

Teacher Readiness for Implementation of Daily Flipped Classroom Technology Instruction

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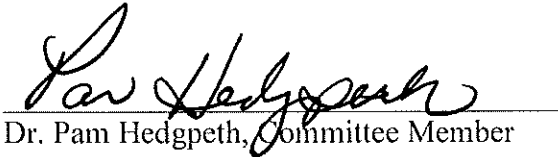
The undersigned, approved by the Department Chair of Graduate Studies in Education, have examined a dissertation entitled:

TEACHER READINESS FOR IMPLEMENTATION OF DAILY FLIPPED CLASSROOM
TECHNOLOGY INSTRUCTION

Presented by Philip Link a candidate for the degree of Doctor of Education and hereby certify that in their opinion it is worthy of acceptance.



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Table of Contents

Acknowledgments	i
Table of Contents.....	ii
List of Tables.....	v
Abstract.....	vi
Chapter One.....	1
Introduction.....	1
Problem Statement.....	1
Theoretical Framework.....	2
Purpose of the Study.....	4
Research Question.....	4
Null Hypothesis.....	4
Limitations.....	5
Delimitations.....	5
Definitions of Terms.....	5
Summary.....	6
Chapter Two.....	7
Introduction.....	7
History of the Flipped Classroom.....	9
21 st Century Skills.....	13
Elements to consider with Technology Integration.....	16
Mobility.....	16
Problem Based Learning.....	17
Inquiry Learning.....	23

Motivating Learners.....	24
Communication and Collaboration for Learning.....	26
Multimedia Rich Learning.....	27
Learning Opportunities for Diverse Learners.....	28
Globalization of Education.....	30
Active Hands on Learning.....	31
Creative Learning.....	32
Learning New Content with Practice.....	33
Feedback, Support, and Assessment.....	34
Objectives for Learning.....	36
Conclusion of Fourteen Elements.....	36
Effective Flipped Classrooms.....	37
Pillars of Flipped Learning.....	39
Challenges of the Flipped Classroom.....	41
Teacher Efficacy in Technology.....	43
Professional Development.....	45
Context Standard.....	46
Process Standard.....	46
Content Standard.....	47
Effective Professional Development for Technology Integration.....	47
Summary.....	50
Chapter Three.....	52
Introduction.....	52
Participants.....	52
Sampling Procedure.....	53

Research Setting.....	54
Research Design.....	54
Instrumentation.....	55
Data Treatment.....	57
Summary.....	58
Chapter Four.....	60
Introduction.....	60
Results (Tables).....	61
Deductive Conclusions.....	71
Research Questions.....	71
Null Hypotheses.....	74
Summary.....	76
Chapter Five.....	77
Introduction.....	77
Conclusions.....	77
Recommendations.....	79
Educator Practice.....	81
Appendix.....	82
Integration of Technology into the Classroom Survey (ITCS).....	82
School Districts in the Southwest Missouri Regional Professional Development Cohort (SWMORPDC).....	86
Letter of permission to use ITCS.....	87
References.....	88

List of Tables

Table 1: Demographic responses to Questions 1 through 4	61
Table 2: Survey Question 5: Before today I have not heard of a flipped classroom.....	62
Table 3: Survey Questions 6-22 indicating Knowledge and Confidence in Technology usage Descriptive Statistics	62
Table 4: Survey Question 23 Respondents' perception of their proficiency with technology in their classroom	64
Table 5: Survey Question 24 Respondents' usage of technology in their classroom	65
Table 6: Survey Question 25 What has enabled you to be successful in integrating technology into your classroom?	66
Table 7: Survey Question 26 Describe your level of confidence in your ability to implement a Flipped Classroom lesson.....	66
Table 8: Survey Question 27: Describe the professional development training you have received that has supported your integration of technology, including Flipped Classroom.....	67
Table 9: Survey Question 29: Describe the types of professional development that you have received in regard to technology implementation in your classroom, especially PD centered on the flipped classroom model.....	68
Table 10: Survey Question 30: Describe the reason(s) why you have either chosen to or not chosen to implement the flipped classroom model into your classroom.....	68

Abstract

Teachers in the Southwest Missouri Regional Professional Development group were surveyed to determine if knowledge and confidence were inhibitors to their implementation of the flipped classroom model as prior research had indicated (Jeffreys, 2000, Gibson, 2003, Johnson, 2009). Results indicated that a lack of knowledge or confidence did not influence a teacher's decision to implement the flipped classroom model. Respondents stated student access to technology as a major inhibitor to implementation of the flipped classroom model. One area for future study includes identifying which in-class activities and instructional strategies support the flipped classroom model.

CHAPTER ONE

INTRODUCTION

Introduction

Teachers and administrators have an abundance of programs, interventions and technology presented to them all stating to be the best and help student achievement. Schools across Missouri have started to use multiple programs like Professional Learning Communities, Response to Intervention, Positive Behavior Interventions & Support, and in terms of technology going 1:1 while using flipped classrooms to enhance student achievement. A 2014 report from Future Source Consulting found that globally, \$13 billion, in US dollars, was spent on education technology in 2013 (Messenger, 2014), an increase of 11 percent over the previous year. Messenger forecasts in the report there will be an eight percent increase per year, until 2018 in the global amount spent on education technology (2014). With the presence of technology increasing in the world the need for schools to adapt and prepare students becomes more important. This study will attempt to gauge teacher readiness for the implementation of flipped classrooms into daily instruction.

Problem Statement

Flipped classrooms is one technological approach to the teaching and learning process exhibiting promise for increased student engagement that may not be implemented by educators because of a lack of knowledge and confidence in their technological abilities.

Jeffreys (2000) looked at effective integration of technology into both curriculum and teaching. He found teachers were unable to integrate technology effectively. Despite the ineffective integration by teachers, Gibson (2004) identifies technology as an essential component in the classroom for both the student and teacher. Johnson supports Gibson (2004) by stating, “in a society where jobs and education are increasingly dependent upon technology,

students and teachers need to experience technology usage in the classroom” (2009, p 3). Gibson confirmed that despite the importance of technology in the classroom, teachers are still struggling to implement because of their own preparedness (2004).

As Jeffreys, Gibson and Johnson have pointed out technology implementation is difficult, especially if teachers lack the knowledge and confidence to implement technology into their curriculum and instruction. Flipped classrooms may not be implemented currently because of the same reason Jeffreys found in 2000, teachers are still unable to integrate technology into the classroom and based on Gibson who found that teachers struggle because of their own preparedness (2004). The purpose of this study is to determine if the problems stated by both Jeffreys (2000) and Gibson (2004) are impeding the implementation of the flipped classroom model of the teaching process.

Theoretical Framework

The theoretical frameworks for this study are constructivism and efficacy. Constructivism is built around the idea of growth and that educational institutions should be organizations that produce growth (Lambert et al., 2002). Huitt clarifies that constructivism, as it relates to the individual learner, must build new knowledge and skills then apply or contribute those back to their community (2003). This idea of applying and contributing back the community is supported in the work of Lambert et al as they point out strength through constructivism is multiplied when everyone is working together (2002). Shinga’s dissertation (2008) sums it up best in that the “...contemporary constructivist theory of learning acknowledges that individuals are active agents, they engage in their own knowledge construction by integrating new information into their schema, and by associating and representing it into meaningful way” (p 25).

Self-efficacy is the “influence how people feel, think, motivate themselves, and behave” (Bandura, 1993 p.118). In a later work, Bandura also pointed out that perceived self-efficacy is the belief in one’s own ability to perform a task at a prescribed level (1997). As it pertains to technology in the classroom, Wozney, Venkatesh, and Abrami (2006) found one of the greatest predictors of whether a teacher will use technology in the classroom or not is their confidence in their own ability to achieve the daily instructional goals.

Parents, teachers and administrators typically want what is best for students in regards to education. School Districts demonstrate this by sending teachers to conferences, which showcase current trends to raise student’s cognitive engagement. Teacher organizational groups like Missouri State Teachers Association, MSTA, and National Association of Secondary School Principals, NASSP, host events for their members to get together to learn more about their role in education. While it is foundational for students to be engaged before learning can take place (Gagne, 1985), it should be the job of the teacher to meet the students and utilize methods that are current and relevant to the students’ lives. Gibson’s work (2004) supports this as he believes technology is a necessary component for not just the students but the teacher as well.

Resources like the Internet, twitter, and digital databases can provide teachers and school leaders with tools and research to help them support their students in their quest for academic achievement. With an internet connection and a little time a school leader or teacher can access the research strategies of Hattie (2012) or how technology is shifting in education (Holland & Holland, 2014).

In an effort to better prepare future students, technology must be utilized but before it can be utilized teachers must be ready/willing to adapt. The best way to gauge teacher readiness, before investing financial resources into a device and infrastructure, is to determine what

teachers know (Gibson, 2004) and how confident teachers are in applying their knowledge in the classroom (Jeffreys, 2000).

Purpose of the Study

The research of Jeffreys (2000), Gibson (2004), and Johnson (2009) point to a lack of teacher knowledge and efficacy when it comes to implementing technology into the classroom. This purpose of this study is to first identify what teachers know and do not know about flipped classrooms. Additionally the researcher would like to identify if efficacy is an inhibitor to teachers implementing flipped classrooms. The data collected from the survey will be shared with school districts in southwest Missouri who have teachers who use flipped classrooms or are planning on implementing flipped classrooms in their school. The data will hopefully be used as a guide to help identify what professional development teachers may need to help improve the effectiveness of the implementation.

Research Questions

RQ₁ What do teachers know about the use of technology?

RQ₂ What do teachers know about the flipped classroom model?

RQ₃ How confident are teachers about their ability to use technology?

RQ₄ How confident are teachers about utilizing the flipped classroom model?

Null Hypothesis

H₁ Teachers indicating prior knowledge of the flipped classroom model will not have more technology knowledge than teachers indicating they had no prior knowledge of the flipped classroom model.

H₂ Teachers indicating prior knowledge of the flipped classroom model will not have used the flipped classroom more than teachers indicating they had no prior knowledge of the flipped classroom model.

H₃ Teachers with prior knowledge of the flipped classroom model will not have more confidence in their ability to utilize a flipped classroom model than teachers without prior knowledge of the flipped classroom model.

Limitations

The researcher was limited by the cooperation of the superintendent and/or the person designated to distribute the survey to the appropriate personnel. The researcher was also limited to the cooperation of the teachers to complete the survey and return the survey. The researcher relied on the integrity of the participant for the accuracy of the data. The researcher must assume the participant was interested enough to return the survey and would therefore be as accurate as possible.

Delimitations

The study was delimited to public schools in Southwest Missouri who are part of the Southwest regional professional development group. Southwest Missouri's Regional Professional Development group comprised of 80 public schools (Appendix). K-8 Districts who are part of the SWMRPDC were omitted as the flipped classroom model is traditionally used in Middle School (6-8 grades) and High School (9-12 grades) classrooms.

Definition of terms

- *Flipped classroom* – student's pre learn lecture-based material at home through watching short video clips before returning to school the next day (Tucker, 2012).

- *Flipped learning* – a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter (FLN, 2014).

Summary

Chapter one provides the basis for identifying if teachers are or are not using flipped classrooms and if not, is teacher confidence and knowledge a barrier for implementation. The two main research questions in this study focus on first, identifying what teachers know and do not know about flipped classrooms. The second main research question focuses on teacher efficacy by looking at the confidence level in regards to technology use and implantation in the classroom. The major limitation to this study is the District's Superintendent or designee's ability to pass on the survey hyperlink to their 6th – 12th grade certified staff that teach in Southwest Missouri and are part of the Southwest Missouri Regional Professional Development cohort.

CHAPTER TWO

LITERATURE REVIEW

Introduction

Technology has impacted traditional education. “With so much new knowledge being created, content no longer matters; that ways of knowing information are now more important than information itself” (Rotherham & Willingham, 2009). Out of that premise formed the 21st Century Skills. The mission of the Partnership for 21st Century Learning states; “Learning takes place throughout life in many places and spaces. From birth through their careers, learners need a broad range of experiences that develop their skills, dispositions and abilities to succeed. A strong foundation for success is rooted in learning that happens in and out of school” (Partnership for 21st Century Learning, 2015).

Through their mission, the Partnership for 21st Century Learning (P21) brings together collaboration between education, businesses, community leaders and government. Working with these stakeholders, P21 has developed a framework of student outcomes and support systems. The support systems include learning environments, professional development, curriculum and instruction, and standards and assessments (Partnership for 21st Century Learning, 2015). The student outcomes include mastery of the core subjects such as reading, writing, and arithmetic. Building on that foundation, additional outcomes include, life and career skills, learning and innovation skills defined as critical thinking, communication, collaboration and creativity. The last of the student outcomes includes information, media, and technology skills (Partnership for 21st Century Learning, 2015).

The three main components of 21st Century Skills include what is referred to as the three C’s (Partnership for 21st Century Learning, 2015). Those skills are creative thinking, critical

thinking, and collaboration. The goal of the three C's, is on generating a learner who has critical thinking skills, the ability to collaborate and can think creatively. This approach contradicts the current Educational System in America, which is stuck between accountability to patrons and legislators therefore adopting a content specific approach. As part of the accountability, states have and continue to develop standardized assessments to go along with standards. The current school structure was established by The Committee of Ten in 1892 and focused on a liberal arts education (Mirel, 2006). "Ever since then we have been fighting about whether our high schools should be college prep for the masses or a cafeteria style curriculum... (Mirel p. 14). The emergence of technology and access to basic knowledge through web-search engines such as Google (Bonk, 2009) has forced educators to re-evaluate their curriculum and how to teach.

Technology is impacting education (Schwann and McGarvey, 2001). One result of technology integration into education is the concept of a flipped classroom. Flipped classrooms developed out of the need for students to "review and reinforce classroom lessons" (Tucker, 2012) at home. While there are several advantages to a flipped classroom there are things that must be considered before implementing this strategy such as, mobility, educational strategies, motivation of students, collaboration, feedback and learning objectives. Through the implementation of a flipped classroom a teacher can guide their students to what has been termed as flipped learning. Flipped learning is essentially learning at higher cognitive levels as a result of a flipped classroom. Challenges to the flipped classroom are plentiful as access for students at home to the Internet, motivation of students and accessibility of meaningful content (Herried and Schiller, 2014).

