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Best Practices and Biblical Worldview for Technology Integration

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Best Practices and Biblical Worldview for Technology Integration

Abstract

This research focused on a study conducted across three different teacher education programs, focusing on equipping teacher candidates with strategies for technology integration while encouraging them to examine how to best glorify God with appropriate technology use in the classroom. Students were instructed using common research-based practices and assignments. These included instruction on the SAMR model, exploration of a variety of technology tools, and a reflection on what it means to glorify God through teaching with technology. Pre- and post-survey data was collected to measure the effectiveness of both the instruction and changes in students' attitudes and perceptions of technology use in teaching. Pre-service teachers read and discussed research addressing Christian wisdom on technology, pursuing excellence in Christian education, technology and computational thinking in the classroom, and digital citizenship as they engaged in these assignments. This article includes main themes, preliminary findings, and implications for future research based on results across all three institutions.

Keywords

Pre-service teachers, technology, Christlike, discernment

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Abstract

This research focused on a study conducted across three different teacher education programs, focusing on equipping teacher candidates with strategies for technology integration while encouraging them to examine how to best glorify God with appropriate technology use in the classroom. Students were instructed using common research-based practices and assignments. These included instruction on the SAMR model, exploration of a variety of technology tools, and a reflection on what it means to glorify God through teaching with technology. Pre- and post-survey data was collected to measure the effectiveness of both the instruction and changes in students' attitudes and perceptions of technology use in teaching. Pre-service teachers read and discussed research addressing Christian wisdom on technology, pursuing excellence in Christian education, technology and computational thinking in the classroom, and digital citizenship as they engaged in these assignments. This article includes main themes, preliminary findings, and implications for future research based on results across all three institutions.

Introduction

Educators make hundreds if not thousands of choices in every single day. Some are deliberate, carefully selected with intentional planning. Others are in response to the classroom climate, flow of a lesson, or as a result

of unexpected questions or circumstances. As educators of future educators, it is a lofty task to not only equip students with the pedagogical knowledge they need for those intentional daily decisions, but also with the wisdom and foresight for the unanticipated decisions.

In March 2020 with the rise of Covid-19, all educators experienced and inexperienced were forced to make many decisions without time to prepare, plan, research, or process. Educators were forced to integrate technology into their classrooms at lightning speed with little to no preparation on best practices of technology integration in the classroom. Immediately, an appreciation and reverence arose for educators across the globe as technology became central to all classrooms and educators did their best to meet the needs of their students from afar. As time has passed, technology integration has remained as students and educators returned to class in person. However, the drastic shift in practice has forever impacted the pedagogy behind best practices of technology integration in the classroom. On one hand, there are many dynamic and creative ways technology is still integrated into classrooms. On the other hand, however, technology can not only dominate the classrooms, but the personal lives of educators and students alike. One thing is certain, classrooms will never

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go back to the standard of “normal” they were before.

Educators and those who train and coach them, must equip pre-service teachers with the pedagogical knowledge and practical skills necessary to engage students in this educational culture that has been forever changed by technology.

Christian educators of pre-service teachers have another task besides instruction on skills of technology integration and instruction in the classroom. Christian educators must instruct pre-service teachers how to accomplish the skills in a way that honors and glorifies God, from a Biblical worldview.

Christian educators must instruct pre-service teachers how to accomplish the skills in a way that honors and glorifies God, from a Biblical worldview... Pre-service teachers must be equipped with the knowledge of how to teach using technology tools and whether they should be teaching with a specific technology tool. Both knowledge and discernment are required to maintain a Biblical worldview.

For the purpose of this study, Biblical worldview is defined as a mindset of teaching grounded in scripture in adherence with Christ’s call to reflect Him in all areas of life. “Because worldview determines both how we think and teach, and what we think and teach, its examination is central to developing God-honoring education for Christian educators in every educational context” (Edlin, 2008, p. 6). Pre-service teachers must be equipped with the knowledge of how to teach using technology tools and whether they should be teaching with a specific technology tool. Both

knowledge and discernment are required to maintain a Biblical worldview.

Defining a Biblical worldview of technology should also include a view of what technology is and what it means to live a life grounded in the word of God. In such a view, technology must be defined. For the purposes of this study, technology was focused on tools, platforms, apps, and computer processes that were a part of a teacher’s day including planning, teaching, grading, and communicating. As educators of pre-service teachers, we must consider technology as “tools, means, and/or processes to achieve particular ends” (Smith et al., 2020, p. 36), thereby necessitating not only knowledge but also stewardship. This stewardship would require both digital citizenship and discernment. Smith et al. (2020) stated discernment as drawing on faith commitments, spiritual formation, and our relation with God whereas digital citizenship is more developed in terms of educational frameworks and practical tools. Therefore, our Biblical worldview of technology seeks to align the use of technology with the Bible. A Biblical worldview of technology integration must be grounded in scripture acknowledging, “The tools are not intruders. They are integrated into the culture in ways that do not pose significant contradictions to its worldview” (Postman, 1992, p. 24). How, then, do we teach effective technology integration practices to pre-service teachers as stewardship? How do we guide them to make wise choices for their classrooms? What does it mean to glorify God with technology in the classroom?

