transfer of knowledge (Darling-Hammond et al., 2020). This, in turn, can lead to improved academic performance, higher graduation rates, and better post-secondary outcomes (Gleason, 2019).

Ultimately, the transformation of social studies education is not only a response to the challenges of an AI-driven world but also an opportunity to reimagine the purpose and potential of education in the 21st century (Marr, 2020). By embracing this opportunity and working collaboratively to develop and implement innovative, student-centered approaches to social studies education, educators, policymakers, and community stakeholders can help ensure that all students are prepared to thrive and contribute meaningfully to an AI-enhanced society (Kozma & Roth, 2012).

Conclusion

In conclusion, the rapid advancements in artificial intelligence have made it imperative for social studies education to undergo a significant transformation. Traditional teaching methods, which often rely on teacher-centered lessons and passive learning, are no longer sufficient in preparing students for the unique challenges and opportunities of an AI-driven world (Chen & Xing, 2021). To ensure that students are equipped with the critical thinking, problem-solving, and collaboration skills necessary for success in an AI-integrated society, educators must adopt new strategies and approaches that foster active inquiry, real-world application, and informed civic engagement (Darling-Hammond et al., 2020).

Educators play a crucial role in driving this transformation by adapting their teaching methods, integrating AI tools and concepts into the curriculum, and continuously engaging in professional development (Kozma & Roth, 2012). By creating student-centered learning experiences that emphasize authentic problem-solving, collaboration, and relevance to real-world issues, educators can help students develop the adaptable skills and mindsets necessary to navigate the complexities of an AI-enhanced world (Gleason, 2019).

The benefits of transforming social studies education are far-reaching, extending beyond individual student success to the development of a thriving, equitable, and civically engaged society (Marr, 2020). By providing students with the knowledge and skills necessary to actively participate in shaping the development and governance of AI technologies, transformed social studies education can help ensure that the benefits of AI are distributed fairly and that potential risks are mitigated (Chen & Xing, 2021).

As we look to the future, education must continue to evolve and adapt to the rapidly changing landscape of an AI-driven world. By embracing the challenge of transformation and working collaboratively to develop innovative, student-centered approaches to social studies education, educators, policymakers, and community stakeholders can help ensure that all students are prepared to thrive and contribute meaningfully to an AI-enhanced society (Levitt & Grubaugh, 2023). In doing so, we can not only meet the demands of the present but also shape a future in which education empowers students to become active, informed, and compassionate leaders in an increasingly complex and interconnected world (Gleason, 2019).

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The Intelligent Learning Environment: Benefits and Challenges of AI in Education

by

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With the evolution of information technology in the digital world that we live in has come the frequently discussed Artificial Intelligence (AI). AI has become integrated into our daily lives in ways we may not consciously notice. What exactly is AI? Should we trust AI technology? These and many other questions surrounding the use of AI have become the center of hot debate. As artificial intelligence (AI) has become integrated into everyday life, its involvement in education is no exception. Though there are challenges and valid risks to its use, the benefits of utilizing AI in education far outweigh the potential drawbacks. AI will be described and analyzed, incorporating a discussion of the benefits and challenges of using AI in education. The goal of this study is to explore and share the ways in which AI can and could be used to benefit the educational society. The Challenges faced as a result of using AI in education will also be scrutinized.

Keywords: AI (Artificial Intelligence), AI in Education, Technology in Education, Benefits of AI, Challenges of AI

What exactly is AI and how has it developed so rapidly? Mon et al. (2023) explain that the recent "boom" is the result of "accessibility of huge amounts of big data, the development of faster computer processors, and advancements in computing methods." Because of the advancements in technology over time, it has increasingly developed into faster, more intelligent software. As far as it works, rapid information processing and analyzing occurs. According to Tapalova & Zhiyenbayeva (2022), "'AI simulates human listening (machine translation, speech recognition), speech (speech synthesis, human-computer dialogue), observation (computer vision, recognition images, text recognition), thinking (theorem proving), learning (machine learning, intelligent adaptive learning) and action (robotics.)" Through rapid processing of data, AI can be used in a vast range of fields both professionally and personally. It can simulate the thinking, language, and actions of people and can therefore be harnessed for endless purposes.

Analyzing data in seconds that would take a human hour to do the same task, using virtual or augmented reality in training simulations, virtual assistants, smart homes and cars, online shopping, and language translations are just a few examples of how AI is used in everyday life.

In this paper, how AI is utilized in the field of education, specifically, will be examined. AI can be used in administrative tasks and is already being used in classrooms worldwide. Ghita & Stan (2022) provide pertinent examples of AI programs currently in use in education for students and teachers alike. Some examples commonly leveraged by students include: "ChatGPT [a] language-based AI [that] generates responses, Essaybot, Wolfram Alpha, Mathway, Cognii, Hemingway Editor, WriteLab, [and]Ref-N-Write." These programs are used for assistance in writing, math, and reading. While some AI programs generate entire written compositions (Chat GPT Essaybot, Ref-N-Write), others are used for editing or asking math questions (WriteLab and Mathway), that generate intuitive responses. Some examples specifically used by teachers are: "Turnitin, Grammarly, SAGrader, Readable, [and Brainly" (Ghita & Stan, 2022). These specific programs are mainly used by teachers to detect plagiarism or the use of AI to complete assignments, an increasingly common issue. On a salient note, utilizing AI does not necessarily equate to illegitimate or fraudulent use. Many programs are being used to help students as well as teachers that are aiding the learning process and improving the education experience. For example, Wardat et al. (2024) mention, "online learning platforms like Khan Academy and Courser [that] offer educational courses that leverage artificial intelligence techniques to guide students and provide accurate assessments of their progress." AI enables individualized data driven instruction, immediate feedback, differentiated content, increases learner motivation, promotes resource sharing among teachers, aids teachers in simple tasks, prepares students for the digital age, and improves accessibility to educational resources.