Before purchasing devices and handing them out to the students and teachers careful consideration must be given to the confidence and technological knowledge of the teachers.

Professional development should be designed and centered on where the teachers currently are in their understanding and where they need to be for the technology implementation. Through purposeful planning and tactical professional development teachers should gain the level of confidence and knowledge to successfully implement technology (Chikasanda et al, 2013) into their lessons at the appropriate level (Puentedura, 2006).

History of the Flipped Classroom

The recent trends in public education have focused on the implementation of technology. In the past decade the emergence of affordable technology has provided many districts with the opportunity to provide each student with a device. This use of technology is called one-to-one or stated as a ratio 1:1. Research done by Fulton (2012) shows that just providing technology to students will not raise their achievement levels as defined by norm referenced tests. Instead, according to Baker (2000) it is the teacher's ability to provide instruction in a new way, such as the flipped classroom concept, that impacts student learning in a positive way. The key to this effective style of instruction is the practice that is monitored and verified by the teacher.

Charles Schwann and Beatrice McGarvey (2001) explored how the use of technology can change the way the youth of America are educated. Schwann and McGarvey (2001) noted technology in each of our lives is customized to our needs and wants. Schwann and McGarvey (2001) noted the website Amazon.com as an example of how technology impacts lives. They referenced how when a book is purchased from Amazon.com an auto prompt is displayed with books the customer may like based on their recent purchases.

Through their book, Schwann and McGarvey (2001) note the idea of customization is applied to education through technology. Customizing education provides each student with an individualized plan for education and seems to push education back to the one room

schoolhouse. Flipped Classrooms provide teachers with a resource that can be utilized to customize education for each child in their class.

Flipped classrooms take advantage of the opportunity that students are engaged in the content on their digital devices and have the ability to access new content customized to their own time constraints. Flipped classrooms afford the students the ability to customize how many times they play a video demonstration, access to various sources, and the ability to express their learning (Tucker, 2012, p. 82).

The idea for a flipped classroom came from two high school chemistry teachers who were frustrated by students falling behind due to absences. Through an investment in recording software the teachers began to record their lessons and share them with the absent students. Surprisingly, the students who were present also appreciated the opportunity to “review and reinforce classroom lessons” taught by viewing the content at home (Tucker, 2012, p 82). These two chemistry teachers, Bergmann and Sams, called their concept the flipped classroom and defined “instruction that used to occur in class is now accessed at home, in advance of class. Class becomes the place to work through problems, advanced concepts, and engage in collaborative learning” (p. 82).

As this phenomenon caught on and the potential for student learning outside the classroom was realized, the format of a flipped classroom began to change into what Horn (2013) describes, as “a form of blended learning in which students learn online at least part while attending a brick-and-mortar school” (p. 78). Horn continues to define a flipped classroom as “time in the classroom, previously reserved for teacher instruction, and is spent on what we used to call homework, with teacher assistance as needed” (p. 78). As the concept expanded it required students to watch videos at home after a day of instruction, and eventually the flipped

classroom evolved to the expectation of requiring students to spend time at home watching a video related to the selected content and working through notes or completing a problem before returning to school the next day (Tucker, 2012). The next day of school should result in the students having the necessary background knowledge or know exactly where and why they are struggling. This allows the teacher to better gauge student understanding and result in students being grouped based on their mastery of the content. Through the use of grouping, the teacher has a better opportunity of targeting the specific gaps in student content mastery. Once the gaps close the teacher can move on to the application of the content for true student learning. Baker's research supports this type of pedagogy. He found using the flipped classroom in his college courses allowed students the opportunity to preview the notes ahead of class time led to richer group discussions and activities which resulted in higher levels of critical thinking (2000).

As the idea of the flipped classroom spread, a key question needed to be addressed; "What is the best use of face-to-face class time?" (Bergmann and Sams, 2014). While educators indirectly consider face-to-face instruction during lesson planning, flipped classroom instruction directly forces teachers to consider their use of face-to-face time. Bergmann and Sams (2014) note the legitimacy of such a profound question in that face-to-face time is limited and valuable for both parties. Bergmann and Sams (2014) state "the key is to rethink and reimagine what class time should look like." (p. 30). An example of flipped classrooms applied to the art classroom was provided in the work of Bergmann and Sams. Art teachers created videos documenting the step-by-step process of sculpting, so students could use class time to sculpt. They give a similar illustration that in the corporate world, nuclear plant operators could improve the face-to-face time with trainers by having participants watch video or modules instead of taking time on educating the operators on the dos and don'ts. When the instructor shows up the

new operators, or students, could apply their knowledge through simulators. This would allow the students to see potential problems and have an expert handy to guide them through resolution (Bergmann and Sams, 2014).

Through use of technology in the classroom Ladner, Beagle, Steele and Steele (2004) found four foundational steps that could help an instructor implement a flipped classroom. The first step was the procurement of video resources through either creation or media such as YouTube. These videos or resources would then be provided for students to watch at home in the evenings or before class and result in more time during class leading to more opportunities for practice and deeper levels of cognition. This second step provides students a base level of content knowledge stemming from the resources provided from the night before. Step three allows for deeper levels of cognition and is accomplished by student engagement in discussion groups, labs, and projects. Since a digital pathway has been established, step four allows students to extend the learning beyond the class room and class time by engaging in discussion groups online through a school established forum (Ladner, Beagle, Steele and Steele, 2004).

Since the birth of flipped classrooms the accessibility of technology has increased along with access to the Internet, which has acted as the accelerant to the flipped classroom implementation. Teachers are taking advantage of companies realizing the potential and power of flipped classrooms such as Google. Google Classroom and Google Docs provide a simple platform for teachers to not only share documents and resources with the students but as a way for students to create and share with their instructor. Several add on programs such as rubrics have been implemented into Google Docs making it easier and more manageable for instructors to provide meaningful feedback and for students to self-assess their projects. (Smith and Mader, 2014).

21st Century Skills

In today's society, "jobs and education are increasingly dependent upon technology, students and teachers need to experience technology usage in the classroom" (Johnson, 2009, p 3). Wager suggests that schools should prepare students with the knowledge and skills they will need to collaborate and compete in an interconnected world (2008). The work of Johnson and Wagner point to the important role that technology has in preparing the 21st Century learner. The 21st Century learner must be able to investigate, frame, evaluate and problem solve with a variety of resources (Darling-Hammond, 2010). Flipping the classroom and infusing technology provides teachers the opportunity and classroom time to model the needed skills of the 21st Century learner.

With the increased accessibility of technology as well as access to knowledge via the internet has virtually eliminated the way a student learned and teacher taught in the 20th century (Church, 2010). Out of this paradigm shift came the need for 21st Century Skills. The 21st Century skills were developed Partnership for 21st Century Skills which was funded by the Bill and Melinda Gates Foundation. P21, which it is also known as, has identified five elements that make up the framework for the 21st Century Skills. These five elements should provide students the opportunities to compete, as Wager (2008) supports, on a global scale:

1. Twenty-First Century Standards: Design schools to prepare all students with twenty-first century knowledge.
2. Assessment of the 21st Century Skills: Provide authentic assessment that is applicable to the real world setting.

3. Curriculum and Instruction: Require students to demonstrate achievement of 21st century knowledge and skills-critical thinking, problem solving, communication skills, as well as exhibiting competency on information and technology literacy.
4. Twenty-First Century Professional Development: Organize schools to function as professional learning communities.
5. Learning Environments: Partner with the business community and organizations to help implement the 21st century skills and provide students with the opportunity to work and learn outside the classrooms

(Partnership for 21st Century Skills, 2008b p. 8)

Partnership for 21st Century Skills also generated subject specific frameworks, which identify the skills needed to succeed in an ever-changing global environment. The subjects identified by P21 are Math, Science, English-Language Arts, Geography, History, World Languages, Arts, Government and Civics. P21 also created the following themes:

1. Global awareness-working with and understanding diverse cultures, religions, and lifestyles
2. Financial/Economic literacy-understand the role of the economy in society and use entrepreneurial skills to enhance workplace productivity and career options
3. Civic Literacy-understanding local and global implications of civic decisions and exercising the rights and obligations of citizenship at local, state, national and global levels.
4. Health Literacy-monitoring personal and family health as well as understanding national and international public health and safety issues

5. Environmental Literacy-Demonstrate, understand and take individual/collective action towards addressing environmental challenges

(Partnership for 21st Century Skills, 2008b p. 8)

The common theme of P21 is that students are required to think beyond the classroom and look at how decisions and knowledge are manifested on a global scale, creating deeper and more meaningful learning for the student. This approach lead to the creation of the 21st Century Skills which are identified as:

1. Creativity and Innovation
2. Critical Thinking and Problem Solving
3. Communication and Collaboration
4. Information Literacy
5. Media Literacy
6. Information, Communication and Technology Literacy
7. Flexibility and Adaptability
8. Initiative and Self Directive
9. Social and Cross-Cultural Skills
10. Productivity and Accountability
11. Leadership and Responsibility

(Partnership for 21st Century Skills, 2008b p. 8)

Through the collaborative approach of twenty-six organizations, including businesses and the U.S. Department of Education, The Partnership for 21st Century Skills has become a leading educational group, advocating the implementation of the 21st Century Skills into State's educational curriculum (Johnson, 2009). Through the use of the flipped classroom model

teachers can utilize the class time to model and connect students through using the 21st Century skills. To effectively connect students, teachers must consider several elements when it comes to technology integration.

Elements to consider with Technology Integration

While Flipped Learning via flipped classrooms noted as a current best practice in the research performed by Janet and John Holland (Holland & Holland 2014). Holland and Holland established a list of 14 elements that today's teachers should consider. Each of them can be implemented with the use of technology. The fourteen will be discussed in the following paragraphs.

Mobility.

Holland and Holland (2014) identified that mobility has been at the forefront of the technological push and is essential for successfully integrating technology within a classroom, including the flipped classroom strategy. More and more people are using smartphones and wireless tablets that allow them access to digital content wherever they may be.

Telecommunications companies are helping to push the idea of mobility with commercials that center on how fast their networks are (3G, 4G, LTE, and XLTE), data and cell coverage across the nation, and reliability. Companies like Apple have worked with programmers to develop applications or apps that allow customers to increase workflow, productivity or spend their leisure time on. On January 7th 2014, Apple announced through a press release that, “customers spent over \$10 Billion on the App Store in 2013, including \$1 Billion in December alone” (Apple, 2014). Just two weeks after that announcement Apple also announced through a press release that they were expanding worldwide access to educational content through iTunes U. Roughly 70 countries now have access to “the world’s largest online catalogue of free

educational content from top schools, leading universities and prominent institutions” (Apple, 2014). More content, available to more people in more places is driving the importance of mobility. Despite the advances in mobility a 2012 report from the Federal Communications Commission found that roughly 19 million Americans lacked access to broadband Internet. A majority of those 19 million were listed as living in rural communities (Duncan, 2013). From this need the Federal Government stepped in to drive the ConnectedED initiative (Whitehouse.gov, 2013). The goal of this initiative is to “connect 99 percent of America’s students to next-generation broadband and high-speed wireless” (Whitehouse.gov) within a five years. The initiative enlists the help of all the major telecommunications companies as well as tech giants, Microsoft and Apple. Aside from just connecting schools to broadband Internet a secondary goal is to provide teachers with training and resources. With the commitment from major telecommunications companies in upgrading their infrastructure and access to rural communities, schools across America will have access to broadband Internet. As children and teenagers become more dependent on technology for learning and every day tasks (Kaiser Family Foundation, 2010) the importance of mobility will only increase as will its impact on education.

Access to the Internet, apps, and technology resources is vital to the success of a flipped classroom as students must be able to access those resources away from the school building. The mobility push from the major telecommunications companies has provided teachers the ability to integrate the flipped classroom model.

Problem-Based Learning.

Holland and Holland (2014) identified Problem-Based Learning as one of the fourteen elements for successfully integrating technology within a classroom, including the flipped

classroom strategy. Problem-Based Learning originated in the 1970's at McMaster University's Medical School (Savery, 2006). A Stanford University newsletter that is sent to all faculty best describes Problem-Based Learning in a 2011 article titled quite simply, Problem-Based Learning (PBL) as "students work with classmates to solve complex and authentic problems that help develop content knowledge as well as problem-solving reasoning, communication and self-assessment skills" (Problem Based Learning, 2011). Walsh identifies four foundational steps to PBL; determining prior knowledge and what must be learned, identify potential resources, report learning, and assessing progress (2005). With the help of technology and online resources, teachers have taken and adapted PBL into their classrooms. For example students in an 8th grade English classroom could be presented a scenario where a teen enters an online chat room, starts discussing personal things with others online. Students then brainstorm how the information given out might impact the teen. Students then create a multimedia project to share with fellow students, parents and community members about how to surf the Internet safely. A Problem-Based Learning project such as this ties in English objectives such as hypothesizing, making judgments, and generating complex/abstract summaries. Also, this PBL activity ties in several 21st Century Skills (information and communication of skills, thinking and reasoning skills, and personal/workplace skills) as well as strategies that lead that maximize the impact on student learning as listed by Hattie (Hattie, 2012). To help with implementation of PBL, Larmer and Mergendoller suggest the following essentials to ensure busy work isn't occurring; a need to know, a driving question, student voice and choice, 21st Century skills, inquiry and innovation, feedback and revision, and finally, a publically presented product (Larmer and Mergendoller, 2010). Student's publicly presented products could be enhanced with the access to technology such as presentation platforms and video editing software. In their work, Dolmans et al,

highlighted by Dianna Wood, outline some effective Problem-Based Learning scenarios. Several of the scenarios required students to gather initial information. This is something teachers can guide students through with implementation of a flipped classroom or access to a learning management system.