A Biblical worldview of technology integration must be grounded in scripture acknowledging, “The tools are not intruders. They are integrated into the culture in ways that do not pose significant contradictions to its worldview” (Postman, 1992, p. 24). How, then, do we teach effective technology integration practices to pre-service teachers as stewardship? How do we guide

them to make wise choices for their classrooms? What does it mean to glorify God with technology in the classroom?

As Christ is praying for His disciples, He acknowledges this concept of being “in the world, but not of it.” In John 17: 15-18, Christ says,

My prayer is not that you take them out of the world but that you protect them from the evil one. They are not of the world, even as I am not of it. Sanctify them by the truth; your Word is truth. As you have sent me into the world, I have sent them into the world.

As Christian educators, our pre-service teachers are preparing to go out into the world to teach. The world they are preparing for is far different than pre-pandemic classrooms because of the emphasis on technology integration. This article will present research done on how to equip pre-service teachers to effectively and wisely integrate technology in their classrooms from a Biblical perspective to answer Christ’s prayer and call to be “in the world, but not of it.”

Research Institutions

The authors of this article researched this topic of technology integration in the classroom from the standpoint of a Biblical worldview. Three different Christian institutions participated in the research. Institution 1 conducted research with sophomores in a technology class, preparing early elementary and special education pre-service teachers, not yet in their advanced field placements. Institution 2 conducted their research with juniors, in a general teaching methods class for elementary educators, preparing for their advanced field placements. Institution 3 conducted the research with adult learners with some employed in educational settings.

Literature Review

Literature reviewed for this study focused on teacher beliefs regarding technology integration and approaching technology integration from a Biblical or faith-based perspective defined as a

mindset of teaching grounded in scripture in adherence with Christ’s call to reflect Him in all areas of life. When integrating technology, research indicates there are two types of barriers to teachers implementing technology in their classrooms. First-order barriers are those factors that are external to the teacher, such as resources, training, and support (Ertmer, 1999; Ertmer et al., 2012). Second-order barriers are those that are internal, such as teachers’ confidence, their beliefs about how students learn, and the value they place on technology to teach and learn (Ertmer, 1999; Ertmer et al., 2012; Kim et al., 2013). Technology in schools continues to change as well as the training and support provided, especially post-pandemic after the shift to digital learning. These continual changes in technology result in teachers being perpetual novices in technology integration (Mueller et al., 2008).

Teacher knowledge is a key first-order barrier making it important to seek to ensure pre- and in-service teachers understand the technology being used combined with the affordances technology provides when used in the classroom (Ertmer & Ottenbreit-Leftwich, 2010). With technology changing this can be challenging as teachers need more than technology provided to them, they need knowledge and skills in how to use the technology in their teaching. Ottenbreit-Leftwich et al. (2010) viewed teacher beliefs as value beliefs, stating that the more valuable teachers judge a tool or approach, the more likely they are to use it. As teachers see the value of a technology and gain knowledge of using the technology, there can be a shift to focusing on second-order barriers.

Prestridge (2012) stated the need to look beyond first-order barriers and focus on the second-order barriers of teacher beliefs about technology and examine the ways they influence technology integration in the classroom. Ottenbreit-Leftwich et al. (2010) found, in general, teachers were able to enact technology integration that aligned with their beliefs. Increasing teacher knowledge and skills in addition to providing evidence of technology integration practices can result in meaningful learning outcomes. Similarly, Kim et al. (2013) studied teacher beliefs in relation to the nature of knowledge and learning, effective ways of teaching, and technology integration. They found support for connections between teacher

beliefs and knowledge of effective teaching or pedagogy related to technology integration, illustrating the importance of ensuring both knowledge of technology and knowledge of effective teaching are included in training teachers to use technology.

Teacher beliefs and readiness also directly influence technology integration, as determined by Inan and Lowther (2010). In examining the relationship between teachers' pedagogical beliefs and their technology practices Ertmer (2005) found three strategies for promoting change in teacher beliefs about technology: personal experiences starting with simple technology uses, vicarious experiences by observing others to gain confidence, and social-cultural influences through establishing a social network of teachers using computers. Teachers also need to have knowledge of the technology they are implementing with their students. Training should relate to the relevance and value of technology paired with teacher support to sustain continued usage (Hu et al., 2003). Prestridge (2012) also found as teachers expressed a greater competency with information and communication technologies (ICT), they were more confident to use ICT in their classroom. Finally, Hermans et al. (2008) found teacher beliefs about the practice of teaching were a significant determinant in explaining why teachers adopted computers in the classroom. Together these studies highlight the importance of how competency and confidence influence a teacher's beliefs about technology.