Benefits of AI in Education

Across literature on the topic, the principal benefit of integrating AI into the classroom is individualized instruction at the learner's level. As Mon et al. (2023) point out, "teachers have many learners to manage. AI helps create curriculum at the individual learner's level." In the primary school setting, teachers instruct and monitor the progress of anywhere between 20-100 students. In secondary and beyond, teachers may be responsible for well over 100 students. This makes it challenging to meet the unique needs of each student, which is currently expected of educators. AI can analyze an individual's data quickly and accurately and will develop content according to the individual's performance. In their article investigating the hype surrounding AI, Humble & Mozelius (2022) state AI programs put "the learners in the center and tailor the learning according to their needs and preferences. Previous research has also suggested that AI systems can be effective tools for supporting students with neurodevelopmental disorders to address challenges in learning and to personalize education." Because AI can listen to and observe the learner, as well as analyze performance data, programming is based on the individual's current level rather than the expected level of achievement. This is ideal for all students, especially those with disabilities that may be performing below typical levels. Further, "speech generation and translation of text can be performed by software-controlled AI assistants with NLP [natural language processing] algorithms (Goksel & Bozkurt, 2019) NLP can also support students in learning and work life-training by recording speech, provide feedback, and order and suggest steps of action" (Humble & Mozelius, 2022). For example, some AI reading programs listen to students read, and if the reader mispronounces a word, the program will teach the correct pronunciation and prompt the student to try again. Fluency, accuracy, and comprehension are monitored, and passages are selected based on the student's current

performance. AI driven programs monitor student progress and can provide various growth measures. In this way, the content is tailored to the individual's level. Such individualization is not possible without this advanced technology when teachers have a multitude of students. In their research on personalized learning pathways with AI, Tapalova and Zhiyenbayeva (2022) explain that "the research identified key advantages to creating personalized learning pathways such as access to training in 24/7 mode, training in virtual contexts, adaptation of educational content to personal needs of students, real-time and regular feedback, improvements in the educational process and mental stimulations." Students cannot access their teacher around the clock; however, they can access their personalized learning applications so long as they have an internet connection, essentially 24/7. This means they can engage with content at their individual level around the clock which improves their progress. Being that it is "smart," the real-time feedback is specific to performance. The feedback provided are not generic automated messages, they are based on what the AI is sensing and retrieving. The output then, is timely and individualized. In a traditional classroom setting, students only receive personal feedback when they are one-on-one or in a small group setting with the teacher, likely less than 30 minutes a day of individualized feedback as the teacher must address the needs of a vast number of students. Conversely, the intelligent learning environment maximizes personalized feedback to improve student progress and enhance growth measures.

Tailoring content to an individual's level requires programs to provide accurate and immediate feedback which AI delivers. In his article on the impact of AI in education, Rahayu (2023) shares that, "especially in the field of assessment, [AI] can provide the ability to increase the accuracy, validity and reliability of assessments. In addition, it can help reduce bias from individual human judgment. AI can also have adaptive assessments that can be tailored to

individual needs." Rahayu makes multiple critical points here. Because AI is more objective than a human with prejudice or bias (conscious or not), when used to assess students, AI is likely to be more accurate, valid, and reliable. Due to the advanced computer processing described previously, that makes AI possible, AI can evaluate students rapidly and objectively. This evaluation limits human error and minimizes subjective judgment and/or preconceived notions; plus it is incomprehensibly faster. Through data analysis, these programs can make comparisons across hundreds of assessments and individuals instantaneously which ensures accuracy, validity, and reliability of various assessment instruments.

Far beyond a textbook's ability to engage students, AI engages and increases motivation through challenging students and offering interactive games and activities. In their article on AI from mathematics' teachers' perspectives, Wardat et al. (2024) shared that AI in the classroom "increased motivation for learning, [by] encouraging challenge, competition, and suspense among students and considering their differences." The pencil and paper approach is outdated and becoming obsolete due to advances in technology. A textbook simply cannot compete with an interactive game on an iPad, tablet, or computer. When students can learn through playing academic games in a fun, interactive way, they are more engaged and motivated to learn. Many programs reward students' participation and progress in lessons with digital rewards or games that encourage students to keep playing and learning. These programs are aligned with academic standards so teachers can monitor which standards are being met, how long students are taking to master a given objective, areas of weakness, and more because of the data that comes from these programs. Even more engaging is the use of virtual reality technology explored by Hu et al. (2023). "Extended Reality (XR) technologies, represented by Virtual Reality (VR), Augmented Reality (AR), and Merged Reality (MR), combine and merge virtual and real worlds in various