The first of the seven effective Problem-Based Learning scenarios is that learning objectives are likely to be defined by the student after studying the scenario should be consistent with the faculty learning objectives. Secondly, she points out that the problems, that are the foundation for the Problem-Based Learning should be appropriate to not only the curriculum being taught but to the appropriate level of the students' understanding. The third effective Problem-Based Learning scenario is that each scenario should have ample intrinsic interest for the students as well as relevance to their future learning or practice. Fourth, the basic science presented in the Problem-Based Learning scenario should be presented in the context of a clinical scenario to encourage the student to integrate their prior knowledge. The fifth way to ensure effective Problem-Based Learning scenarios, according to Wood, is that the scenarios should contain issues to stimulate discussion as well as encourage the students to seek explanations for the issues or problems that are presented. The sixth component to an effective Problem-Based Learning scenario that Wood identifies is that the problem should be open, in that it is not concise. Wood points out that if the problem is open it will keep the discussion from curtailing too early in the process (p 329). The last component to an effective Problem-Based Learning scenario, as described by Wood, is that each scenario should promote the students to seek information from various resources (Wood, p 329). Through the use of technology teachers can provide students with many resources.

Through these scenarios students are able to demonstrate the following generic skills and attitudes: teamwork, chairing a group, listening, recording, cooperation, respect for colleagues' views, critical evaluation of literature, self-directed learning and use of resources and finally presentation skills (Wood, 2003). These scenarios help highlight some of the advantages Jones identified when teachers used Project Based Learning effectively.

The first advantage of Project Based Learning, as identified by Jones is that Project Based Learning makes curriculum content relevant by building learning around clinical, community or scientific problems. The second advantage that Jones points out is that Project Based Learning helps to focus the learning on the core information, which is relevant to real scenarios. As a result, which Jones points out, is that information overload is reduced (p 486). The third advantage of Project Based learning is that it fosters a development of skills that are useful not only today, but as the learner continues to develop. The skills that are developed include, leadership, teamwork, communication and problem solving. Jones identifies facilitating trainees to become responsible for their own learning as the fourth advantage of Project Based Learning. Jones further points out that being responsible for your own learning are crucial in the medical field as specialists are engaged in continual professional development throughout their professional lives. Flipped classrooms can help prepare students for personal responsibility for their learning, as the students are responsible for logging in and previewing the content in a flipped classroom. The fifth advantage of Project Based Learning is that the learners' motivation is increased as they see relevance since the learning occurs through projects, which are based on real-life scenarios. The sixth advantage that Jones points out is that Project Based Learning focuses on depth of learning as opposed to a surface level approach as trainees interact with information and multiple levels as opposed to traditional teaching approaches which focus on

facts. The seventh and final advantage that Jones notes, Project Based Learning uses a constructional approach in that the trainees build their new knowledge from and around their prior knowledge and understanding (Jones, p 486).

While there are many benefits of utilizing flipped classrooms with Problem-Based Learning, there are a few disadvantages highlighted by Weimer (2009). In her work, she identifies five major disadvantages of Problem-Based learning. The first disadvantage of Problem-Based Learning is that students aren't prepared for it in that their prior knowledge and education does not prepare them for the tasks in Problem-Based Learning. The second disadvantage of Problem-Based Learning is that it time intensive for the students. It requires a lot of time to not only research the problems but come up with solutions. This time can distract them from their other subjects. The third disadvantage of Problem-Based Learning that Weimer notes is that it creates higher levels of anxiety for the students since the learning isn't traditional. Weimer calls this messier learning. In this method of learning students can not look up answers in a book and must draw conclusions based off of research and data. This leads to the fourth disadvantage of Problem-Based Learning, which Weimer identifies as, group dynamics issues. Since students are required to work in groups with Problem-Based Learning group dynamics issues may arise which compromise how effective Problem-Based Learning can be. The final disadvantage of Problem Based Learning that Weimer addresses is that less content knowledge may be learned since students are focusing on a solution to the problem instead of the content knowledge learned through the process (Weimer, 2009).

One additional disadvantage, observed by Long and Qin, was the lack of qualified Problem-Based Learning instructors (Long & Qin, 2014). Jones points out that "no single education strategy is perfect for all educational situations" (p. 486). She, like Wood, points out

disadvantages to PBL but adds five additional factors. First, trainees struggle to emulate teachers as role models because the teacher no longer is the disseminator of knowledge but a facilitator. This leads to the second factor, which is the faculty or training staff may consider the process inefficient or demotivating since teachers are not required to directly impart their knowledge with this model. The third factor is that the knowledge gained through this model is less organized than traditional, direct instruction. Long and Qin (2014), identify the fourth factor as being the difficulty that is faced with training individuals. The final factor is time. It takes considerable amount of time to educate teachers or trainers how to use the model effectively. Therefore teachers who are qualified to teach this model are scarce (Long & Qin, p. 486-487).

Problem-Based Learning and Project Based Learning can be interpreted as the same since their acronyms are exactly the same, PBL. However, Larmer (2013) points out that there are some differences as well as similarities between Project Based Learning and Problem-Based Learning. Larmer first points out that both Project Based Learning and Problem-Based Learning focus on open-ended tasks. The second similarity between Project Based Learning and Problem-Based Learning that Larmer identifies is that both provide authentic applications of content and skills. He goes on to point out that both approaches build 21st Century Skills as well as the 4 C's Competencies. In a separate work, Larmer notes the 4 C's as Critical thinking, Collaboration, Communication and Creativity (Larmer, 2013). Students' access to technology can help as they work to communicate with each other and the teacher. The third similarity between Project Based Learning and Problem-Based Learning, as identified by Larmer is that both emphasize student independence or less reliance on the teacher, as well as inquiry learning. Flipped classrooms help support this similarity as student independence is emphasized for acquiring the base level knowledge. The final similarity that Larmer notes is that both require a significant

time requirement as they tend to be multistep verses traditional lessons which culminate with a daily activity (2014).

In his work, Larmer also identifies several differences between Project Based Learning and Problem-Based Learning. The first difference is that Project Based Learning tends to involve several disciplines in one project where Problem-Based Learning tends to focus the problem within one specific discipline. A second difference between the two is that Project Based Learning, since it covers multiple disciplines, can last up to several months. However, Problem-Based Learning can be lengthy, as Larmer points out, most tend to be shorter than a few weeks. The third difference identified by Larmer is that Problem-Based Learning follows specific, traditionally prescribed steps where Project Based Learning follows general, variously named steps. The fourth difference between Project Based Learning and Problem-Based Learning is that Project Based Learning requires that either a performance or product is created as the culminating activity. In Problem-Based Learning the ending product could be as simple as a student proposal, which could be in writing or an oral presentation, which identifies a possible solution to the problem. The final difference that Larmer points out between Project Based Learning and Problem-Based Learning is that Project Based Learning tends to involve real-world or authentic tasks or settings, which cover multiple disciplines. In Problem-Based Learning case studies or fictitious scenarios are used as the problem (2014).

Inquiry Learning.

Holland and Holland (2014) identified Inquiry learning as one of the fourteen elements for successfully integrating technology within a classroom, including the flipped classroom strategy. While similar to Problem-Based Learning, Inquiry Learning has one major difference and Neil Stephenson describes it well on the webpage titled, Introduction to Inquiry Based

Learning (n.d.). “Inquiry is not merely having students do projects but rather strives to nurture deep, discipline-based way of thinking and doing with students” (Stephenson, n.d.) Inquiry learning is not a technique to teach subject matter, however it is a way to get students to a deeper understanding of thinking and learning. Flipped classrooms provide teachers the class time to bring students to these deeper levels of learning through questioning, research, collaboration, and taking on real-world questions/issues. (National Research Council, 2000). Hattie identifies Inquiry Learning as a viable teaching strategy (Hattie 2012). Through his Meta-analysis he found Inquiry Learning to have a positive impact on student achievement and learning with an effect size of .31, which Cohen (1988) identifies as a moderate impact. Technology can play an important role in inquiry process. Blumenfeld et al. (1991) identified six ways technology can aid in the inquiry learning process: enhancing interest and motivation, providing access to information, allowing active representations, structuring the process with tactical support, diagnosing and correcting errors, and managing complexity while aiding production. In the next section, how technology integration programs such as the Flipped Classroom strategy enhances interest and motivation will be discussed.

Motivating Learners.

Holland and Holland (2014) identified motivating learners as one of the fourteen elements for successfully integrating technology within a classroom, including the flipped classroom strategy. Blumenfeld et al.’s findings in 1991, are further supported by the fact that in the years following their research, 1995-2008, the average number of computers in public schools went from 72 to 189 (Snyder & Dillow, 2012). With greater access to technology teachers now had to find ways to keep learners motivated. Through a synthesis of research on strategies for motivating students Brophy (1987) identified six preconditions that must exist; a

supportive environment, appropriate level of challenge/difficulty, meaningful learning objectives, and moderation/optimal use (Brophy, 1987). Hattie's 2012 research concludes that motivation plays an important role in student achievement as it has an effect size of .48 which Cohen (1988) would state is between a moderate and large impact. In a podcast interview for The Principal Center, Barbara Blackburn states that there are two types of motivation, intrinsic and extrinsic (Baeder & Blackburn, 2015). Blackburn continues to point out that for a student to be intrinsically motivated they must be able to see value and know that success is possible (Baeder & Blackburn, 2015). Extrinsicly, Alfie Kohn states, "Indeed, extrinsic motivators do not alter the emotional or cognitive commitments that underlie behavior- at least not in a desirable direction" (Kohn, para 4).

For a student to be intrinsically motivated, teachers must take an active role in finding out what each student's interests are and tailor the learning or lesson to the individual, thus providing value to the student (Baeder & Blackburn, 2015). Flipped classrooms provide teachers with the class time needed to get to know their students' interests. The quality and nature of motivation are determined once three needs: autonomy, competence, and relatedness are met (Ryan & Deci, 2000). Once the three needs are met internal forms of motivation, intrinsic motivation, is realized. When a student has high levels of intrinsic motivation the ability for them to have higher levels of engagement and learning increase (Ryan & Deci, 2000).

Technology can play a role for increased motivation in students, but it is also important to note these digital natives use technology in almost every facet of their life. In their eyes technology is a tool to help them function throughout the day (Pedro, 2006). Teachers should leverage technology, the tool through flipped classrooms, to build relationships with students,

which should help the students' intrinsic motivation. Building relationships starts with communication.

Communication and collaboration for learning.

Holland and Holland (2014) identified communication and collaboration for learning as one of the fourteen elements for successfully integrating technology within a classroom, including the flipped classroom strategy. There is not a budget big enough provide for all the resources needed to those who need aid (Melton, 2002). Working together and sharing resources is a must. Communication between students and adults, student-to-student, and adult-to-adult all help facilitate an environment where learning is enhanced (Strauss, 2013). When communication is shared collaboration occurs. Technology can play an important role in allowing collaboration to occur between all parties. Adults/teachers use technology to aid in their collaboration over student data. With schools implementing Professional Learning Communities teachers get together to plan lessons, develop common formative assessments, (DuFour, 2004) and implement lessons that integrate the 21st Century Skills.

Teachers are meeting students with technology by incorporating lessons that allow students to congregate and collaborate in digital spaces to create products. Programs such as GoogleDocs allow students to not only create and share documents but, collaborate simultaneously from different computers in different places/environments. Google has built an arsenal of apps that allow students to collaborate on products. With more and more schools adopting technology it can be understood that the number of apps geared to education are only going to increase. With that increase collaboration between teachers, students and in-between students, more meaningful learning opportunities will increase (Smith and Mader, 2014).

Multimedia Rich Learning.

Holland and Holland (2014) identified multimedia rich learning as one of the fourteen elements for successfully integrating technology within a classroom, including the flipped classroom strategy. Multimedia rich learning developed out of Mayer's multimedia model for learning (Pastore and Ritzhaupt, 2015). His theory is broken down into three tenets, dual channels, limited capacity, and knowledge construction. In dual channels, Mayer pointed out that humans have different channels for processing different types of information whether it be visual or auditory (Mayer, 2003). Limited capacity, as its designation suggests, means that humans have a limited ability to process and store information. The third tenet, knowledge construction, suggests that humans are constantly trying to process and connect old knowledge to new knowledge (Mayer 2003). The third tenet, knowledge construction, is foundational piece for Constructivists, who are individuals that support the idea that people are constructing knowledge every second we are awake (Stahl, 2003) and knowledge is always developing (Piaget, 1970). Piaget states that constructivist models are, "a continual construction and reorganization" (Piaget, 1970, p. 2).

A recent study was just conducted in which a graduate psychology class went through an online class that was built around multimedia rich learning or where videos were created or pulled from web resources (Bledsoe and Simmerok, 2014). The software platform was also developed to give the appearance that the students who accessed the online content were in a school. Pictures of the whiteboard were taken and on top of the pictures digital links were inserted. When a student accessed their classroom they saw a whiteboard and were able to click on the digital links for their daily work. These digital links focused on delivering content in the form of videos or media. Upon completion of the study, results were compared to the previous

year when the content was not focused on multimedia. Growth was seen in enjoyment of the course from 65 to 79 percent and difficulty in understanding the content, 19 to 42 percent (Bledsoe and Simmerok, 2014). Providing relevant instructor created multimedia could lead to the same results.

Learning Opportunities for Diverse Learners.

Holland and Holland (2014) identified learning opportunities for diverse learners as one of the fourteen elements for successfully integrating technology within a classroom, including the flipped classroom strategy. The idea of Diverse Learners comes from the work of Howard Gardner who hypothesized that there are seven intelligences. He defined the seven as, visual-spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, linguistic, and logical-mathematical. Through this research teachers have realized that students learn at different rates, through different activities, and in different settings. Rate of learning, activities, and setting come back to the work of Howard Gardner. After an extensive literary review, Zeichner (1992) developed a list of twelve teaching elements that are still effective for diverse populations today.

1. Teachers have a clear sense of their own ethnic and cultural identities.
2. Teachers communicate high expectations for the success of all students and belief that all students can succeed.
3. Teachers are personally committed to achieving equality for all students and believe that they are capable of making a difference in their students' learning.
4. Teachers have developed a bond with their students and cease seeing their students as "the other."
5. Schools provide an academically challenging curriculum that includes attention to the development of higher-level cognitive skills.