The second area of research for this study explored approaching technology integration and teacher beliefs from a Biblical or faith-based perspective. This area of research was limited when searching for the terms "technology integration" and "Christian worldview." However, in the research which was found, integrating technology from a Biblical perspective showed two key themes: technology integration needs to be intentional and requires creating more than consuming (Berkelaar, 2018, Castellon & Jule, 2020). Research revealed a few keys to meaningful integration within a Biblical worldview.

First, teachers need to teach purposeful and educational use of technology in classrooms

(Castellon & Jule, 2020). Belcher and Pebesma (2022) found teachers lack justification for their technology choices. If technology integration is necessary for "digital literacy" (Castellon & Jule, 2020), then teachers need to be taught not only the technology they are using but also how to justify its use. Postman (1992) was in agreement with this need of justification for use, even before technology was as prolific as it is today when he explained that technopoly flourishes when there is a disconnect or severance between information and human purpose, presented at a rapid pace in large volumes.

The disconnect is a challenge with the vast amount of information available in its various forms today. The ability to sift the technology, decide on its use in teaching, and then apply it to teaching will require a teacher to be able answer the high-level questions of how and why to use it. Research showed keys to justification are understanding how technology is interconnected with culture and technology is not neutral (Bull, 2016). Culture reflects our values and beliefs and technology is found in each of these areas. Technology is also not neutral in that there are benefits and limitations to each technology a teacher chooses to use. These technologies are not simply right or wrong as a teacher needs both knowledge of the technology, as well as knowledge of how it connects with their beliefs for justification.

Discernment is also valuable (Bull 2016; Smith & Sevensma, 2019) as teachers seek to justify technology use. Nouwen (2013) defined discernment as "faithful living and listening to God's love and direction so that we can fulfill our individual calling and shared mission" (p. 3). Smith et al. (2020) shared how this discernment is not only about what we should do individually, but also how our actions embody love of God and neighbor contributing to a shared mission. It is in this discernment that future teachers can share faith and model Christian character to future generations. Through the lens of technology integration from a Biblical worldview, "the task of Christian discernment includes asking how new technologies might shape the faith and life of the community and our capacity to respond to God and the world" (Smith et al., 2020, p. 144).

Integrating technology goes beyond simply having students perform a task, but rather should be connected and aligned to learning goals as well as teacher beliefs when moving to a deeper level of understanding and use for students. This justification will need to consider the reality that literacy skills have been altered. The iGen generation spends more time reading electronically than in books (Twenge, 2017). Twenge explained that electronic reading requires a different skill set by encouraging multitasking whereas book reading requires an ability to sustain focus. Part of the justification process that teachers will need to account for will include a reason for engaging in electronic device use vs. paper or book use and overall engaged screen time in a day. In addition to digital literacy, there is also an increase in the use of artificial intelligence, AI. The need for discernment will continue. We are reminded that as, "AI is changing most things, it does not change the foundations of the Christian faith" (Thacker, 2020). The justification for use is up to the teacher to model.

Secondly, technology integration from a Biblical worldview requires engaging with technology creatively (Berkelaar, 2018) and creating more than consuming (Berkelaar, 2018; Castellon & Jule, 2020). Teachers also need to seek to structure time consciously when integrating technology (Berkelaar, 2018). Belcher and Pebesma (2022) also found the importance of using technology wisely for learning purposes to enhance learning in meaningful ways. As teachers are seeking to structure lessons with technology that are purposeful, there is a need for teachers to have a technology pedagogy or philosophy for teaching with technology (Belcher & Pebesma, 2022). Smith et al. (2020) also found teachers mentioned the idea of needing a philosophy of technology and concluded, "When the idea of worldview or perspective was to the fore, the focus tended to be on the perspectives and ideas encountered through technology more than rethinking technological practices" (p. 196).

In conclusion, the research reviewed focused on teacher beliefs regarding technology integration and approaching technology integration from a Biblical or faith-based perspective. First and second order barriers reveal the importance of teacher beliefs on technology

integration. Teachers' technology beliefs connect to their knowledge of effective teaching (Ottenbreit-Leftwich et al., 2010). Also, teachers' use of technology relates to their competency, confidence, and practice (Hermans et al., 2008; Inan & Lowther, 2010; Kim et al., 2013; Prestridge, 2012). This review also showed two key themes for integrating technology from a Biblical perspective: integrating technology intentionally and requiring creating more than consuming. Teachers need to teach purposeful and educational use of technology in classrooms (Castellon & Jule, 2020) as well as use discernment when seeking to justify technology use (Bull, 2016; Smith & Sevensma, 2019). Additionally, as teachers are seeking purposeful technology use, they need to have their students be creating more than consuming (Berkelaar, 2018; Castellon & Jule, 2020). Additionally, there is a need for teachers to have a technology pedagogy or philosophy for teaching with technology (Belcher & Pebesma, 2022; Smith et al., 2020).

There was a lack of research in the area of providing pre-service teachers a technology pedagogy for integrating technology in their classrooms from a Biblical perspective. Frameworks such as the Technological Pedagogical Content Knowledge (TPACK) describe how teachers combine their knowledge of content, pedagogy, and technology to further student learning (Mishra & Koehler, 2006), yet inclusion of a Biblical worldview for Christian educators is missing. Discernment and teacher beliefs are important for technology integration, however, research about how to glorify God with technology use as future educators was lacking. There is a need to teach pre-services teachers more than just how to use technology, but how to think of technological practices and choices through a Biblical worldview. This study sought to explore this gap in the research.