ways in different educational and teaching scenarios, which can enhance the learning experience and provide more possibilities for solving complex problems." (Hu et al., 2023). Imagine learning to fight fires, operate on an animal, build a skyscraper through augmented or virtual reality experiences. Extended reality simulations make virtual and real-world experiences come together for the most hands-on and engaging learning experiences ever. This incredible, advanced technology helps individuals learn to problem solve in a real way, as if they are really "on the job." "Enlightened by AI courses, students can solve practical problems by using programming and computational thinking, develop the core quality of disciplines, and improve their abilities of problem-solving and higher-order thinking, which has become an important way to promote digital survival and adapt to the development of future intelligent society" (Hu et al., 2023). Not only is AI highly engaging, it helps students solve real world problems and prepares students for the digital world that we live in. Teaching using pencil-to-paper, textbook-memorizing methods is not engaging, nor does it effectively prepare students for the digital, technologically advanced society that we live in. Education must prepare students to be active participants in society, and being proficient in technology is a prerequisite skill for any sector. Classrooms today, like society at large, are "intelligent" meaning knowledge is widely accessible and technology highly advanced. Therefore, utilizing AI in education enhances digital proficiency and adequately prepares students to be a part of society. As Malik. and Gangopadhyay (2023) stated, "AI-driven technology for the education sector is gradually becoming a practical necessity globally." There is no escaping the prevalence of AI; it is widely accessible and increasingly integrated into nearly every aspect of life and every field, or discipline. We must prepare students to participate by effectively utilizing AI in education.

Not to be overlooked is AI's ability to automate simple tasks, allowing teachers to spend more face time with students. "Previous research suggests that AI-systems should focus on assisting concrete pedagogical tasks that for a human teacher would be perceived as exhausting and time-consuming, for example assisting in constructing grade responses" (Humble & Mozelius, 2022). Teachers can get bogged down in countless tasks that while necessary, take up valuable time and energy. Such tasks as grading, progress monitoring, and various documentation, lead to teacher burnout. Exhausted teachers not only lack the time, but also the energy to build relationships with students, a critical part of a student's educational experience. If there is a way to lighten the heavy workload of teachers and save them time, why wouldn't we harness that power? "AIEd provides the most immediate benefits of automating simple tasks such as assessments, digital asset classification or scheduling. AIEd helps teachers to save time usually spent on routine tasks and devote more time to communicating with students." (Tapalova & Zhiyenbayeva, 2022). Grading/evaluating programs, virtual assistants, programs to assist in scheduling, progress monitoring software, etc. save teachers valuable time and energy that can be better used to develop meaningful relationships with students. Education is more than content; it entails more than academics and must provide the opportunity for social-emotional development. Supplying teachers with time and resources to do more than the necessary, yet tedious, tasks is beneficial to both students and teachers.

Another benefit of AI technology is that it promotes intelligence and resource sharing. Shuliar et al. (2023) explain that "the integration of complex software-hardware systems into the educational process lies in incorporating big data analytics, robotics, neural networks, and artificial intelligence. The objectives of reforming the educational system require corresponding changes in teaching methods, as well as in higher education, through informatization and

digitalization. This has led to the emergence of open education which allows for unrestricted access to educational resources." Because the integration of information technology and artificial intelligence in education requires a reform in teaching methods, teachers must answer the call to learn how to incorporate it into their teaching. Open education allows for open access to countless digital resources for educators. Hu et al. (2023) write that AI promotes the transfer of teachers' intelligence and the sharing of teaching resources and plays the role of "connector to share the high-quality content resources of education" and "multiplier to enlarge the scale of education services." Information sharing is easier than ever, and teachers can take advantage of this to improve their teaching. Teachers do not have to create content independently and can easily access quality resources online through open access libraries. AI can even assist teachers in finding the content and resources they are looking for. Digital media and resources for a given topic can be created, discovered, and shared with ease. Open access is useful not just to teachers, but students, administrators, professors, etc. The range of materials openly accessible to the public is wide and allows for the distribution of knowledge and resources.

Improved accessibility of high-quality education is another benefit of the development and advancement of information technology and artificial intelligence (Humble, N. & Mozelius, 2022). While many students, parents, and educators were forced to undertake a crash course in eLearning during the Covid-19 pandemic, online learning started well before then. When online learning was once an optional path, the pandemic caused it to become the sole option for a period of time. This increased the pressure on digital course creators and programmers to vastly improve usability and quality. Additionally, it opened the eyes of many as to how much AI can do for teachers and students. Shuliar et al. (2023) explain that "online education can be obtained without leaving home, either for free or at significantly lower costs than traditional education.

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This tackles the problem of social disparity and equal opportunities as those with limited funds can still study at top universities around the world. Moreover, education becomes accessible regardless of the place of residence, age, health status, elite status, or financial condition." Learning online has become increasingly common due to its convenience and low cost. Because education can be accessed at a low cost from virtually anywhere, AI has leveled the playing field and promoted equal opportunity to education.