6. Instruction focuses on students' creation of meaning about content in an interactive and collaborative learning environment.
7. Teachers help students see learning tasks as meaningful.
8. Curricula include the contributions and perspectives of the different ethnocultural groups that compose the society.
9. Teachers provide "scaffolding" that links the academically challenging curriculum to the cultural resources that students bring to school.
10. Teachers explicitly teach students the culture of the school and seek to maintain students' sense of ethnocultural pride and identity.
11. Community members and parents or guardians are encouraged to become involved in students' education and are given a significant voice in making important school decisions related to programs (such as resources and staffing).
12. Teachers are involved in political struggles outside the classroom that are aimed at achieving a more just and humane society (Zeichner, 1992).

With the emergence of technology, teachers have the ability to differentiate their lessons to meet students who prefer to operate in one of the seven intelligences versus the other. Recently the US Department of Education recognized the importance of meeting the diverse needs of our Diverse Learners in a special section titled "Diverse Learners" from a press release on Public Education (US Department of Education, 2010). As fast as the phrase, diverse learners, transforms to a buzzword, teachers' ability to differentiate their lessons to meet the needs of these students must increase.

Globalization of Education.

Holland and Holland (2014) identified Globalization of Education as one of the fourteen elements for successfully integrating technology within a classroom, including the flipped classroom strategy. As of 2012-2013 there were 819,644 foreign students studying in America (Cohen, 2014), compared to only 283,332 Americans studying abroad (Cohen, 2014).

Technology has aided in the ability for groups of people to meet, communicate and exchange ideas without every person being in the same location. Flipped classrooms provide students the ability to learn from their teacher from the comfort of the student's home or wherever they decide to log-in. Most devices that can be purchased such as, cell phones, tablets, laptops, and desktop computers come equipped with a camera and are internet ready. Through the use of the internet and a camera on the device people can digitally meet face-to-face to communicate and share ideas. If a camera is not accessible then tools such as blogging, tweeting, or chat-rooms can be used. Today's students use technology as part of their lives. If they don't understand how to beat a level on their favorite video game they quickly pull up YouTube or Vimeo and watch a tutorial, which could have been made by a teenager or a younger child. If they are into sports games or first person shooter games they can log onto a server through their gaming device and now have the ability to team up with people around the world. Young teens are gaining access to technology at unprecedented rates.

In 2014 seven countries, Argentina, Columbia, India, Thailand, Turkey, Uruguay, Venezuela reported distributing over 500,000 devices for educational purposes (Molnar, 2015). Through the use of microphones and ear-buds these children/teens are not only digitally interacting with people from around the world but are communicating with them. Whether they

realize it or not their access to technology has made the world a smaller place by bringing people from different places around the world together for a common goal.

Middle school students in the DC will soon have the opportunity to experience globalization in education first hand. A recent initiative for DC public schools provides middle school students the opportunity to travel to a foreign country as part of the career exploration and enrichment offerings (Chandler, 2015). In the classroom students can take advantage of this through project-based/problem based learning as referenced earlier. Through learning activities such as project-based/problem based learning students begin to master the learning and innovation skills, which will help them meet the 21st Century Skill Standards (Partnership for 21st Century Learning, 2015).

Active Hands on Learning.

Holland and Holland (2014) identified Active Hands on Learning as one of the fourteen elements for successfully integrating technology within a classroom, including the flipped classroom strategy. Hands on learning can be restated simply as, learning by doing. Learning by doing lends itself to the Constructivist philosophy of education in that the learner is trying to connect what they're currently learning, new knowledge, with prior known information, old knowledge (Mayer, 2003, Piaget, 1970). With hands on learning, specifically in science, teachers allow students to opportunity to learn through interacting with models. Learning through models also ties in with project-based learning. One example of this in Missouri is Project Lead the Way (PLTW). "PLTW is the nation's leading provider of K-12 STEM programs" (PLTW.org). Students' learn about acceleration and factors that impact acceleration by building models. Through testing their models they learn about friction and the impact of friction on acceleration. Concepts scaffold through the semester culminating with the students building and programing

simple robots. Through the course of the semester students had to come to an understanding of several basic physics concepts. From their basic understandings the students build and construct which lead to higher levels of learning. Through this method of teaching, students demonstrate their learning in a way that can't be measured by a paper a pencil test. Teachers rely on alternative assessments such as demonstrations or performance tasks (Eductopia, 2008).

Passanisi and Peters (2014) point out that technology and hands-on learning are essentially married together. "Making physical things and using the virtual world for augmentation, and as the vehicle for that creation, is a mirror of our own physical realities" (para. 6). Using hands-on learning and technology can lead to the creation of new objects as well as meaningful learning experiences.

Creative Learning.

Holland and Holland (2014) identified Creative Learning as one of the fourteen elements for successfully integrating technology within a classroom, including the flipped classroom strategy. Creation is listed as the highest level of the Revised Bloom's Taxonomy of Learning diagram (Gainesville City Schools). Hattie's research (2012) indicated that creativity programs had an effect size of .65, which Cohen (1988) identifies as a large effect. For a student to create they must have a foundation of the steps before the highest level, creation. Those steps, starting with the most fundamental, include; Remembering, Understanding, Applying, Analyzing, and Evaluating (Gainesville City Schools). Halpren and Hakel found that assignments which contained creative opportunities for the students, allowed for deeper learning and insights (Halpern and Hakel, 2003). Cole, Sugioka, and Yamagata-Lynch support creative learning through their findings that creative assignments improve engagement and promote learning (Cole, Sugioka, and Yamagata-Lynch, 1999). Technology, such as flipped classrooms, enhances

a teacher's ability to get content, at the lower levels, into the students' hands. Having an Internet capable device allows the teacher to direct students to specific websites where content can be read, watched, or interacted with to not only gain an understanding but through the use of multiple sites students can get to a point of analysis of the content. Students can be taught how to evaluate the content for bias or integrity. Through that process students can be brought to a place where they can use their devices, to generate products that show a new view point or are flat out a product created with little guidance from the teacher.

Learning New Content with Practice.

Holland and Holland (2014) identified Learning new content with practice as one of the fourteen elements for successfully integrating technology within a classroom, including the flipped classroom strategy. Alan Iverson made a statement in a press conference that became the center of pop culture during the 2001 NBA season and shed light on a professional basketball player's perspective of practice during his MVP season. His comment was "...We're talking about practice, man. What are we talking about? Practice? We're talking about practice, man" (Gordievsky, 2006). Alan Iverson viewed his team's practice as repetitive and it's clear from his comments that there was very little value. As a professional basketball player who was quick and known for ankle-breaking crossovers, Iverson, did not see the value in practicing the skills he had mastered.

Students can, at times, demonstrate this same attitude towards practice when they don't have the opportunity to engage with new content at nothing more than a level of remember or apply. Teachers can take student's affinity for technology and use that as the foundation to build lessons, which allow the students to engage with new content in various formats. Flipped classrooms provide students the opportunity to practice and learn new content at the student's

own pace. By engaging with content across various formats more opportunities for practice are provided. Since these formats are varied, students are kept from doing the same repetitive actions, hopefully leading to higher levels of learning and engagement through practice. In her dissertation, Lee, gave several examples of how technology assisted in the students ability to learn and apply the skills they had learned in class. One example Lee (2015) cited was from the work of Underwood, Baguley, Banyard, Coyne, Farrington-Flint, and Selwood. In their research they cited an example where several students from various schools practiced their learning by developing digital content, ranging from newsletters to radio programs to short films (Underwood et al., 2007). Just as technology can assist the students through practicing their learning, it also allows teachers the ability to gauge the learning of their students.

Feedback, Support, and Assessment.

Holland and Holland (2014) identified Feedback, Support and Assessment as one of the fourteen elements for successfully integrating technology within a classroom, including the flipped classroom strategy. Assessment is the tool used to determine if learning has occurred. Edutopia states, “assessment is an integral part of instruction, as it determines whether or not the goals of education are being met” (Edutopia, 2008, para 1). Teachers use programs such as Socrative and Kahoot! to not only assess students but support them as teachers and students receive real time feedback on student progress (Ferriter, 2014). Teachers can attach assessments to their flipped classroom assignments as a way to measure which students need additional help and which students are ready for the next level of learning.

Assessments are broken into two distinct categories, Standardized and Alternative or Authentic (Edutopia, 2008). The Glossary of Education Reform defines standardized tests as any test that; “requires all test takers to answer the same questions...in the same way, and that is

scored in a standardized or consistent manner” (Ed Glossary, 2013). While standardized tests are used at the state level to compare schools across the state there are some factors that standardized tests miss as Serravallo points out. Serravallo highlights that there are five things standardized tests cannot tell a teacher, parent or administrator; how a student handles print, the child’s fluency, what will engage a child, the child’s comprehension, and what students can do in collaboration with others (Serravallo, 2014). Alternative or Authentic assessments “are designed so that the content of the assessment matches the content of the instruction” (Edutopia, 2008). Some examples of Alternative or Authentic assessment include performance tasks, exhibitions, demonstrations, rubrics, portfolios and journals (Edutopia, 2008).

More important than assessing is feedback to the student as it helps the student determine what they did master as well as still need help with. Flipped classrooms, through a learning management system, provide teachers the opportunity to provide students with direct feedback or answer any questions the students have, in real-time. Hattie lists feedback as a Top 10 effect on student achievement, garnering a .73 effect size (Hattie, 2012) which Cohen (1988), would state is a large impact. Feedback is not described as simply saying, “Good job! Well Done or similar trite phrases. However, feedback is valuable questions, support, or insight that provoke the learner to reassess their knowledge and lead them to deeper learning.

According to Wiggins there are seven keys that must be present for feedback to be effective; goal referenced, tangible and transparent, actionable, user-friendly, timely, ongoing, and consistent (Wiggins, 2012). Technology has helped improve several of the seven keys of effective feedback, especially the key, timely. While students are working on a project, teachers can utilize software where they can see what is on the student’s computer screen and comment on it in real time, even if the students are working from home through a flipped classroom

model. While this is great, it also requires the teacher to be in front of a screen, thus removing them from moving around the room unless a wireless connection is available.

Objectives for Learning.

Holland and Holland (2014) identified Objectives or Learning as one of the fourteen elements for successfully integrating technology within a classroom, including the flipped classroom strategy. Objectives for learning or simply stated: goal setting, plays an important role in the learning process. Hattie found that in classrooms where objectives or daily goals were posted and students were able to reflect on those objectives their achievement was increased by an effect size of .56 (Hattie, 2012), which Cohen (1988) would identify as a large impact. This indicates students who take time to realize what is expected of them and are able to self-assess if they have reached their goal will be more successful in terms of educational achievement.

These objectives can be shared with the students on the opening page as the students log into their flipped classroom. Students then can turn in evidence that demonstrate their mastery of the objectives as the unit progresses. Teachers can use web-based programs such as GoogleDocs or DropBox as a way to share objectives and conversely for students to share their artifacts demonstrating mastery. When students use these tools to self-assess based on objectives they reach a whole new level, the highest level of achievement on Hattie's list of student achievement. Self-reporting garnered an effect-size of 1.44, the highest (Hattie, 2012). When students can self-assess based on objectives they are engaged in high levels of learning.

Conclusion of the Elements.

Holland and Holland (2014) identified elements that impact education. As stated above, each of the fourteen are impacted, directly or indirectly by the introduction of technology. Technology tools such as flipped classrooms help provide Feedback, Support, and Assessment as

Ferriter (2014) notes in his review of Kahoot!. While others, such as Globalization of Education (Molnar, 2015) and Inquiry Learning (Blumenfeld et al., 1991) are indirectly impacted by the implantation of technology. Holland and Holland's Elements should be in place to assist in a successful flipped classroom.

Meaningful learning experiences are manifested through the flipped classroom in Project Based and Problem Based learning, inquiry based learning, creativity, and practice. Stronger mobility, provided from telecommunications companies, allows teachers to leverage flipped classrooms to motivate, provide timely feedback, assessment, communicate and provides insight into the globalization of education. Flipped classrooms free up class time so teachers can help monitor hands-on learning experiences, and provide diverse learning experiences for diverse learners. Leveraging flipped classrooms as a tool provides teachers and students with an effective way to maximize valuable face-to-face class time.

Effective Flipped Classrooms

Effective flipped classrooms have two key components, “out-of-class instruction, delivered via technology, and the in-class learning experiences” (Merrill, 2015 p. 21). Out-of-class instruction provides students with the basic skills and knowledge while the in-class experience provides the students with the opportunity to extend and solidify new knowledge. Shifting basic instruction to an out-of-class activity allows more class time to be spent on guided practice and in-class activities/practice instead of direct instruction (Casto, 2012).

An additional effective use for flipped classroom video use was uncovered through data collected in a study completed by Kay and Kletschin (2012) on the impacts of video podcasts in a higher education math class. Kay and Kletschin found that through the use of Camtasia, 59 videos were created and posted to the class website focusing on the five key areas of the

undergraduate level calculus class. The five key areas were trigonometric functions, exponential and logarithmic functions, operations with functions, solving equations and linear functions. In three weeks these 59 videos were tracked to determine the number of views and the length of each view. The data collected showed that roughly two-thirds of the students watched the videos frequently (4,500 times) in just 21 days. An exit survey given to the students showed that the teacher created videos were easy to follow and helped them understand the new material.

Teachers may use a multitude of strategies, like those listed earlier by Holland and Holland (2014) to engage and teach their students. Brame (2014) identifies four key elements to consider as teachers develop effective flipped lessons.