Method

The purpose of this mixed-method survey study was to equip future teachers with the knowledge of how to glorify God by selecting and using appropriate technology for teaching. The research would enhance their confidence to incorporate the

technology into instruction and justify its use. Based on research, Ertmer (2005) stated teachers need personal experiences starting with simple technology uses and vicarious experiences by observing others to gain confidence. This study included both as teachers were provided opportunities to explore new technologies individually in addition to watching their peers. Additionally, the importance of ensuring both knowledge of technology and knowledge of effective teaching were included in the courses and common assignments (Kim et al., 2013). These questions and terms were created from a collaborative common interest among the three research institutions as the researchers sought to brainstorm and investigate best practices in teaching with technology. The following research questions were the focus of the study:

1. How do we teach effective technology integration practices to pre-service teachers as stewardship?
2. How do we guide pre-service teachers to model and make wise technology choices in their classrooms?
3. What does it mean to glorify God with technology in the classroom?

Methodology

Throughout the study, several terms listed in Table 1 were utilized and later affirmed by student responses. Defining these terms is vital to understanding the context and purpose of the study as they are included in both the research questions and responses.

Table 1

Key Terms and Definitions

Key Term	Definition	Technology Integration Example
Stewardship	Carefully and responsibly managing something entrusted into one’s care.	Pre-service teachers have the responsibility to learn how and when to use technology tools appropriately in their classrooms and personal lives.
Wisdom	Knowledge applied.	Using appropriate technology tools in a world saturated with options, requires wisdom to select the most timely and appropriate tool.
Glorifying God	Honoring God with thoughts, words, and actions.	All technology use should honor God by pointing others to him rather than away.
Creating	Making something new or different that was previously inconceivable.	Creating something new with technology allows pre-service teachers and their students to engage and teach in new ways, beneficial for all.
Consuming	Passively using something without much thought.	Consuming something implies a passive, thoughtless use of technology.

Additionally, this mixed-method survey study incorporated multiple sources of data based on an online pre- and post-survey administered across all three contexts with common assignments taught across courses within the three contexts between the surveys. In order to examine the similarities and differences across institutions with a direct comparison, each institution taught

similar content and administered common assignments. First, students at each institution were taught using common articles and research. Each institution was required to read and discuss the same articles and all were instructed using the same common research based best practices. The articles and assignments incorporating best practices covered are listed in Table 2.

Table 2

Articles Incorporating Best Practices

Article	Summary
Terada, Y. (2020). <i>A powerful model for understanding good tech integration</i> . Edutopia. Retrieved May 18, 2022, from https://www.edutopia.org/article/powerful-model-understanding-good-tech-integration	SAMR Model- This article provides detailed information about the SAMR Model and how teachers can use Substitution, Augmentation, Modification, and Redefinition to apply best practice of technology integration into their instruction.
Smith, Smith, D. I., & Sevensma, K. (2019). Discernment, technology, and digital citizenship in a Christian school system. <i>International Journal of Christianity & Education</i> , 24(2), 135-152. https://doi.org/10.1177/2056997119868248	Technology Tool Discernment- Selecting and integrating technology as a tool in classrooms requires knowledge and discernment for appropriate and effective integration.
Berkelaar, D. (2018). <i>Christian wisdom on technology use and parenting - in all things</i> . Retrieved May 18, 2022, from https://inallthings.org/christian-wisdom-on-technology-use-and-parenting/	Using Technology to Glorify God- Integrating technology in the classroom in a God-honoring way requires wisdom and proper stewardship.
Bull, B. (2016). <i>Five foundations to exploring technology in Christian education</i> . Retrieved May 18, 2022, from https://news.cph.org/five-foundations-to-exploring-technology-in-christian-education/	

After receiving the same type of instruction based on common research, pre-service teachers across all three institutions also engaged in the same three common assignments. The first assignment

involved creating an activity linking a standard, objective, and an assessment while incorporating technology into the lesson. In addition, after developing a mini-lesson or lesson plan, pre-

service teachers were required to then use the technology incorporated in their lesson to teach it to their peers. The purpose of this assignment was to examine how to effectively integrate technology into a lesson plan and then practically use it while teaching to benefit students. Technology does not always work perfectly and this assignment provided pre-service teachers an experience using technology in a lesson with an audience requiring them to be well-prepared and think on the spot if something did not go as planned.

Another common assignment incorporated the SAMR model (Terada, 2020). Pre-service teachers were required again to integrate technology into a lesson, but also to justify the use of technology at each “level.” Meaning, they had to explain how they would use substitution, augmentation, modification, and redefinition to change the assignment into something else in an effective way. They were first extensively instructed on the SAMR model before having to apply it to their lessons. This assignment challenged pre-service teachers to critically think about how technology can change or even redefine lessons when used and implemented with careful thought and planning.