<p align="center">Challenges of AI in Education</p>

Much of the literature on the topic suggests that the main challenges of utilizing AI in education surround data security and privacy, accountability for students and teachers, undermined interpersonal relationships, and programmer bias. While these present valid risks, improvements in data security are already advancing and other measures can be put into place to mitigate these risks. Using AI to assist with or complete assignments can negatively impact accountability for students. Reliance on intelligent technology could affect the work, drive, and motivation of students. "When every question has an easily accessible answer, why should students make any effort to seek information from sources beyond the easiest one?" (Ghita & Stan, 2022). Every time we talk to Alexa, Google, or Siri, for example, we are using AI to ask any question that comes to mind, and an answer is instantly at our fingertips. With the advancement of technology including software and devices, children and youth are fully immersed in technology and are growing up with a virtual assistant in their pockets. This begs the question, why would students be motivated to seek knowledge on a deeper level when a sufficient answer comes up first? This is a valid risk of using AI and while educators cannot control what students use at home, most schools have policies or procedures in place to limit students' use of personal devices during instruction unless it is a program being used in class.

Additionally, schools can monitor and restrict access to many websites on schools, district, or private network Wi-Fi-connected devices. If not connected to Wi-Fi, connectivity may be limited on these premises. Therefore, while on campus, students are only on devices and websites that are permitted and would not be able to use AI technology to complete their work. If teachers suspected the use of AI on assignments that students completed at home, there are programs to check that it is original work. Come assessment time, students are not permitted to use technology, or if completing them online, they can be on a locked browser and must possess the previously taught knowledge and skills to perform well. If students were acing homework assignments that were completed at home and then failing assessments, that could be an indicator that they are using AI or other technology to assist them in their work apart from their own knowledge. In this way, accountability is still very much required of students. A decrease in accountability is not only a concern for students, but teachers as well if they become overly dependent on AI to monitor the progress of students. The incredibly advanced AI driven programs described previously can track and monitor progress, but educators must not be overly reliant on these programs to be the sole progress monitor of the student. Teachers can be held accountable by administrators by having regular meetings regarding students' progress. The progress on any given learning application or program would represent one piece of data and the progress of the whole child requires many pieces of data. It is not likely a teacher would make it without adequately and appropriately monitoring student progress.

"AI is now an essential, pervasive, and inescapable component of our daily lives, even though it is frequently hidden. In fact, ironically, the more integrated it is, the less we tend to consider it to be artificial intelligence" (Mon et al., 2023). AI is frequently hidden, it is listening in your pocket, it analyzes Google searches to provide personalized ads, and when it answers

those frequent questions, it captures your voice, language, search history etc. While we are using it (intentionally or not), our data is on the internet. A major concern of utilizing AI in education is data security and privacy. After all, AI works by analyzing the actions, language, search history, etc. of a given individual. Keeping students' personal data confidential is a legitimate concern. Under federal law, students' data must be kept private and using AI which analyzes these data could potentially be leaked or stolen. AI driven programs and applications contain information like students' names, identification numbers, voice, face, and other private information that must remain confidential. It will be imperative for educators and schools to implement proper precautions for ensuring these data remain secure. The technology that has evolved into AI is the same technology that has evolved its security measures and privacy practices. As such, users can accept or decline data analytic cookies and must read and accept privacy agreements when entering confidential information. Public and private education institutions can, and must, maintain the most up to date standards to protect students' data.

A less obvious but significant downfall of technology is that it could potentially undermine important social interactions and relationships between students and teachers. Referencing Vygotsky's theory of cognitive development, Ghita and Stan, A. (2022) warn that AI may undermine "important social interactions and collaboration between students and teachers." Reliance on technology inevitably leads to more technological time than face to face time. As mentioned previously, a part of educating students is social emotional learning in which important personal relationships, communicating, and collaborating are essential. If students are spending too much time on technology devices and less time collaborating with peers and working with the teacher, their progress in social emotional areas, as well as academic areas may be impaired. Rahayu (2023) shares the perfect response to over-reliance on AI in education.

Regarding accountability, and interpersonal relationships alike, it is important to remember, "however, [that] AI technology itself is only a tool in the learning process where the final decision is in human hands. Therefore, the use of AI technology in the world of education must be done wisely to develop the world of education for the better." AI is a remarkable tool that can be leveraged in education for its many benefits, but we must remember it is a tool in the educator's toolbox and should be treated as such. It should supplement instruction, not replace it. It can help the teacher and the student, but it cannot replace human to human interaction and the need for personal relationships.

The final challenge of the intelligent learning environment is perhaps the least discussed and least obvious: programmer bias. Humble and Mozelius (2022) expound:

With the rise of artificial intelligence in education, the systems implemented in educational contexts is and will be built by people. Algorithms that are developed to process data are created by programmers with potential biases in the code (Nichols & Holmes, 2018). Moreover, training data and models used for machine learning are corrected and evaluated by humans (Namugenyi et. al., 2019). Since there are no definite guidelines for ethics in either AI or AI-applications in education (Nichols & Holmes, 2018), the weaknesses of AI-systems may have real consequences for education due to the increased attention that AI researchers, product developers, venture capitalists, and advocates for educational technology are putting on the educational market (Namugenyi et. al., 2019). The consequences of potential biases in AI-systems for education are further amplified by the marketing efforts to present AI-algorithms as value-neutral and objective to the public. The use of AI-systems and technological solutions in education

raises the question of "who sets the agenda for teaching and learning" (Humble &

Mozelius, 2022).