1. Provide an opportunity for students to gain first exposure prior to class
2. Provide an incentive for students to prepare for class
3. Provide a mechanism to assess student understanding
4. Provide in-class activities that focus on higher-level cognitive activities

Aside from the two key components of a flipped classroom, out-of-class activities and in-class activities, identified by Merrill (2015), consideration must be given to the learner (Brame, 2015). Students today are becoming the most frequent users of technology (Kaiser Family Foundation, 2010) but technology isn't changing the student's ability to grasp and retain information (Thurlow, Lengel, & Tomic, 2004, p. 42). Foundations and advocacy groups such as The Partnership for 21st Century Skills developed a framework to identify and address skills that the 21st Century learner will need to compete in a technology driven society. Understanding that technology doesn't change a student's ability to retain information, The Flipped Learning Network (FLN) developed the Four Pillars of Flipped learning to help teachers seeking to implement flipped classrooms.

Pillars of Flipped Learning

The four pillars of effective flipped learning include: flexible environment, learning culture, intentional content, and professional educator. Together the first letters of each pillar spell out FLIP. A Flexible environment, as defined by the Flipped Learning Network (FLN), comes down to the structure and flexibility of the teacher in regards to two main areas, the classroom and the timelines for learning. To create a flexible environment the teacher must be willing to create or accommodate an atmosphere where students can rearrange the learning space to fit the dynamics of group or independent work, including one-on-one instruction. This space will impact the behavior of the students and teacher who are working within the confines of it (Walker, Brooks & Baepler, 2011). Additionally, the physical layout should be an extension of the teacher and reflect the teacher's personality (Shalaway, 2015). The second part of the flexible environment allows a teacher to have flexibility on expectations/timelines for assessments/learning. Since students learn at different paces this is a fundamental understanding of Flipped Learning.

The second pillar of Flipped Learning is Learning culture. Learning culture takes the traditional classroom, teacher in the front of the room with the omniscient approach to each lesson, and turns it upside down. In Learning culture, the goal is to purposely shift the instruction to a learner-centered/student-centered approach. To do this Heick (2014) provides three simple steps. The first step is to show the students by modeling and demonstrating the correct habits. Secondly, Heick suggest helping the students. The teacher provides help by putting the students in groups, coaching them, and providing general support (Heick, 2014). The last step is to Let them. In this step the teacher gets out of the way and lets the students take off. Through these three steps identified by Heick (2014) a culture of learning will develop in the classroom. These

three steps also promote students spending the class time exploring topics in greater depth and creating more meaningful learning opportunities. Since students arrive with a base level knowledge they can actively engage in the construction of new knowledge with teacher guidance and formative evaluation.

The third pillar of Flipped Learning is intentional content (FLN, 2015). With this pillar the teacher has to draw on their experience or education to determine which tools or materials should be given for the students to explore or learn at home/on their own or under the guidance of the teacher (Bennett, 2013). Taking an intentional approach to what activities or resources are used should help the students to develop a stronger conceptual understanding of the content (Epstein, 2007). Through the process of intentionally choosing between class time or face-to-face time, can be used with great efficiency.

The last pillar of the four is professional educator (FLN, 2015). This pillar focuses on the most important person/role in the classroom and that is the educator. To obtain the pillar of Professional educator, the teacher must not only, establish a flipped classroom but observe, assess and provide their students with relevant and timely feedback (Wiggins, 2012). Once a lesson or unit is complete the work doesn't stop there. The Professional educator reflects on the lesson or unit and determines what lead to learning and what might not have. This may require the teacher to collaborate with not only teachers in the building but around the country (Johnson, 2011). Through this collaboration the professional educator may encounter constructive criticism. It is important that the criticism be evaluated and if it is deemed constructive to improving the educational process it should be accepted (Wiggins, 2012). It is important to note that professional educator takes a back seat to the students in a flipped classroom, the teachers maintain a vital role in leading students to success through Flipped Learning (FLN, 2015). Even

though the teacher takes a back seat in this model they must be able to command a strong sense of self-efficacy when it comes to the use of technology (Hsiao & Yang, 2010).

Challenges of the Flipped Classroom

While there are many positives to utilizing the flipped classroom approach some pitfalls have been identified by a variety of researches. Herreid and Schiller (2014) identified two major pitfalls. The first pitfall is that the culture, or way students have always engaged in new material has to change. Within the flipped classroom model students must pre-read texts, review slide shows, or watch videos at home before class. More emphasis is placed on the students learning the basics of the new concept at home instead of in the classroom. If there is a lack of student motivation and they are not willing or forget to watch the videos or read the texts then they are unprepared for class (Shi-Chun et al, 2014). Herried and Schiller observed several faculty members working to remedy this problem by inserting short quizzes at the end of the videos or having the students take short quizzes when they come to school the following morning over content that was specifically covered in the text or video (Herried and Schiller, 2014).

The second major pitfall they uncovered was that the videos chosen or created had to be specifically tailored for their students and results in additional screen time for students (Krueger, 2012). While there are several videos on YouTube, TeacherTube, Kahn Academy and iTunes U, many videos do not provide the specific content or skill needed by the teacher. Videos available could be above the students' vocabulary, too detailed, not detailed enough, or un-motivating. Teachers may be required to create their own videos, which can be labor and time intensive. Software programs like Camtasia, PaperShow, and ShowMe allow teachers to create and edit their own videos faster than resources such as iMovie or Adobe Movie Maker. Through these programs, teachers can post their videos to YouTube or podcast to iTunes U and include a link

through the school's course management system (Blackboard, Edmodo, Moodle, My Big Campus, and Google Classroom) to all students in their class (Molnar, 2014).

In the most basic sense, flipped classrooms are built on the traditional model of teaching, lecture in that students either watch a video demonstration, videoed notes, or review documents prior to class. While direct instruction or lectures may not be ideal, Hattie found that direct instruction had a positive effect on student learning with an effect size of .59 (Hattie, 2012). Nielson's comments suggest that she prefers the work of Cole, Sugioka, and Yamagata-Lynch who found that when students are creating products their engagement increases (Cole, Sugioka, Yamagata-Lynch, 1999). Nielsen sums her concerns up by stating, "without questioning that type of pedagogy in the first place, we are doing our children a disservice" (2011, para. 8).

Despite multiple programs and platforms one main concern still exists and that's the amount of screen time a student has per day (Krueger, 2012). Recent research found a correlation between the amount of screen time and the participants' ability to recognize emotions. Students in the study who logged at-least four and a half hours of screen time a day made more mistakes identifying emotions displayed by people in pictures compared to a group of students who did not have screen time (Wolpert, 2014). Understanding emotions is important as it helps supports the message the creator is trying to send.

As student success became more prevalent in schools with the flipped classroom model, a need for more positive attention and resources will be needed (FLN, 2015). One of the greatest resources for teachers and administrators is a website devoted to all things about flipped classrooms. The website titled, Flipped Learning Network, FLN, was developed to help educators get to the understanding that there is a difference between a flipped classroom and flipped learning. According to the Flipped Learning Network, the only way students can engage

in flipped learning is when the teachers incorporate the four pillars of Flipped Learning into not only the classroom but their development as teachers (FLN, 2015).

Teacher Efficacy in Technology

Perceived self-efficacy, or the belief in one's own ability to perform a task at a prescribed level is derived from the work of Bandura (1997). According to the work of Hsiao and Yang (2010), teacher self-efficacy is the main factor in determining if a student will have academic success. Yeo, Ang, Chong, Haun, & Quek (2008), support the work of Hsiao and Yang through their research. They state teachers who have high self-efficacy are more likely to remain in the field than a teacher with low self efficacy. For schools to have teachers with high efficacy, especially when technology is introduced, teachers must have more than just technical knowledge to successfully integrate technology into their practice (Ertmer & Ottenbreit-Leftwich, 2010). Wozney, Venkatesh, and Abrami (2006) found that one of the greatest predictors of teachers' technology use in the classroom was their confidence in their own ability to achieve the daily instructional goals. Research shows that teachers achieve higher levels of technological efficacy through playing with the technology (Somekh, 2008), learning by working with peers who have knowledge of the technology (Ertmer, Ottenbreit-Leftwich, & York, 2006), and through professional development (Cole, Simkins, & Penuel, 2002).

In her dissertation, Roney (2015), states that there are four variables that impact a teacher's technological efficacy. The first variable is determining if the teacher is a digital native or digital immigrant, which is the work of Prensky. In his research, Presnsky (2001) noted that today's classrooms are filled with students who have been immersed in technology their whole lives. He refers to these students as digital natives. The analogy is taken further by pointing out

that students are taught by teachers, who have had to learn how to use technology, or have had to be introduced to it as digital immigrants (2001).

Roney (2015) points out that, “it is important to consider gender and its influence on attitudes towards computers and technology” (p 43). Roney pointed out that research from Tsai and Tsai (2010) suggested that, in junior high aged students, the girls in the study had more confidence than boys in regards to Internet communication.

Education, is suggested by Roney, to be the third variable to consider in regards to a teacher’s technological efficacy (2015). She uses the research of Phillips and Vinten (2010), which focused on participants’ perceptions towards innovating teaching strategies.

The final suggested variable that impacts a teacher’s technological efficacy, suggested by Roney is locus of control (2015). She highlights the research of Broos and Roe (2006), who found that the Finnish adolescents in the study who had higher efficacy in their ability to use computers as well as strong expectations of computer control were more likely to use computers (Broos & Roe, 2006).

Ferreira (2013) pointed out in her Masters Thesis, that the outcome of education is to “equip students with the intellectual tools, efficacy beliefs, and intrinsic interests to educate themselves” (Bandura, 1995, p. 17). Ferreira continues “In order to impart feelings of efficacy for technology use in diverse situations, teachers must also feel efficacious in its use and associate technology with positive outcomes (2013, p. 25). As pointed out earlier in the work of Somekh (2008), teachers who practice with technology more will have a higher efficacy towards it. Professional development provides a venue for teachers to receive additional practice and support for improving their technology skills and efficacy.

Professional Development

As people of all ages increase their dependence on technology for every-day tasks, children have become the most frequent users (Kaiser Family Foundation, 2010). As pointed out earlier, Gibson's findings point out that teachers are struggling to implement technology for the students into the classroom and curriculum because of their own preparedness (2004). Jeffrey's work supports this as he found teachers lacked the ability to implement technology effectively (2000). Johnson stated "in a society where jobs and education are increasingly dependent upon technology, students and teachers need to experience technology usage in the classroom" (2009, p 3).

Professional development has a broad range of meanings and Meagher outlines multiple ways the term Professional Development is used (2011). The first definition pointed out by the research for professional development is the opportunities educators have to gain new knowledge, skills, or approaches to increase their effectiveness in the classroom (Loucks-Horsley et al, 1998). Elmore describes another definition of professional development as being an activity or service that is organized by school administrators for the educators of that district (1997). Maegher also points out that it is commonly accepted that professional development and staff development are synonymous terms (2011) yet uses the research of Loucks-Horsley et al (1998) to point out that there are some differences. One of the major differences being that professional development gives a connotation of continuous learning while staff development leads to the perception of mandatory staff attendance and participation (1998). Guskey adds an additional definition for professional development in that it is... "processes and activities designed to enhance the professional knowledge, skills, and attitudes of educators so that they might, in turn, improve the learning of students" (2000, p. 16). Building and classroom leaders

can impact the effectiveness of professional development by utilizing the Standards for Professional Learning that were generated by Learning Forward, formerly the National Staff Development Council. Learning Forward has broken their standards for professional development into three components; Context Standards, Process Standards and Content Standards (Easton, 2008).

Context Standard.

In the first component, Context, the goal is to understand what role context plays in focusing professional development (Appolloni, 2009). To understand the three aspects that make up context, Appolloni gave the example of a professional learning community or PLC meeting together during an allotted time created by administrators for teachers to meet and engage in professional learning with the goal of constructing new knowledge with the ample resources provided to them (2009). From this example the three aspects become clear; organized learning communities, instructional improvement, and resources to support adult learning.

Process Standard.

The second standard for Professional Development that was created by the National Staff Development Council is Process Standards (Easton, 2008). The primary goal of this standard is to understand what kind of design is needed (Appolloni, 2009). Easton describes the design as the “learning strategies appropriate to the intended goal” (2008, p. 25). Appolloni suggests that for the design portion that norms must be established which helped to create a positive learning community (2009). Within this positive learning community the group worked to learn together understanding that there wasn’t one person who had all the answers. Through the process standard the group learned to function as a whole by understanding each other’s strengths and weaknesses (2009).

Content Standard.

The third and final standard for professional development that was created by the National Staff Development Council is the Content Standard (Easton, 2008). In this standard the primary goal is to identify what the learners need to know (Appolloni, 2009). Easton identifies six steps to consider with the Content Standard.

1. Answer the question: What should students-in this case-novice teachers-know and be able to do?
2. Keeping in mind what novices need to know and be able to do, consider what teachers-in this case mentors-should know and be able to do.
3. Look at how well the current professional learning program works to support needed content.
4. Design your own professional learning program.
5. Determine indicators of success for novices and their mentors.
6. Determine indicators of success for others in the system. (2008)

Appolloni also suggests that collective data be used to “determine our desired learning outcomes, which were organized into categories” (2009, p. 38). The organized categories referred to are identified by Killion (2009) as Knowledge, Attitude, Skills, Aspiration and Behavior. The National Staff Development Council points out that many sources of data are needed to guide the improvement process (NSDC, 2001).

Effective Professional Development for Technology Integration

Benefits of technology implementation into the classroom depend on the teacher’s competency level, the type of technology and how the technology is utilized. Puentedura’s Substitution, Augmentation, Modification, and Redefinition, SAMR Model (2006) helps teachers

identify technology integration levels so that teachers can correctly pair the level of technology integration with the desired level of either Bloom's Taxonomy or Webb's Depth of Knowledge.

When students perform a task such as reading a text digitally they are at the lowest level, Substitution. The second level, Augmentation, occurs when the students use a feature like Siri or "Hey Google" to read the passage aloud while the student listens. The third level, Modification occurs when technology is used to redesign the task, for example; after reading the text the students are asked to create and share their response to the passage either through GoogleSlides or GoogleDocs. The sharing process allows for feedback from peers as well as the teacher. The highest level of Puentedura's SAMR model is Redefinition. It occurs when technology is utilized to complete tasks that were previously impossible without technology (2006). "For example, students can take a virtual field trip using web conferencing technology" (Rowe, 2014, 12). The SAMR model provides teachers and administrators a way to identify the level of technology integration, much like teachers use Webb's Depth of Knowledge to identify the cognitive rigor of an educational task.