Finally, after receiving all this instruction and engaging in the two more practical assignments, pre-service teachers were asked to reflect. They were asked the question, “What does it mean to glorify God with technology in your classroom?” and asked to examine what a good steward and teacher of technology would look like to the glory of God. The goal was to challenge students to think more deeply about the way their Biblical worldview impacts their classroom practices and technology integration.

One additional assignment was completed at two out of the three institutions. This assignment was a technology tool investigation assignment. Pre-service teachers investigated different technology tools and presented their findings to the class in a presentation. This way, all pre-service teachers had the opportunity to learn about a wide variety of tools available for different purposes of classroom use.

The surveys included the same questions with the addition of one reflection question on the post-

survey. The online survey provided a mixed-method design with check-all-that-apply, short answer, and Likert scale items. Students were provided time to complete the pre-survey the first week of the course prior to instruction and the common assignments. The first two questions on the survey were selecting from a list of technologies to gain insights into technology use for personal purposes and then for teaching purposes:

- List technologies you have used. (suggested list)
- List technologies you are comfortable using to teach. (suggested list)

The next section included three open ended questions connected to the research questions:

- How do your personal beliefs about technology impact the way you integrate it into your teaching?
- How should Christian teachers use and teach with technology?
- How do we use technology to glorify God?

The last section included three questions to measure low-confidence (1) to high-confidence (4) using a Likert scale related to personal and classroom technology use and justification of technology use:

- How confident are you with technology for personal use?
- How confident are you with technology for classroom use/teaching?
- How confident are you justifying your reason for using a specific technology in your instruction?

The post-survey included one additional question:

- Were there any assignments that had a greater influence on your confidence to teach using technology? If so, which one(s) and why?

The post-survey was administered at the end of each course after instruction and common assignments were completed to track growth and

change in feelings and attitudes toward technology integration as well as which assignments were most impactful. Once the survey data was collected, qualitative data analysis consisted of three concurrent activities: (a) data condensation, (b) data display, and (c) conclusion drawing and verification (Miles et al., 2014). Using the pre- and post-surveys across all three institutions, the researchers looked at the data collectively and coded results together. First, all researchers examined their data looking for common themes on survey responses. The data from these responses were then combined to look for trends and examine differences between the pre and post survey. Similarly, each researcher examined the data on the open-ended questions from their own institution first looking for key words and common themes. After that, key words and common themes were compared across all three institutions to look for overlap.

Results

Response Rates

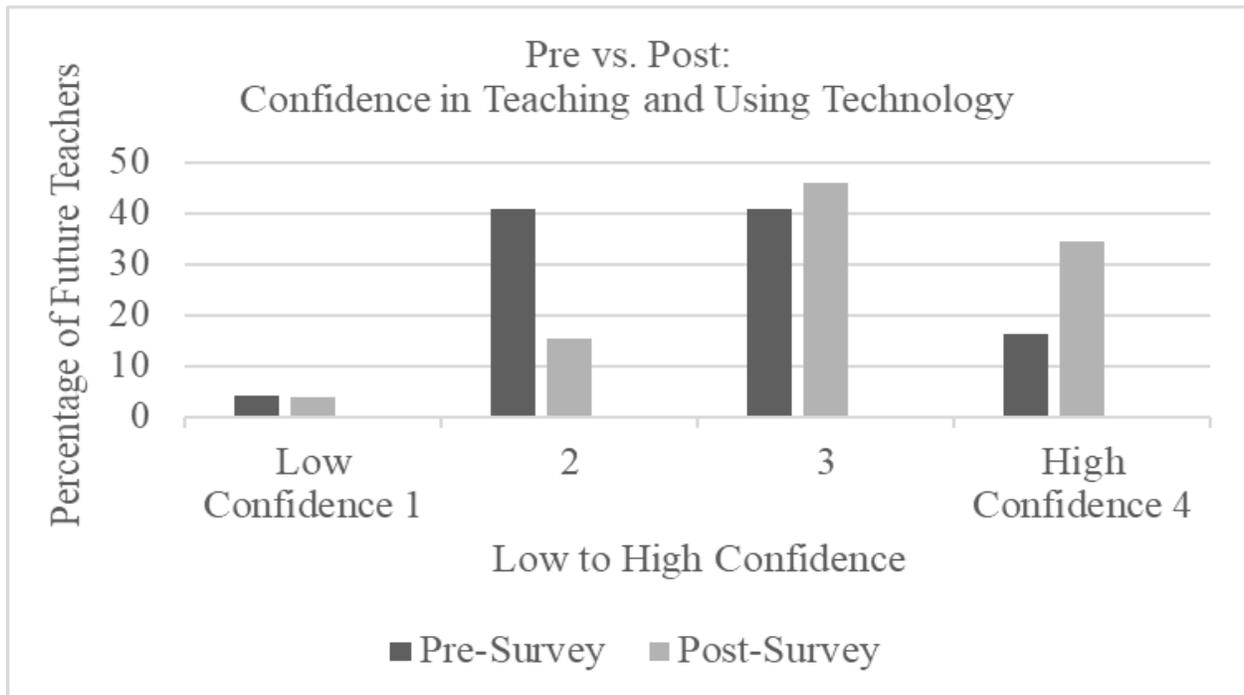
Responses for the pre-survey totaled N =49, and responses for the post-survey totaled N=26. Analysis of both pre- and post-survey responses were analyzed with percentage to allow for comparison of pre- and post-survey data with differing response rates. The percentages were rounded for comparison purposes.