We tend to think of AI as not real, after all it is computer based, and more commonly associated with an emotionless robot. However, as explained here, the systems' algorithms are created by humans. Humans with prejudices and biases. Further, the models and training data used are also evaluated and corrected by humans with opinions of their own. As the authors have pointed out, given the more recent timeline of AI in education, there is not a set of ethics guidelines being followed so the educational market is full of resources subject to its programmer's bias. While marketed as objective, any human has opinions as well as conscious or subconscious prejudices which have the potential to impact on the codes and algorithms of programmers. Who hires the programmers? What is their agenda? These are important questions when examining the objectivity of an AI driven application or program. Administrators and directors must select programs that are evidence based and driven by research. Additionally, it is critical to examine the research behind the programs to ensure the population of students is represented in the research and is an appropriate choice. Programmer bias is a risk, but educational institutions can find and utilize only the programs proven to be effective by research.

Conclusion

Less of a choice, and more an expectation to keep up with current trends (Wardat et.al. 2024), AI driven technology is inevitably becoming integrated into classrooms today. Intelligent learning environments can come with risks, however. Utilizing AI brings data security and privacy concerns, potential accountability issues, threats to interpersonal relationships and possible programmer bias. Despite this, there are measures that can be exercised and implemented to mitigate these risks. With policies, procedures, and best practices in place to

reduce these risks, the benefits of AI driven technology in education can be unleashed. "AI technology helps teachers understand teaching tasks more clearly, teach content accurately, choose teaching keys, and make a scientific assessment of learners' study life. Hence, AI technology plays an important role in promoting the development of learners" (Lin, 2022). AI enables individualized data driven instruction, immediate feedback, differentiated content, increases learner motivation, promotes resource sharing among teachers, aids teachers in simple tasks, prepares students for the digital age, and improves accessibility to educational resources.

The research for this study was very intense and yielded approximately five thousand peer reviewed articles. Carefully selected articles bequeathed the revered information found in the study. Although there are challenges, the benefits of AI in the intelligent learning environment clearly outweigh the potential challenges.

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Designing Global Classrooms: Creating Study Abroad Programs in International Education

by

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This paper examines a study abroad program that gives graduate education students hands-on experience in diverse educational settings and deepens their understanding of global education (Netz, 2021). The program, located in Ireland, features two courses: "Global Educational Practices" and "Comparative Content Instruction: Ireland and the United States." These courses cover essential topics such as Irish history, the famine, the "Troubles," bilingualism, and comparative educational studies. The semester includes two weeks in Ireland, with pre-departure assignments and a research component involving fieldwork and interviews with Irish educators. The paper discusses the program's objectives, planning, collaboration, risk management, and technology integration. It emphasizes using tools like virtual reality tours and digital partnerships to prepare students. Assessment methods include reflective journals, e-portfolios, presentations, and tests. The paper concludes by recommending ways to align assessments with program goals, customize reflective activities, and provide ongoing feedback and support. (deLusé, & Thomas, 2022).

Keywords: study abroad programs, global education, graduate education, intercultural competencies, international education, Ireland, educational systems comparison, cultural immersion, transformative learning.

The authors of this paper are instructors who teach in a curriculum and instruction department at a large university in South Florida. The student body is diverse, with learners from all backgrounds, ages, cultures, and financial means, they rarely have the opportunity to travel and study abroad. To offer the chance for students to participate in a faculty-led study abroad experience, the writers decided to develop a study abroad program for Ireland (Case Western, 2024) This article explores the development and implementation of a study abroad program designed to provide graduate students in education with first-hand experience in diverse educational settings and to enrich their understanding of global education systems. The program

in Ireland includes two distinct graduate courses: "Global Educational Practices" and "Comparative Content Instruction: Ireland and the United States." These courses focus on comparative educational studies, immersion in local culture, and literacy practices in secondary education. A research component involving fieldwork and interviews with Irish educators aims to contribute to the body of knowledge in international education.

1. Identify the Program Needs, Goals, and Objectives

As educators, we first determined our primary goal: to provide graduate students with first-hand experience in diverse educational settings (Tanja, 2016). We believe that experiences abroad would enrich their understanding of global education systems and offer insights to people of other cultures, which could result in a greater understanding of the diverse students in the school settings of their home country. We provided two graduate courses, one with a state-mandated reading component and the other with a global education aim. We needed to:

- Address academic purposes and curriculum of the program to be offered.

- Address the needs of the American student body population.

- Address the needs of the host population (Irish students and their teachers).

Our overall objectives were to focus on global educational practices and to compare educational systems in which students were immersed in the local culture and language. In the first course, we highlighted the critical components students needed to know about Ireland. The primary topics were an overview of Irish history and language, the famine, and its relation to the United Kingdom, the "Troubles," bilingualism, and current events today. Students were assigned readings and were asked to complete the readings before leaving for Ireland. However, they did not have to answer the questions or submit the assignments until we returned, as we had several

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weeks remaining before the grading was due. After returning to the United States, we thought students would have a different perspective, even after reading about the topics assigned before their trip (Reid, 2023).

In addition to engaging in Course 1's Irish topics, course 2 focused on comparative content instruction in Ireland and the United States. Students researched and analyzed educational policy and practices, primarily focusing on literacy and language instruction in secondary education. The research component included interviewing and communicating with Irish educators, highlighting students' fieldwork. Their findings may contribute to the body of knowledge in international education.