Once teachers have an understanding of the levels of technology integration the focus should shift to "professional development opportunities and experiences that not only allow them competence and confidence with technology, but ... enjoyment or interest in technology and its potential" (Mingus 2014, 32). Chikasanda et al's four phase teacher professional development model (2013) aims at providing teachers with confidence and enjoyment as they implement it into their lessons.

The first phase of the Malawi teacher professional development model is establishing needs and professional development planning. Chikasanda et al (2013) recognized the need for first understanding the existing views, practices, and expectations of the group as they prepare to

grow professionally. Phase two starts with teacher workshops that allow teachers to collaboratively explore concepts of technology and technology education. “Social cultural frameworks enhanced teacher’ capacity to provide each other support, encouragement and began to create a community of learners” (2013, 602). Workshops were spread out over a month to allow teachers the ability to implement and reflect on the new concepts learned. Once the initial workshops were complete, phase three, on-going reflections and support, began. In this phase teachers took part in peer observations as well as reflections, feedback from the observations were shared at the follow up workshops. The feedback portion of phase three leads to the final phase of the Malawi teacher professional development model, reflective discussions in a school based professional development. The goal of the final phase was to enhance and support teachers by building an on going, collaborative and cooperative environment.

Implementation of their four-phase teacher professional development model can support teachers to “develop a more effective and holistic understanding of the nature of technology and technology education, knowledge about teaching and learning technology and curriculum and social issues in technology” (2013, 617). The teacher outcomes of this professional development model align with the six focus areas generated by The Partnership for 21st Century Skills.

As teachers prepare students for the 21st century, The Partnership for 21st Century Skills, outlines six focus areas to help generate vision for professional development in their 2009 publication. The first element educators should understand is the importance of the 21st century skills as well as how to best integrate them into their daily instruction (2009). Secondly, educators, administrators, as well as other stakeholders must be able to collaborate (2009). The third focus area is that teachers and principals must be able to build their own learning communities (2009). The fourth focus area outlines for schools to look at their own personnel

and utilize them as resources for coaching and mentoring (2009). The fifth focus area is that of supporting educators in their role of facilitating learning (2009). The final focus area that The Partnership for 21st Century Skills outlines is that of using the tools that 21st century students use (2009).

Summary

Technology is impacting education and its effects can be seen in several different ways (Schwann and McGarvey, 2001) especially when lessons were recorded and students were given the ability to re-watch a teacher's instruction. This gave way to what is commonly called today as the flipped classroom (Tucker, 2012). Once lessons were put online students had the ability to learn not only at school, but at home (Horn, 2013). Student access to content at home lead teachers and administrators to re-evaluate the use of their most precious resource; which is face-to-face time with the students (Bergmann & Sams, 2014).

Understanding that technology impacts how instruction occurs, a new collaborative effort was created, The Partnership for 21st Century Learning. A group of educators concluded that teachers are preparing today's students for jobs that don't yet exist and that today's students will need different skills, skills that are not prevalent in a traditional liberal arts education (Partnership for 21st Century Learning, 2015). Fitting in with 21st Century Skills, Holland and Holland developed a list of best teaching practices using technology. Nearly all of the fourteen elements incorporated parts if not all of the 21st Century Skills and have implications for effectively implementing the flipped classroom concept (Holland & Holland, 2014). Infusing technology in both Problem Based Learning and Project Based Learning supports the 21st Century Skills as pointed out in the research of Larmer (2014). Feedback, Support and Assessment are enhanced through web-based learning management systems such as Google

Classroom, Moodle, and Edmodo as they allow for more timely feedback as well as several other keys of effective feedback noted by the research of Wiggins (2012).

While there are strengths of technology and flipped classrooms in education there are a few pitfalls as pointed out by Herreid and Schiller. One of the major pitfalls is motivation (Herreid & Schiller, 2014). If a student is to have intrinsic motivation they must find value in the task that is before them (Baeder & Blackburn, 2015).

Aside from access to technology and software a successful classroom implementation starts with teacher confidence, which can be built through professional development. The research of Wozney, Venkatesh, and Abrami (2006) found that one of the greatest predictors of teachers' technology use in the classroom was their confidence in their own ability to achieve the daily instructional goals. Bandura called this confidence in one's ability to complete a certain task at a pre-determined level as self-efficacy (1997). This confidence or self-efficacy increases as teachers have opportunities to gain new knowledge, skills, or approaches to their instructional effectiveness (Loucks-Horsley et al, 1998). As teachers prepare students for the 21st Century it's important to keep the four C's of the 21st Century Skills in mind; critical thinking, creative thinking, collaborating, and communicating (Partnership for 21st Century Learning, 2015) while using technology to help facilitate a Problem Based Learning and Project Based Learning (Larmer, 2014) environment.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

Introduction

The researcher measured teacher perceptions of readiness for the implementation of flipped classrooms into daily instruction. The researcher sent out a survey to teachers in Southwest Missouri, to ascertain their perceptions as to their abilities to effectively implement flipped classrooms into their daily instruction. Southwest Missouri is defined as any public school district serviced by the Southwest Regional Professional Development Center.

The Integration of Technology into the Classroom Survey (ITCS) collected demographic information such as school district size and how long they have been teaching. Survey questions were asked, to determine teachers' knowledge and confidence with using technology and teaching with technology in Southwest Missouri. The responses were collected and calculated to determine if there is a Person r correlation between the level of teacher education, years of teaching experience, and readiness to implement flipped classrooms.

Participants

The participants of the study were teachers in Southwest Missouri Public Schools belonging to the Southwest Regional Professional Development Center, SWRPDC. Certified staff who taught in either a middle school/junior high or high school were given opportunities to participate who were currently employed as teacher in the public schools belonging to the Southwest Regional Professional Development Center. Teachers with varying experience in both years in the profession, and technological experience responded to the survey. The SWRPDC is comprised of 80 school districts ranging from the largest in the state of Missouri with 17,717 students and 2135 certified staff, 1028 of which teach in a middle school or high school, to some

of the smallest in the state of Missouri with 14 certified staff in a junior high/high school, located in rural, suburban and urban settings. For the purpose of this study the researcher surveyed rural and suburban schools and exclude the two large, urban districts, Springfield and Joplin. The participants provided a similar diversity to the rest of the school population in Missouri.

Sampling Procedure

The participants were not randomly selected. The researcher utilized a purposive sampling process so as to include all teachers meeting the criterion of interest for the researcher. The criteria of interest for the researcher are teachers employed in Missouri public schools in southwest Missouri and who have access to the Southwest Missouri Regional Professional Development Center. The survey was sent out to the 80 school districts that host grades 6-12, containing a total of 5408 certified staff, located in the Southwest Regional Professional Development cohort. Two versions of the survey were created and they were identical to each other. For the convenience of organizing responses based on the designation of rural and suburban, each group received a copy of the survey. Thus the results for each group; rural, and suburban were separate and then were compared. The researcher then organized the groups based on whether the respondents have heard or not heard about the flipped classroom model.

The study was delimited to Southwest Missouri public school districts as defined in chapter one. A request for participation was sent to the Superintendents who then passed the survey on to the building administrators in the school districts located in the Southwest Regional Professional Development Center. The researcher provided the opportunity for all of the identified population of interest to participate but was limited to the beneficence of the building administrator in the dissemination of the survey. Therefore the control and selection of a sample was not possible, as the entire population was in theory offered the opportunity to participant.

Research Setting

The setting for this study included the 80 public schools that belong to the Southwest Missouri Regional Professional Development Cohort and that are not K-8 Districts. School districts ranged from rural farm towns to the suburban schools. The primary ethnic background in Southwest Missouri is Caucasian. The school districts ranged in size from 14 certified staff to 249 certified staff. The certified staff to student ratios also ranged with 3.6 students to certified staff in some of the rural schools to 13.4 students to certified staff member in the suburban schools. Of the 80 public school districts in the Southwest Missouri Regional Professional Development Cohort, 65 were designated rural and 15 were designated as suburban.

Research Design

To help improve the effectiveness of the implementation and integration of technology in the classroom, the researcher focused on the integration of the flipped classroom. Certified staff members who taught at least one of 6-12 grade in Southwest Missouri and whose school districts are part of the Southwest Missouri Regional Professional Development network received a survey through Survey Monkey that attempted to gauge their efficacy and knowledge in regards to technology implementation and flipped classrooms. Certified staff received one of two identical *The Integration of Technology into the Classroom Survey* (ITCS) surveys depending on the identification of the school district as rural or suburban. Each District's designation can be found in the Appendix. Through the survey's qualitative and quantitative questions, the researcher attempted to identify if teachers are implementing flipped classrooms in Southwest Missouri and if not is a lack of teacher efficacy and or knowledge the cause. The survey respondent's answers were anonymous.

The survey was sent out through Survey Monkey, which also collected the responses to participants meeting the criteria of teaching 6th-12th grade in one of the 80 school districts in the Southwest Missouri Regional Professional Development cohort. The initial survey was sent May 12, 2016.

One week after the initial survey link was sent, a reminder link was sent in an effort to gather additional responses. After an additional week the researcher determined a sufficient number of responses had been received to begin the data entry process. The qualitative results were inputted in SPSS. Depending on the number of independent variables were included determined whether an ANOVA or a *t*-test were calculated to determine teachers knowledge of flipped classrooms as well as their confidence level in utilizing them. Finally, constant comparative analysis (Bogdan & Biklen, 2007) was performed on the qualitative questions responses to establish the themes relating to the research questions stated for the study.

Instrumentation

The instrument was a survey. The survey titled, *The Integration of Technology into the Classroom Survey* (ITCS). The survey was created by and used with the permission of Dr. Paul Johnson who tested the instrument's validity and reliability in his doctoral dissertation research. Johnson based the creation of ITCS on research that examined technology integration and usage (Johnson, 2009). The purpose of the survey in this study was to establish participant demographics and teacher readiness to implement flipped classrooms. The ITCS was modified to match the specific data the researcher was seeking. The researcher pilot tested the survey after the minor modifications to establish the instrument still maintained validity.

Validity is the extent an instrument or item measures what it was intended to measure. It is vital for a test to be valid for the results to be correctly applied and interpreted. Validity is

determined by a body of research that demonstrates the relationship between the item or instrument and the behavior it is intended to measure (Whipple, 2012). Content validity will be assured by first pilot testing it with a group of educators similar to those in the study.

To determine the validity the researcher piloted the survey with a group of educational professionals consisting of retired superintendents, building administrators, classroom teachers and college professors with doctoral degrees. The pilot study participants were asked to assess each item of the survey, commenting on items of confusion. The pilot study participants' suggestions and critiques were used for improvement of the test items.

The survey was modified based on the feedback from the pilot group. The changes made to the survey were to better focus the research on flipped classrooms. The initial validity established by Johnson (2009) was not impacted because less than ten percent of the initial survey was modified. Based on the feedback from the pilot group the researcher determined validity was considered established.

Cronbach's Alpha was utilized to test reliability. Cronbach's coefficient alpha is the most widely used measurement of internal reliability in educational and social science research, cited as being used in 5,590 studies between 1951 and 2004 (Cronbach, 2004). In many of those studies the coefficient alpha is obtained from a sample size of ≤ 200 . Yet, the general view is the sample coefficient alpha obtained from larger samples tends to produce a more accurate estimate of the population coefficient alpha. Numerous researchers have noted that with low sample sizes alpha coefficients can be unstable. In literature going back to 1994, a minimum sample size of 200 to 400 is advised (Charter, 2003).

Cronbach's Alpha was calculated for the confidence scale with survey questions 16, 18, 19, 20, and 22 having an Alpha of .623. Cronbach's Alpha was also calculated for the

knowledge scale with survey questions 8, 9, 10, 13, 14, 15, 16 having an Alpha .761.

Cronbach's Alpha is considered to indicate reliability at .70. The researcher determine the scales had reliability as the confidence questions were close to .70 at .623 and the knowledge questions were above .70 at .761.

Data Treatment

Data were collected through Survey Monkey and stored on their server. Access to data was by user name and password and only the researcher has the password assuring confidentiality. Data collected was used to determine what teachers know about technology and the use of technology for flipped classrooms. The researcher also utilized the data to ascertain if confidence with technology factors into a teacher's decision in the use of the flipped classroom model. The data collected for this study used single-stage, non-probability sampling (Creswell, 2003, p 156-157). The Integration of Technology into the Classroom Survey (ITCS) was created by Johnson (2009) to specifically collected quantitative data. Open-ended questions were used to further explain the closed end data. These qualitative questions helped the researcher to group themes or relationships found within the data. The responses were analyzed and grouped based on themes. They were then coded by their themes, which related back to the two research questions (Bogdan & Biklen, 2007). The responses were analyzed and grouped based on themes. They were then coded by their themes, relating back to the research questions.

The research questions are:

1. RQ₁ What do teachers know about the use of technology?
2. RQ₂ What do teachers know about the flipped classroom model?
3. RQ₃ How confident are teachers about their ability to use technology?
4. RQ₄ How confident are teachers about utilizing the flipped classroom model?

The quantitative questions at the beginning of the survey were based on a Likert Scale and respondents chose from one of three options, Always, Sometimes, and Never, as it related to the specific questions in the ITCS. For statistical purposes; Always was given the numerical value of 3, Sometimes, was given the value of 2, and Never was given the value of 1.

Using SPSS data software an ANOVA, MANOVA, and a *t*-test were performed to see what the respondents knew about flipped classrooms and compare responses of respondents with prior knowledge of the flipped classroom to responses of those who had no prior knowledge of the flipped classroom model. The researcher also compared the responses of the two groups and their confidence level regarding their utilization of the flipped classroom model. The hypotheses tested were:

H₁ Teachers indicating prior knowledge of the flipped classroom model will not have more technology knowledge than teachers indicating they had no prior knowledge of the flipped classroom model.

H₂ Teachers indicating prior knowledge of the flipped classroom model will not have used the flipped classroom more than teachers indicating they had no prior knowledge of the flipped classroom model.