Evaluation Ratings

Evaluation of the pre- and post-survey responses indicated an increase in confidence in teaching and using technology from the pre- and post-survey as indicated in Table 3. Findings indicate that low confidence scores of 1 were 4.08% at the pre-survey and 3.85% at the post-survey. Low Confidence Scores of 2 were 40.81% at the pre-survey and 15.38% at the post-survey. Confidence scores of 3 were 40.81% at the pre-survey and 46.15% at the post-survey. The high confidence Scores of 4 were 16.32% at the pre-survey and 34.61% at the post-survey. Evaluations of the percentages indicate a greater percentage of participants had a high confidence in teaching and using technology on the post-survey.

Table 3

Confidence in Teaching and Using Technology

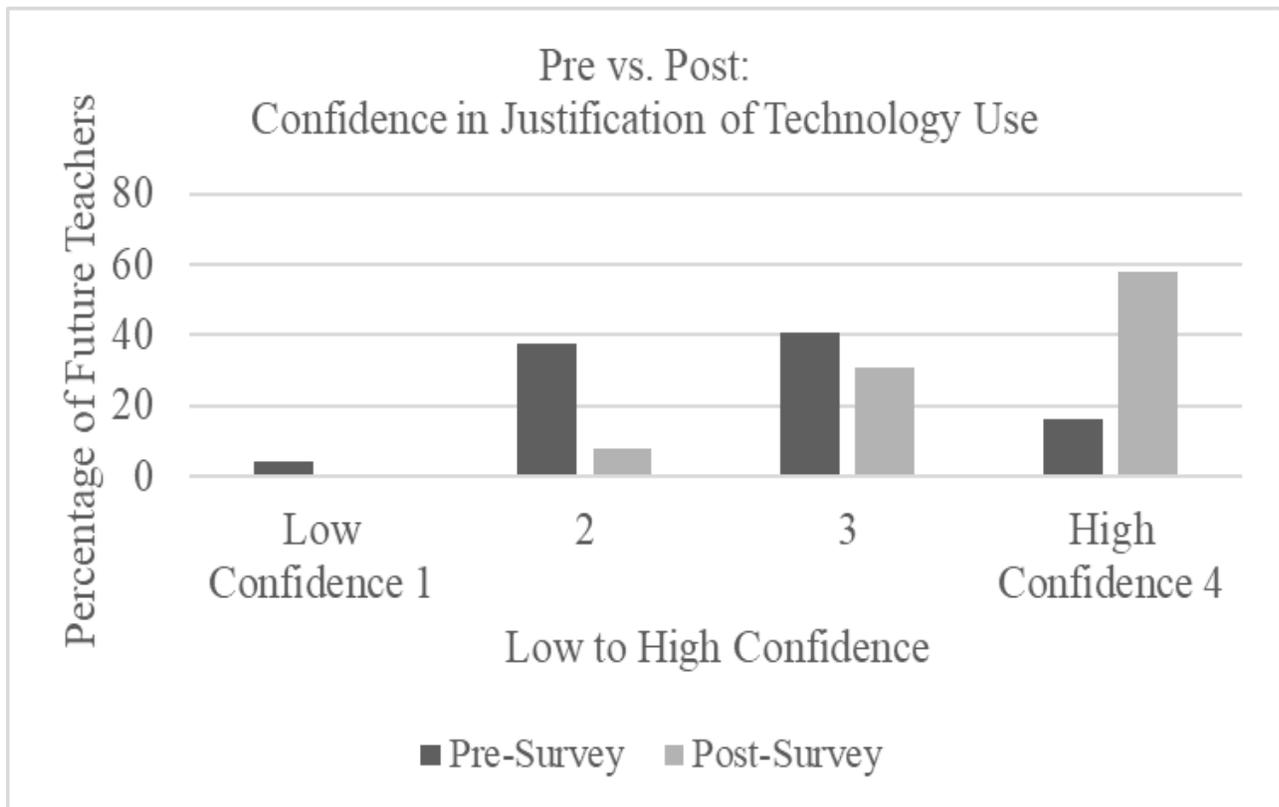


Evaluation of the pre- to post-survey responses indicated an increase in participants' confidence in their ability to justify the use of a technology in teaching from the pre- to post-survey as indicated in Table 4. Findings indicate that Low Confidence Scores of 1 were 4.08% at the pre-survey and 0% at the post-survey. Low Confidence Scores of 2 were 37.74% at the pre-survey and 7.69% at the

post-survey. Confidence Scores of 3 were 40.81% at the pre-survey and 30.77% at the post-survey. The High Confidence Scores of 4 were 16.32% at the pre-survey and 57.7% at the post-survey. Evaluations of the percentages indicate a greater percentage of participants had a high confidence in ability to justify technology use on the post-survey.