Both instructors were ready to take on the study abroad challenge; however, as there was no such program in existence in our college, we had to create, develop, and implement all components ourselves and began a step-by-step plan to build a study abroad program that would work for our distinct program needs and issues.

2. Research and Planning

Where are we going, and what do we need to know to prepare for our students? Escorting people abroad is a tremendous amount of responsibility. We will be the first line of defense and must understand where emergency resources are available.

- We needed to familiarize ourselves with the intended location's social, economic, and political environment and local customs.
- We explored the U.S. Department of State Bureau of Consular Affairs website.
- Reviewed the travel advisory information for the intended program location.
- We consulted CDC Travel Health Notices for the intended program location.
- We looked at medical facilities, police stations, fire stations, and transportation options.

3. Collaboration and Support

Our institution did not provide much support, so we explored options as we created our program. We explored all options and found two potential steps below.

- Consider using a third-party custom program provider who can offer 24/7 program support and take care of the logistical and local lodging and travel arrangements on-site.
- Alternatively, consider hosting your faculty-led program at one of your partner institutions.

Program Design

Itinerary and Budget: Many choices and options are made for you and determined by your institution. The first question is how many students are needed to make the program viable. However, after creating the syllabi, you will have better ideas about where you want students to go and what you can offer them. That might call for negotiation concerning what trips and itineraries to provide students with within a determined budget.

To determine the most appropriate dates for your students to be on the ground, local school district and Irish school calendars must be consulted to determine when the American counties and Irish teachers finish school and what is mutually agreeable.

Then, it gets easier to develop the program itinerary and budget, determine the duration of the program, determine the most logical courses to be offered, and determine what cultural activities will be included.

Program Approval Process: This process may take a lot of time if you need to go through multiple channels for levels of signatures. Give yourself adequate time, and several gentle reminders can be sent out suggesting that the program cannot proceed without proper signatures.

- Submit the necessary forms and documents to your institution's appropriate department or office for approval.

Risk Management: These trainings are mandatory for our Global Engagement department. Lead faculty must be prepared for surprises, so we must know where to go, whom to call, and what to advise our students. There is a fine line between accompanying students to the hospital and lending them money because they lost their wallets. Know how much is expected of you and be clear that the students also know.

- Attend faculty risk management training.
- Ensure comprehensive health and safety measures are in place.

Marketing and Recruitment: Start early and be everywhere. It is not enough to depend on someone sending messages to departments. Signs, ads, blurbs, study abroad fairs, brochures, and asking fellow faculty to tell their students about the program's availability are ways of reaching potential educational travelers.

- Begin marketing the course and recruiting students.
- Ensure that the program can attract enough participants.

Registration and Finance: Most large institutions have study abroad programs, and scholarships and student loans are available for these educational trips. Know where students should go to find information and resources.

- List the course in your institution's registration system and register students.
- Coordinate program fees and finances with your department, college, and the global studies department.

Predeparture and Orientation: Schools may have the presentations they want you to conduct. However, we scoured the Internet for various resources and added our experiences from multiple years of travel.

- Conduct pre-departure orientations to prepare students for the study abroad experience.
    - Costs: airfare, entertainment, food.
    - Length of time.
    - Overview of courses.
    - Best and worst of things to know.

Technology Integration: We did not know our students before the trip, so we had Zoom meetings to meet them and present our pre-departure information. We also had question-and-answer time and shared our experiences. We also had a dedicated What's App forum that we communicated through. We communicated daily, and students had a direct line to us as faculty leaders.

- Utilize online platforms for pre-departure orientations and ongoing communication.

- Implement virtual reality (VR) tours of the host country to familiarize students with the environment.

- Use educational apps and tools to enhance learning experiences during the program.

Assignments to Enhance Student Learning Abroad

Find strategies to extend student learning while abroad. The following strategies are ways to introduce students to their field abroad, which may expand learning experiences.

Fieldwork and Research Projects

- Local Interviews: Assign students to interview local educators, students, or community members. Students may find their counterparts before leaving for Ireland. Reaching out to educators, professors, school systems, and in-service professionals can introduce students to local individuals and set the tone for face-to-face meetings in Ireland.

- Case Studies: Have students conduct case studies on specific educational practices or policies in the host country.

- Look up educators who have been involved with Fulbright and other study abroad organizations and contact them for interviews. Look for professors and educators in the Irish university education departments (in the desired field) and write to them. Make contacts before arriving in Ireland and ask for recommendations for people or organizations with the appropriate people to talk to or interview.

Cultural Immersion Activities

- Cultural Journals: Students must maintain a journal documenting their cultural experiences, observations, and reflections.

- Use the information recorded in personal journals as a starting point to debrief when students and faculty meet in the evenings. (Creative Primer, 2020).

- Photo Essays: Assign students to create photo essays that capture their experiences and the cultural aspects of the host country.

- All these components are excellent parts of a final paper for students.

Collaborative Projects

- Group Projects with Local Students: Facilitate collaborative projects between your students and local students.

- Service Learning: Encourage students to participate in community service projects.

- Student transcripts should note service-learning projects, and credit can be given for the extra international work/service.