H₃ Teachers with prior knowledge of the flipped classroom model will not have more confidence in their ability to utilize a flipped classroom model than teachers without prior knowledge of the flipped classroom model.

Summary

Prior researchers have identified that teacher confidence and knowledge have inhibited teacher implementation of the flipped classroom model (Jeffreys, 2000; Gibson, 2004). *The Integration of Technology into the Classroom Survey (ITCS)* was utilized to see if confidence

and knowledge are still inhibitors to flipped classroom/technology implementation. Through an ANOVA, *t*-test, and MANOVA the researcher tested the hypotheses stated. The qualitative data was coded and the researcher, through constant comparative analysis, determined themes presented by the respondents of the *The Integration of Technology into the Classroom Survey* (ITCS) survey. Frequency data and descriptive data from the survey respondents also contributed to the researcher's ability to answer the research questions. The survey provided the researcher with data to determine if teachers in districts who are a part of the Southwest Missouri Regional Professional Development cohort have knowledge in the use of technology and are confident in their ability to utilize it in the classroom. The researcher also wanted to determine if teachers had knowledge of the flipped classroom model of teaching with technology. The researcher questioned if teachers were confident enough to implement flipped classrooms or were other factors preventing implementation of a flipped classroom model. Results of the data collection and the analysis of the data are presented in chapter four.

CHAPTER FOUR

RESULTS

Introduction

Several school districts across southwest Missouri have initiated or are in the process of initiating technology strategies to put electronic devices in students' hands providing teachers with the knowledge and confidence needed to utilize the new tools. Researchers found that teacher knowledge and confidence were the inhibitors to classroom technology implementation (Jeffreys, 2000, Gibson, 2003, and Johnson 2009). The researcher attempted to determine if knowledge and confidence were barriers teachers encountered when implementing technology in the classroom and if knowledge and/or confidence specifically inhibit teachers from utilizing the technology teaching strategy flipped classroom model.

The survey instrument utilized by the researcher to collect data for the research study asked respondents 30 questions. Four questions were demographic in nature and one question was used to group the respondents depending on their prior knowledge of the flipped classroom. Seventeen Likert questions allowed the respondents to choose from one of three categories Always value of 1, Sometimes value of 2 and Never value of 3. Always means at-least 80 percent of the time. Sometimes means more than once and Never indicates the respondent has never tried or attempted. Two questions asked targeted specific usage of technology the respondents had the knowledge and/or confidence to utilize. Six of the 30 questions were open-ended responses that allowed the respondent to elaborate on their Likert style responses and/or to provide their perspective on their knowledge and usage of technology in the classroom. Four of the six questions were related to flipped classrooms. The researcher used constant comparative analysis to group the responses to the six open ended questions into themes to clarify and provide

data to answer research questions (Bogdan & Biklen, 2007). The quantitative data were organized and uploaded into SPSS where descriptive data, frequency tables, an ANOVA, MANOVA and *t*-test were calculated.

The researcher presents the survey responses collected from teachers employed in districts that are a part of the Southwest Regional Professional Development Center. The researcher received 205 responses however some responders did not answer all of the questions and the researcher had an N=196 on most questions. The response rate was lower than the researcher wanted however; the response rate did provide a calculated margin of error of just seven percent using an online sample size calculator (Raosoft, 2004).

Results

The results are presented in the following order:

Qualitative Data

1. Demographic information: Questions 1 through 4
2. Group defining data: Question 5
3. Descriptive Data: Likert Questions 6 through 22
4. Descriptive Data: Question 23 and 24
5. Open Ended Questions 25 through 30

Table 1

Demographic responses to Questions 1 through 4 N=205

Q1 Gender:	Female 142	Male 63		
Q2 Years of Experience:	1-5 Years 31	6-10 Years 37	10+ Years 137	
Q3 Subject Taught:	Academic Core 149	Elective 49	Physical ED 7	

Q4 Grade Level	6-8 th	9-12 th
	95	110

Group defining data.

Table 2

Q 5: Before today I have not heard of a flipped classroom

	Agree	Disagree	N=205
Frequency	43	162	
Percentage	21	79	

Table 2 is a question that identifies the group the respondent should be assigned. Group one is Agree, meaning the respondent had not heard of the flipped classroom model before receiving the survey. Group two is Disagree, meaning the respondent had heard of the flipped classroom model before receiving the survey. Comparisons are made between the two groups to test the stated null hypotheses and presented in quantitative data later in the results section.

Table 3

Questions 6-22 indicating Knowledge and Confidence in Technology usage Descriptive Statistics

Question	Responses			Mean
	Always	Sometimes	Never	
6. Computers and other technology for my classroom are sufficiently available.	114	72	10	1.469
7. I have a computer with internet access available for use at school.	188	7	1	1.046
8. I participate in collaboration with other teachers on issues of instruction that involve teaching with technology.	77	102	17	1.694
9. I participate in mentoring/peer observation/coaching relative to the integration	36	103	57	2.107

of technology in the classroom.

10. I participate in a network of teachers that discusses/addresses technology in the classroom.	59	108	29	1.847
11. My school provides on-site technology support.	147	49	0	1.250
12. I put a lot of effort into implementing technology into the classroom.	86	100	10	1.612
13. I have the knowledge to create a lesson/unit using the flipped classroom model.	57	83	56	1.995
14. Using technology enhances student learning.	47	147	2	1.770
15. My school provides staff development to assist with technology integration, including flipped classrooms.	87	104	5	1.582
16. Flipped classrooms is a technology strategy that I use.	8	68	120	2.271
17. I would feel uncomfortable using a flipped classroom model.	32	109	55	2.117
18. I feel confident in my ability to use technology.	116	75	5	1.434
19. I expect my technology activities to be successful.	103	91	2	1.485
20. I keep working even when there are problems with technology.	169	26	1	1.143
21. My school administrators are supportive in the area of technology integration, including flipped classrooms.	120	69	7	1.423
22. I'm confident that I could create a unit, utilizing the flipped classroom strategy.	90	85	21	1.650

Table 3 depicts the descriptive responses to seventeen survey questions, 6-22, that indicate a respondent's level of knowledge or confidence. Respondents selected one of three

options, Always, Sometimes, Never. The responses to these questions helped the researcher answer the four research questions.

Table 4 Q23
 Respondents' perception of their proficiency with technology in their classroom

Program Names	I am proficient	with help I use it	I know little about this
Basic computer	187	5	0
Word Processing	187	5	0
Spreadsheets	138	48	6
Presentation Software	170	21	1
Graphics	56	114	22
Computer input devices	125	60	7
Learning management systems	122	52	18
Video recording	78	87	27
Flipped classroom instruction	48	92	53

Table 4 contains the descriptive responses to question 23 of the survey. The data in this table informs the researcher of the respondents' perception of their proficiency with technology in their classroom by targeting specific programs or technology resources a teacher may use. For each resource a respondent had the opportunity to select from one of three choices; I am proficient, with help I can use it, and I know little about this. The data depicted in table four helped the researcher answer the research questions.

Table 5 Q24
 Respondents' usage of technology in their classroom

Program Names	Use in classroom (daily/weekly)	Use in classroom (occasionally)	Use in classroom (never)
Basic computer	179	10	3
Word Processing	152	28	12
Spreadsheets	90	60	42
Presentation Software	106	64	22
Graphics	17	73	102
Computer input devices	62	68	62
Learning management systems	83	54	55
Video recording	35	78	79
Flipped classroom instruction	12	66	114

Table 5 informs the researcher of the respondents' usage of technology in their classroom. Respondents identified their rate of use for each of the resources identified in Table 4. For each resource the respondents chose from; Use in classroom daily/weekly, Use in classroom occasionally, and Use in classroom never. The descriptive data in table five helped the researcher answer the research questions in this study.

Questions 25 through 30 are open ended questions designed to allow respondents to express their attitudes and ideas about technology in their classrooms.

Table 6

Question 25: What has enabled you to be successful in integrating technology into your classroom?

	Frequency	Percent	N=157
Training/Practice	105	51	
Technology Access	52	25	

Table 6 is a frequency table identifying common themes from the responses collected. The two main themes provide the researcher with an understanding of what has enabled the respondents to successfully integrate technology into their classroom. The emerging themes helped the researcher answer the main research questions.

Table 7

Question 26: Describe your level of confidence in your ability to implement a Flipped classroom lesson.

	Frequency	Percent	N=169
Highly Confident	58	28	
Moderately Confident	41	20	
Confident w/student concerns	25	12	
Low Confidence	20	10	
No Confidence	32	16	

Table 7 is a frequency table identifying the levels of confidence that the respondents shared in the open-ended portion of the survey. Respondents' answers were grouped into one of five categories; Highly Confident, Moderately Confident, Confident with student concerns, Low Confidence, and No confidence. The responses outlined in Table 7 helped the researcher answer the main research questions.

Table 8

Question 27: Describe the professional development training you have received that has supported your integration of technology, including Flipped Classrooms.

	Frequency	Percent
District/School Provided PD	81	40
Little or Personal Learning	46	22
Never been offered	39	19

N=166

The data in Table 8 come from survey question 27, which is an open-ended question that asks the respondents to describe their level of professional development they received which supported their technology integration. Respondents' answers were grouped by themes. Three major themes emerged; District/School provided PD, Little or Personal Learning, and Never been offered. Little or Personal Learning means that the respondent received minimal District/School provided PD and relied on personal learning. The themes generated, based on the survey responses helped the researcher answer the major research questions.

Question 28: What professional development success have you experienced in preparing to integrate technology into your classroom?

Respondents did not complete question 28. The researcher received no feedback as to the validity of this question in the pilot test with the expert panel. Researcher assumes the question was not understood or the respondents were tiring of answering questions.

Table 9

Question 29: Describe the types of professional development that you have received in regard to technology implementation in your classroom, especially PD centered on the flipped classroom model.

	Frequency	Percent
		N=183
No Training on FCM	67	33
District/School Provided PD	53	26
No Response provided	36	18
Little or Personal Learning	27	13

Table 9 is a frequency table that lists the themes generated when the respondents were asked what types of professional development they received, especially centered on the flipped classroom model. There were four themes that emerged; No training on the flipped classroom model, District/School provided, No Response provided, and Little or Personal Learning. Little or Personal Learning means that the respondent received minimal District/School provided PD and relied on personal learning. The themes amassed in Table 9 helped the researcher answer the major research questions.

Table 10

Question 30: Describe the reason(s) why you have either chosen to or not chosen to implement the flipped classroom model into your classroom.

	Have Frequency	Percent	Have not Frequency	Percent	Combined percent
Tech Access concerns	23	26	8	28	26
Teacher Knowledge	11	12	17	59	24
Teacher time	12	13	1	3	11
N= 118		89		29	

Table 10 is a frequency table that identifies the major themes that emerged from question 30 on the survey. Question 30 was an open-ended question that asked the respondents why they chose to or chose not to implement the flipped classroom. The data in Table 10 are the responses to those who chose not to implement the flipped classroom model. There were three major themes that emerged; Technology access concerns, Teacher knowledge, and Teacher Time. The 118 responses in Table 10 are the respondents who chose not to implement the flipped classroom model. The descriptive data in Table 10 contributed to the researcher's answer of the research questions.

Quantitative Data

Table 11
 Questions 6-22 ANOVA Calculation of Knowledge and Confidence in Technology usage between Group with Prior Knowledge of the Flipped Classroom Model and Group without Prior knowledge of the Flipped Classroom Model

Question	Responses		N=196
	Mean Square	F	Sig
6. Computers and other technology for my classroom are sufficiently available.	.414	2.428	.091
7. I have a computer with internet access available for use at school.	.056	.326	.721
8. I participate in collaboration with other teachers on issues of instruction that involve teaching with technology.	.025	.148	.862
9. I participate in mentoring/peer observation/coaching relative to the integration of technology in the classroom.	.087	.508	.603
10. I participate in a network of teachers that discusses/addresses technology in the classroom.	.067	.391	.677
11. My school provides on-site technology support.	.187	1.095	.297
12. I put a lot of effort into implementing	.115	.677	.510

technology into the classroom.

13. I have the knowledge to create a lesson/unit using the flipped classroom model.	.163	.953	.388
14. Using technology enhances student learning.	.097	.567	.568
15. My school provides staff development to assist with technology integration, including flipped classrooms.	.530	3.104	.048
16. Flipped classrooms is a technology strategy that I use.	.184	1.081	.342
17. I would feel uncomfortable using a flipped classroom model.	.325	1.906	.152
18. I feel confident in my ability to use technology.	.125	.731	.483
19. I expect my technology activities to be successful.	.007	.042	.959
20. I keep working even when there are problems with technology.	.068	.396	.674
21. My school administrators are supportive in the area of technology integration, including flipped classrooms.	.189	1.110	.332
22. I'm confident that I could create a unit, utilizing the flipped classroom strategy.	.014	.082	.921

Table 11 lists survey questions 6-22 and the ANOVA results for each of the 17 survey questions with significance at $< p .05$ level. The data in Table 11 determines whether the researcher rejects or fails to reject the null hypotheses.

Table 12

Question 15: My school provides on-site technology support.

A t-test calculation of respondents in suburban schools and respondents in rural schools

N=196

<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>	<i>95% Confidence interval of the Difference</i>	
			Lower	Upper
1.239	194	2.17	-.060	.264

Table 12 outlines the results of a t-test that was performed on survey question 15. In Table 11, survey question 15 was the only question that had significance at the < p .05 level. The t-test indicated that no significant differences in responses between responders in rural and suburban school districts were identified. The researcher previously calculated a MANOVA to determine if significant differences existed between demographic groups, no significant differences were indicated.

Deductive Conclusions

The researcher states the research question and follows with qualitative data related to the research question. The null hypotheses are stated after the presentation of data for all research questions. The researcher determined based on calculated by the calculation of an ANOVA to determine if a significant difference in mean responses to the research questions pertaining to technological knowledge between the two groups of responders. The researcher also calculated an ANOVA to determine if a significant difference in mean responses to the research questions pertaining to the confidence in utilization of technology between the two groups of responders. The quantitative data presented if the null hypothesis should be rejected or if the researcher failed to reject the null hypothesis.