Table 4

Confidence in Justification of Technology Use



Analysis of open-ended responses were collected and thematic responses were combined with similar trends. Tables 5, 6, and 7 display the three themes from responses, highlighting the frequency of terms used in open-ended responses. Example quotes are also provided from student responses representing the three institutions.

purpose and plan, care, integrate, wise, enhance, and benefit/beneficial.

The first theme in the data, Table 5, indicated that technology integration must be both responsible and intentional. The keywords in responses that supported technology integration as responsible and intentional were: responsible, intentional,

Table 5

Theme One: Technology Integration as Both Responsible and Intentional

Key Theme	Example quotes	Frequency of terms used in open-ended responses
Technology integration must be responsible and intentional.	<p>“Christian teachers should use technology in the ways it is meant to be used. - appropriately and with benefits.” Institution 1</p> <p>“I believe that technology should be used intentionally in order to enhance the learning experience.” Institution 2</p> <p>“I believe that technology is an important tool for learning and should be integrated with care and thorough planning.” Institution 3</p>	<p>Responsible: 2 Intentional: 3 Purpose/Plan:3 Wise: 4 Enhance: 4 Care: 5 Integrate: 7 Benefit/Beneficial: 8</p>

The second theme in the data, Table 6, indicated teachers need the knowledge and discernment to integrate technology in a God-honoring way as

well as model proper use to students with keywords in responses that included: honor, Bible, love, integrity, pleasing, and glory.

Table 6

Theme Two: Knowledge and Discernment to Integrate Technology in a God-honoring Way

Key Theme	Example quotes	Frequency of terms used in open-ended responses
Teachers need knowledge and discernment to: Integrate technology as a tool in a God-honoring way.	<p>“We should use it to share God's word and share ideas of God. We shouldn't use technology to fight, but it should be used to be a platform to share our faith and to model a Christian lifestyle. The pictures posted, the words spoken, and the actions presented should all be pleasing in God's sight.” Institution 1</p> <p>“As Christian teachers we should use technology with intentionality and careful thought. We need to be aware of what we are surrounding ourselves with through the internet. Are we surrounding ourselves with negativity and things that do not glorify God?” Institution 2</p> <p>“We can use technology to glorify God by being good models for students. Technology gives us the opportunity to reach more students and grow engagement.” Institution 3</p>	<p>Citizen: 2 Positive: 2 Bible: 2 Integrity: 2 Pleasing: 3 Glory: 3 Advance: 3 Share: 3 Honor: 4 Love: 6</p>

The third theme, Table 7, responses indicated that teachers need knowledge and discernment to model proper use for students with keywords in

responses that included: tool, importance/vital, appropriate, think, need, and present/presentation.

Table 7

Theme Three: Knowledge and Discernment to Model Proper use for Students

Key Theme	Example quotes	Frequency of terms used in open-ended responses
Teachers need Knowledge and Discernment to Model Proper Use for Students	<p>“They should use it in a way that reflects the character of Jesus. Meaning, they should use it with care and respect.” Institution 1</p> <p>“I believe that technology is vital in today's day and age and that as a teacher I can help my students to understand how helpful technology is and give them the tools to be successful in the classroom and the world.” Institution 2</p> <p>“Create a framework that is inclusive for all learners in the classroom.” Institution 3</p>	<p>Appropriate: 5 Need: 6 Present/Presentation: 7 Importance/Vital: 10 Think: 11 Tool: 25</p>

Discussion

Results from the survey indicated that there was an increase in the students’ confidence in their ability to teach and use technology from the pre- to post-survey. There were more pre-survey responses than post responses. Data was reported in percentages to reflect the perceived growth. While the Likert scale questions did show growth, the information obtained from the open-ended questions helped to inform the reason for the growth. Overall, the largest theme in the data included the use of “tool” as a keyword. Student responses indicated the individual tech tool assignment was the most interesting and/or beneficial in helping them to learn about tools being used in the field today. It should be noted that only two of the three institutions completed the individual tech tool assignment as a common

assignment. It was discussed by the group initially and determined it may not be possible to fit the assignment into all three courses. However, two institutions added this assignment into their work in addition to the common assignments that all three institutions completed. Interestingly, despite the fact that only two institutions did the individual tech tool assignment, it was mentioned more than any other in response to this question, “Were there any assignments that had a greater influence on your confidence to teach using technology?”

Students also indicated that learning how to use technology, becoming more efficient, and becoming more aware of available technology was beneficial to their confidence. Teaching a lesson using technology was mentioned by approximately one third of post responses. End

survey results indicated that confidence in using technology to enhance learning or accompany standards they have to teach was increased comparative to presurvey percentages.