Language Practice: Irish is the official language of Ireland, yet almost everyone speaks English. Language activities can be arranged for students wishing to investigate or study Irish. If students are not situated in a Gaeltacht area (Irish speaking), alternative activities and assignments can be created before launching the trip, during the stay abroad, and afterward, as a final summation of what they have learned about speaking Irish and the Irish language.

- Language Exchange Programs: Pair students with local language partners for regular conversation practice. (This applies to students in Irish-speaking areas or connections to Irish language schools or classes in Ireland. This can also take place in the United States through classes, groups, or language apps like Duolingo and Memrise

- Language Diaries: Have students keep a diary in the local language, documenting their daily experiences and new vocabulary learned.

Facilitating Reflection on Study Abroad Experiences

Structured Reflection Activities: It is important to us as educators that our students experience more than a trip out of the country. We created a template for daily reflection journals with questions that allowed students to think deeply about and make sense of their experiences. We used these reflections when we met in the evenings to debrief, knowing they would also be a part of their final capstone paper.

- Reflective Essays: Assign reflective essays where students analyze their experiences, challenges, and personal growth.

- Discussion Groups: Organize regular discussion groups where students can share their experiences and reflections with peers.

- Every few days, we met informally around the living room areas and talked about their experiences and feelings, which resulted in intense sharing and self-revelation.

- Students expressed that they felt as though they had been through something transformational, as they challenged themselves and learned more about themselves by seeing others in a different cultural light.

Digital Reflection Tools

- Blogs and Vlogs: Encourage students to create blogs or vlogs documenting their study abroad journey.

- Students posted on their Instagram and Facebook pages.

- E-Portfolios: Have students create e-portfolios that compile their assignments, reflections, photos, and projects. (This was our final assignment.)

Post-Program Reflection: We gathered this type of information at the end of our study abroad time, and they incorporated it into the final paper. We did not officially meet face to face after the class returned to the United States, although it might have been a better idea so students could have physical interaction with each other, and they could say goodbye. Still, students shared their reflections in our WhatsApp application space and spontaneously talked to one another about what they felt and shared. In the final papers, we had the chance to read all the daily journals to see how students who had been previous strangers bonded through natural selection during the two-week program.

- Re-Entry Workshops: Conduct re-entry workshops where students reflect on their experiences and discuss how to apply their learning back home.
- Presentations: Ask students to present their study abroad experiences to the campus community. Although this is an excellent idea, we were unable to fit it in timewise due to the end of the semester. However, we encourage students to write about and present their experiences in professional organizations and conferences.
- Presentations in Ireland: Students could make the presentation as one of the assignments in Ireland. This could be a mini conference, giving them practice for presenting at national or international professional conferences.

Guided Reflection Prompts: This assignment was the backbone of the trip, so students could jot notes daily and later reflect upon what they had thought about. While we used the points as daily conversation starters about the day, when meeting at the end of the day, overall, they would use these daily reminders to respond to questions and make a more global sense of what they had experienced.

- Guided reflection prompts such as the following were used:

  o What was the most challenging aspect of your study abroad experience?

  o How did you adapt to the cultural differences you encountered?

  o What did you learn about yourself during this experience?

  o How has this experience influenced your future academic or career goals?

Sample of a Daily Reflection Log: June 9-22, 2024

Instructions

- Each day, you will write in your daily log. At the end of the course, you can create your final paper by using your daily reflections and photos you have taken.

- Please use this template for each reflection. You can write every day, but you need at least ten reflections. These will be part of your final paper.

- What should you write about? Here are possible topics:

- Daily logs can reflect cultural experiences, interactions with locals, and general educational or life observations.

- Share any cultural nuances you have discovered impact teaching and learning.

- If you have the opportunity, conduct interviews with Irish people. Think about what questions you might like to ask Irish people and interact whenever you can. You might want to ask questions that compare educational practices, policies, and philosophies.

- Try to identify similarities, differences, and potential reasons behind variations and explore how cultural nuances impact teaching and learning.

- After each visit or interaction with people, write your reflection so you can discuss what you have learned and compare it to an American context. Share your impressions.

- Take photos and include them in your logs and final paper. Each image should be accompanied by a short reflection of what it is and its significance to you.

Date: June	
• Location/Event: Where did you go, or what cultural event/activity did you participate in today?	
• Observations: What did you learn today? What stood out to you about local customs, traditions, or behavior?	
• Emotions/Impressions: How did you feel during this experience? Are there any surprises or insights?	
• Challenges: Share any challenges you encountered today (language, adapting to norms, etc.).	
• Learning Moments: What new knowledge or skills did you gain?	
• Questions: Are there any lingering questions related to education or culture?	
The highlight of the Day: • Memorable Experience: Write about the most memorable moment of your day. • Why It Matters: Explain why this experience was significant to you.	

- How did today's experiences connect to your overall learning goals? - How did today contribute to your personal and academic development?	

Sample student reflection:

1. Cultural Insights: What aspects of Irish culture were most surprising or impactful to you?

    The kindness and warmth deeply rooted in Irish culture have left a lasting impression on me. I have encountered numerous instances of people going out of their way to assist without any ulterior motive. The admiration and respect for their artists and performers are genuinely inspiring, and it makes me wish that in the US, we shared the same level of appreciation for the arts.

2. Academic Growth: How has studying in Ireland contributed to your academic and professional goals?

    My experience studying in Ireland has sparked a desire for a career that allows for frequent travel instead of being restricted to the US's standard two weeks of vacation per year. Truly understanding a culture often requires immersing oneself in it, and this trip has broadened my horizons regarding potential work opportunities and strengthened my resolve to pursue a job overseas.

3. Language and Communication: How has your experience with the Irish language or bilingualism in Ireland enhanced your understanding of cultural identity?

Studying the methods of teaching Irish has enlightened me on how language choice can shape the portrayal of history and heritage. The ongoing effort to promote the use of Irish

within the educational system is commendable. A culture's commitment to preserving its language is a powerful example of Ireland's resilience and deep-rooted pride in its traditions.

4. Historical Perspective: How has learning about Ireland's history, such as "The Troubles," changed your perspective on conflict and reconciliation?

I am deeply grateful for delving into Ireland's history, particularly "The Troubles" and "The Great Famine." This research has profoundly shaped my understanding of Ireland's stance on international policy. Despite Ireland's commitment to military neutrality, its principled support of Palestine, even in the face of potential international backlash, is truly commendable.

5. Natural Beauty: Describe a natural landscape in Ireland that you visited and explain how it might symbolize aspects of Irish heritage.

As I journeyed from Dublin to Belfast, I was struck by the breathtaking beauty of the Mount Pleasant fields. The lush, rolling hills of vibrant green grass seemed to stretch endlessly, offering a profound realization of why Ireland is affectionately known as the Emerald Isle. In that moment, I couldn't help but appreciate how such a picturesque landscape has inspired countless poets and renowned painters throughout history.

6. Personal Development: What personal qualities or skills have you developed while abroad?

During my time abroad, I have gained confidence and determination. The freedom to choose which experiences to pursue and which school assignments to focus on has strengthened my ability to juggle multiple tasks. I now feel less overwhelmed, knowing that my decisions usually lead to success. The trip, which initially worried me, was one of my life's best experiences. I enjoyed interacting with new people and exploring the city

without feeling anxious about being more productive. I've realized that learning can take place anywhere, especially when it happens naturally.

7. Educational Systems Comparison: After comparing the Irish and American educational systems, what elements would you like to see implemented in your home country?

I firmly believe that universities in the US should strive to be as affordable as those in Ireland. Ireland is consistently ranked as home to some of the best universities globally, and I understand why. Unlike in the US, Irish universities are not burdened by multiple standardized tests shaping their curriculums, allowing for a focus on developing a solid academic foundation.

8. Interpersonal Relationships: Reflect on the relationships you formed in Ireland. How did they enrich your experience?

The connections I forged during my trip to Ireland will always hold a special place in my heart, greatly enhancing my overall experience. The classmates I interacted with were truly remarkable, providing a fantastic opportunity to compare educational experiences. Their insights into Irish culture and education were incredibly insightful, shedding light on the disparities within the US system. Moreover, the Irish friends I made briefly added an unexpected layer of richness to my journey. With the Euros taking place during our stay, conversations about football flowed easily, and I cherished listening to their wonderfully entertaining stories, which created a wonderful warm and inviting atmosphere.

9. Challenges Overcome: Discuss any challenges you faced abroad and how you overcame them.

In the beginning, I was concerned about the financial aspect and whether I would regret going on this trip. Fortunately, within the first few days of the trip, doubts about

regretting this experience vanished. Conversations with my classmates about our experiences made me realize the importance of embracing life's experiences and "sucking the marrow out of life."

10. Biggest Takeaway: What is your biggest takeaway from your study abroad experience in Ireland, and how will it influence your future endeavors?

The critical insight from my study abroad experience was to embrace opportunities as they arise. While I could have chosen to travel to Ireland independently, I wouldn't have had the same experience or built the meaningful connections and relationships I have now. This has motivated me to integrate travel into my life goals and to recognize it as an essential aspect of life rather than merely a luxury.

Evaluation: Throughout the entire program, you can use formative assessment by taking stock of the overall process and the daily results. Consider these points as a brief guideline:

- Implement the program.

- Continuously evaluate effectiveness for future improvements.

- Gather student input for changes in future trips.

- Ask for reflections and post conversations so students can debrief.

- Conduct a thorough post-evaluation to assess the success of the program.

- Use feedback to make necessary adjustments for future iterations.

- Evaluate final papers.

Conclusions

The study abroad program for graduate students who had never previously traveled internationally proved to be a self-described transformative experience, profoundly impacting their intercultural understanding and self-development. Through their immersion in diverse educational settings and engagement with local cultures, students developed enhanced intercultural competencies and a deeper appreciation for global education systems. Daily journaling (McInnes, 2023) played a crucial role in this transformative journey, allowing students to reflect on their experiences, share insights with peers, and foster a sense of community within the group (Avid, 2023) They also wrote about the interactions with Irish people, which were illuminating.

To further elevate the program, incorporating more qualitative research elements, such as in-depth interviews and ethnographic studies, would provide richer data and deeper insights into the students' experiences. Additionally, enhancing the pre-departure preparation by involving the students, and continuing to provide ongoing support could further improve the effectiveness of the program.

By continuously refining and adapting the program based on feedback and emerging best practices, we can ensure that future iterations of this study abroad program continue to offer meaningful, transformative experiences for graduate students.

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