Results from the pre to post survey indicated that at the conclusion of the survey there were no respondents with a Likert scale confidence of 1. On the presurvey, 16.32% indicated a high confidence of a 4 in justification ability, but at the post survey that percentage increased to 57.7%. The growth in students' perceived confidence to justify why they used a technology showed that on the scale of 1 to 4, 88.47% of students had a confidence of 3 and 4 on the post survey compared to only 57.13% on the presurvey.

Discernment and justification of technology use are imperative in being able to model a Christlike discernment in technology use. More specifically, how can pre-service teachers glorify God with their use of technology in the classroom in such a technology saturated society? Glorifying God can be defined as, "feeling and thinking and acting in ways that reflect God's greatness, that make much of God, that give evidence of the supreme greatness of all His attributes and the all-satisfying beauty of his manifold perfections" (Piper, 2013). Thus, glorifying God denotes feeling, thinking, and action. When surveyed, the pre-service teachers participating in this study across all three institutions, detailed their feelings on technology. Most noted that feelings about technology in the classroom impacted whether or not teachers integrate technology at all. In addition, they felt that technology was "a tool" and should be used wisely. Their feelings impacted their confidence with technology integration. Positive feelings promoted confidence whereas negative feelings discouraged technology integration.

Glorifying God with wise technology use also requires careful thinking. Pre-service teachers must have the knowledge of the technology as well as the knowledge of the why behind the technology they are using to integrate it effectively. There is such a thing as too much technology and there is such a thing as too little. Honoring God means finding the balance to meet the needs of students. It is easy to see a classroom where technology is used for a "break" for the teacher and when it is used with intentionality,

thought, and purpose. Effective use requires careful and deliberate instructional choices in the same way teachers select and learn new curriculum. Technology integration is not one size fits all. It must be researched and selected intentionally to meet the needs of the classroom of students and lesson at hand. When used as a babysitter or entertainer, it ceases to be effective and God-honoring.

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Additionally, honoring God with technology requires action. It is one thing to have the knowledge of many different technology tools for a variety of purposes and another entirely to actually put them into practice. Just as James tells us to be "doers of the Word and not hearers only" (James 1:22), so teachers must act or their knowledge is useless. This is why the researchers focused on first equipping preservice teachers with the knowledge behind technology integration with instruction on the SAMR model and other technology principles, but then challenged the pre-service teachers to put it into practice by applying the SAMR model, putting technology into

practice with lessons, and exploring and sharing technology tools.

In order to honor God with technology, feelings, thoughts, and actions must be filtered through a Philippians 4:8 lens where it says our feelings, thoughts, words and actions should focus on, “whatever is true, whatever is noble, whatever is right, whatever is pure, whatever is lovely, whatever is admirable—if anything is excellent or praiseworthy—think about such things” Thus, a framework for technology stewardship must be developed to help teachers both pre-service and practicing integrate technology for God’s glory. With glorifying God as the central goal, the four components of equipping teachers with the knowledge behind technology tools, justification for technology tool selection, the ability to create new things rather than just passively consume technology and establishing a standard for appropriate and ethical technology use, must be central to this framework. The researchers hope to develop such a framework with ongoing research.

Conclusion

In conclusion, as technology for instructional use continues to evolve, so does the approach to training teachers to integrate technology as well. There is a need to continue to encourage and assist pre-service teachers to continue to learn about the technology tools that are available for their use. As they build their knowledge about the tool, its features, abilities, and uses, their levels of competence and confidence will increase. For Christian educators, this training and learning should occur through the lens of a Biblical worldview. Pre-service teachers must understand their beliefs regarding technology and technology integration in their classrooms in order to use it effectively.

This research approached technology integration from a Biblical worldview where being intentional with justification for choices and creativity over consuming were important. This study sought to answer these research questions:

- How do we teach effective technology integration practices to pre-service teachers as stewardship?

- How do we guide them to make wise choices for their classrooms?
- What does it mean to glorify God with technology in the classroom?
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From this study, three key themes emerged from the survey results related to these questions: confidence in teaching, justification of technology use, and glorifying God with technology.

- Confidence in teaching - study participants showed increased levels of confidence for using technology in their classrooms.
- Justification of technology use - study participants also showed they were able to provide justification, or the reason, for their technology integration choices in their teaching including choosing technology to meet student interests, student needs, and to align with standards.
- Glorifying God with technology - student participants reflected technology as “a tool” should be used wisely and requires careful thinking to be used in ways to glorify God.
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With the goal of equipping teachers to be “in and not of” the world saturated with technology, research will continue on how to provide pre-service teachers with a solid foundation to glorify God with technology in their future classrooms.

Future research will work to craft a framework centered on stewardship, wisdom, and glorifying God using knowledge gained from this study. This framework will include glorifying God as the central goal with four additional components including: equipping teachers with the knowledge to use technology tools, justification for technology tool selection, the ability to create new things rather than just passively consume technology, and establishing a standard for appropriate, equal, and ethical technology use.

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The researchers hope to develop such a framework with ongoing research and practical application to our own teaching practices.

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