Research Questions

RQ₁ What do teachers know about the use of technology?

Teachers surveyed (see Table four) indicated they are proficient with the basic computer, word processing, spread sheets and presentation software. Respondents indicated that if they had assistance from other teachers with knowledge of additional programs they would be successful in using; graphics programs (87%), input devices (94%), learning management systems (92%), and video recording (84%). This may be because 91% of teachers surveyed participate in collaboration with teachers on issues of incorporating technology into instruction. In addition to collaboration, 71% of teachers surveyed participate in mentoring/coaching relative to the integration of technology into the classroom and 85% of teachers surveyed participate in a network of teachers that discuss/address technology in the classroom. Teachers are utilizing the peers in the building, support of the district as well as their organizations or other networks they have established to grow their understanding of technology implementation in the classroom.

Some of the qualitative responses included, “I have not received any PD training. All technology has come from my own trial and error,” and “I have attended several RCET plus SWRPDC workshops on technology in the classroom.”

Based on the data collected teachers are knowledgeable about and perceive themselves to be proficient with many of the technological programs necessary for use in the classroom. Teachers also perceive that any technology they are not proficient with they have the technology knowledge to learn from others. The researcher concludes that teachers are knowledgeable about the use of technology.

RQ₂ What do teachers know about the flipped classroom model?

The basics of the flipped classroom model include understanding how to use a computer, word processing, spread sheets and presentation software. A majority of respondents identified they were knowledgeable of each of those four components. While 71% of the respondents, either sometimes or always, stated they have the knowledge to create a lesson/unit using the flipped classroom model and 71% of the respondents participate in mentoring/peer observation/coaching relative to the integration of technology there are still 70% of respondents that would be uncomfortable using the flipped classroom model.

Some of the qualitative responses included, “I received 200+ hours of eMINTS training and am certified in this area.” This respondent learned from “Professional Development Academy and colleague collaboration,” while this respondent “...taught myself how to flip lessons. I am still improving the process. The more lessons I do the more I feel comfortable with creating lessons and I learn what to do and what not to do.”

Based on the data collected, it appears that teachers have knowledge of the flipped classroom model and 70% of teachers surveyed stated they have the knowledge to create a lesson/unit using the flipped classroom model. However, 58% of respondents have never used the flipped classroom model. It appears that respondents have more pressing concerns, aside from knowledge, as to why they have not implemented the flipped classroom model.

RQ₃ How confident are teachers about their ability to use technology?

The location of the respondents’ district classification as rural or suburban school, did not factor whether a teacher has confidence when it comes to their ability to use technology. Over 97 % of teachers are confident in their ability to use technology. Respondents not only have confidence in their ability to use technology, respondents (95%) state that they put a lot of effort

into implementing technology into the classroom. When the respondents implement technology into their lessons, 99 percent of them expect their technology activities to be successful.

Some of the qualitative responses included, “I use technology in my personal life on a daily basis so it was easy integrating it into my classroom.” Another respondent stated, “For years, I worked with colleagues on an Interdisciplinary Team that were very tech-savvy that allowed me to be less fearful of utilizing technology in the classroom. I now have a Department that is very hungry to incorporate technology into the classroom, including Flipped Classroom. Furthermore, I work in a District that provides on-going Professional Development on new technology. Lastly, we have a librarian in our school that is phenomenal at rooting out and teaching professional development classes on new ways to incorporate technology in the classroom.”

Based on the data collected it appears that the respondents are highly confident in their ability to use technology. Respondents also pointed out that if they lacked the confidence they would consult with peers or coaches who could guide them. Confidence does not appear to be an inhibitor to teachers implementing technology into the classroom.

RQ₄ How confident are teachers about utilizing the flipped classroom model?

While over 97% of the respondents are confident in their ability to use technology, only 46% state that they are always confident in their ability to create a unit utilizing the flipped classroom model. With support that percentage of respondents that are confident in their ability to create a unit using the flipped classroom model jumps to 89%. Over 96% of the respondents stated that their school administrators were, to some degree, supportive when it came to technology integration in the classroom.

Some of the qualitative responses included, “My confidence level in my ability is high. Of course beforehand, I would research, research, research.” Another respondent stated, “I’ve only heard a little about flipped classrooms but sounds interesting enough to possibly try, if/when applicable.”

Based on the data collected it appears teachers are confident in their ability to create a unit/lesson utilizing the flipped classroom model either on their own or with some help. When it comes to the implementation of the flipped classroom model, teacher confidence is not an inhibitor. Factors other than teacher confidence may inhibit teachers from implanting the flipped classroom model.

Null Hypotheses

H₁ Teachers indicating prior knowledge of the flipped classroom model will not have more technology knowledge than teachers indicating they had no prior knowledge of the flipped classroom model.

The researcher failed to reject this null hypothesis based on the results of the ANOVA calculation between the group with prior knowledge of the flipped classroom model and the group without prior knowledge of the flipped classroom model. The researcher identified five questions that pertained to knowledge; 10, 13, 14, 15, 16. While questions 10, 13, 14, 16 had no significance at $< p .05$ (.677, .388, .568, .342) question 15 did (.048).

H₂ Teachers indicating prior knowledge of the flipped classroom model will not have used the flipped classroom more than teachers indicating they had no prior knowledge of the flipped classroom model.

The researcher failed to reject this null hypothesis based on the results of the ANOVA calculation between the group with prior knowledge of the flipped classroom model and the

group without prior knowledge of the flipped classroom model. The researcher identified two specific questions that pertained to use of the flipped classroom model; 13 and 16. Both question 13 and 16 failed to show significance at $< p .05$ (.388 and .342).

H₃ Teachers with prior knowledge of the flipped classroom model will not have more confidence in their ability to utilize a flipped classroom model than teachers without prior knowledge of the flipped classroom model.

The researcher failed to reject this null hypothesis based on the results of the ANOVA calculation between the group with prior knowledge of the flipped classroom model and the group without prior knowledge of the flipped classroom model. The researcher identified five specific questions that targeted teacher confidence with the flipped classroom model. All five questions; 16, 18, 19, 20, 22, failed to show significance at $< p .05$ (.342, .483, .959, .674, .921).

Summary

The data collected and subsequent results were obtained from survey responses that were from teachers who belong to the Southwest Regional Professional Development Center. Respondents were from either rural or suburban school districts. Utilizing the *The Integration of Technology into the Classroom Survey* (ITCS) survey sent out through Survey Monkey, respondents were able to anonymously answer each question. Data was gathered from the responses to the survey and through a t-test, ANOVA and MANOVA as well as descriptive and constant-comparative analysis, the researcher aimed to identify if knowledge and confidence were inhibitors to teachers implementing technology and the flipped classroom model.

CHAPTER FIVE

CONCLUSIONS AND RECOMENDATIONS

Introduction

The purpose of this study was to determine if teacher knowledge and confidence impacted whether or not a teacher whose district is part of the Southwest Regional Professional Development center in Southwest Missouri would use the flipped classroom model. The findings of this study potentially could be of interest to the superintendents whose districts are located in Southwest Missouri or any district that is in the beginning/implementing stages of a technology initiative. This study was conducted by first collecting and reviewing both quantitative and qualitative data via a survey that was administered through the web-based survey tool, Survey Monkey, which was sent to the superintendents of each of the 80 districts in the SWRPDC. Using Frequency tables, *t*-tests, ANOVAs, and constant-comparative analysis (Bogdan & Biklen, 2007) the researcher compared the group that had heard about the flipped classroom model to the group that had not heard about the flipped classroom model to determine if knowledge and confidence were factors in implementing the flipped classroom model or not.

Conclusions

The results of the study indicate that whether a teacher has heard of a flipped classroom or not, their confidence would not hinder them from trying. The researcher has identified three main insights based on the data collected. First, confidence with technology was not an inhibitor for a majority of teachers. The researcher understood this to mean that teachers were willing to try anything as long as they had base level knowledge to work off of. Ninety-seven percent of responding teachers stated that they receive professional development via their district, specifically to assist with technology integration. Table 7 provides the responses to question 26

which asks the respondents to describe their level of confidence in their own ability to implement a flipped classroom. Seventy percent of the respondents reported having some level of confidence towards implementing while only 30% had low to no confidence.

The second insight was despite not knowing what a flipped classroom was, or knowing very little about it, teachers are willing to learn about it. Respondents acknowledge that professional development around technology and the flipped classroom model are available. They also identified they actively seek them out. Question 8 asked those surveyed if they participate in collaboration over technology and over 91% of the respondents stated that they had participated to some degree. Question 10 asked the respondents if they participate in a network of teachers that discusses/address technology concerns and 85% of those surveyed stated that they had participated to some extent.

The third insight was whether a teacher had heard about the flipped classroom model or not, one major reason they have not or will not consider it is because of their students' access to technology/internet at home. Teachers from both groups have heard (26%) and have not heard (28%) about flipped classrooms, stated access to technology was a reason why they have not implemented the flipped classroom model. A majority of teachers surveyed stated their students have access to technology during the day at school but were told by their building administrators to assume students did not have access at home. Teachers who had not heard of the flipped classroom model stated the reason they had not implemented the flipped classroom model was because of their perceived lack of knowledge of the flipped classroom model. However, their responses to the survey indicated that this was not the case.

Recommendations

Unlike the work of Jeffreys (2000), Gibson (2003), Johnson (2009), the researcher identified that knowledge and confidence were not a hindrance to implementing the flipped classroom model. Instead of knowledge and confidence, the surveyed group noted access to technology as the main deterrent to implementation of the flipped classroom. Some respondents stated, “I do not use the flipped classroom model because it requires students to have reliable access to the internet outside of school...” as well as “...my students lack of internet access at home has limited my implementation of a flipped classroom.”

The researcher recommends school districts seeking to or that already have implemented 1:1 technology initiatives survey their students or patrons to determine Internet accessibility for students at home. Research presented earlier noted that roughly 19 million Americans are without broadband Internet access (Duncan, 2013). Student/Patron surveys may provide district officials with information that could be shared with the teachers, which would help with the 1:1 initiatives.

Knowledge was identified as one of the two reasons why teachers are not implementing technology strategies into the classroom (Jeffreys, 2000; Gibson, 2003; Johnson, 2009). Question 30 in the survey for this study provided teachers the opportunity to answer the questions in an open-ended format. One theme, which was mentioned second to technology access, was perceived teacher knowledge. Results from the survey indicated this was not the case and teachers did have knowledge of the model. What teachers may be trying to say is that they lack the knowledge of tying the flipped classroom model to a meaningful in-class learning experience.

A recommendation to help increase teacher knowledge in this regard could start with district officials considering targeted, researched based, professional development (Appolloni, 2009; Easton, 2008; Killion, 2009; Chikasanda et al, 2013) on the relationship between the flipped classroom model and in-class learning experiences. Professional development around creating effective videos, which require minimal time to set up and edit would also be a strong recommendation. Teacher leaders could then take the lead and serve as the resident expert in each building or department, which may help build more teacher buy-in with the technology initiatives.

The researcher would also encourage the suburban schools to follow the lead of the rural schools by offering more training around the technology that is available to teachers. Research from this study indicated that 65 percent of rural teachers always receive staff development to assist with technology integration while 26 percent of suburban school districts identified that they always receive training to assist with technology integration.

The researcher would encourage that this survey be sent out statewide through regional professional development center. Once each regional professional development center receives the results they can then compare their findings to the other regional professional development centers in Missouri. This would help identify if teacher knowledge of tying the flipped classroom model to meaningful in-class learning experiences and student access to technology were just a concern in Southwest Missouri or if it were a statewide educational concern.

Additionally the researcher suggests future research be done in the areas of student motivation and engagement with not only the flipped classroom model but with any technology in the classroom. Recent research compiled by Zainuddin and Hajar Halili (2016) of the flipped classroom model found it to be an effective strategy and they were unable to find any studies that

showed it to be an ineffective practice. Noting that it is an effective strategy future considerations might be given to researching how to best educate teachers on effective video lectures, effective video aesthetics, and effective editing techniques. These three areas might help improve student engagement and motivation.

The last and what might be the most helpful for teachers is future research on how to tie an effective flipped classroom lesson into an effective in-class lesson. Research could focus which in-class instructional strategies the flipped classroom model works the best with. Is there a specific learning style that the flipped classroom works the best/worst for?

Educator Practice

For practicing educators this study has identified that the flipped classroom model is one more tool teachers could use to enhance student learning. While it is not perfected and teachers lack knowledge, teachers could focus their personal growth on determining what instructional strategies work best with the flipped classroom model. In-class action research could focus on how the flipped classroom model could support their in-class instruction.

The respondents to this survey identified in their open ended responses that knowledge was still a concern and the major factor as to why they have not implemented it. However their responses to the quantitative questions stated otherwise. Hopefully future research around professional development on the model, student motivation and supporting instructional strategies will help educators utilize what has been identified as an effective model.

APPENDIX

(ITCS) Integration of Technology into the Classroom Survey

Directions: For each item listed below, indicate the answer that best describes your current status.			
1. What is your Gender?	Male	Female	
2. Years of experience in education	1-5 years	6-10 years	11+ years
3. Subject taught	Academic Core (MTH, ELA, SCI, SS)	Elective/PE	
4. Grade level taught	Sixth -Eighth	Nine - Twelve	
5. Before today I had never heard of a flipped classroom.	Agree	Disagree	

Directions: Check the box that is closest to your position. Please check only one box per statement.			
	Always	Sometimes	Never
6. Computers and other technology for my classroom are sufficiently available.			
7. I have a computer with internet access available for use at school.			
8. I participate in collaboration with other teachers on issues of instruction that involve teaching with technology.			
9. I participate in mentoring/peer observation/coaching relative to the integration of technology in the classroom.			
10. I participate in a network of teachers that discusses/ addresses technology in the classroom.			
11. My school provides on-site technology support.			
12. I put a lot of effort into implementing technology into the classroom.			
13. I have the knowledge to create a lesson/unit using the flipped classroom model.			
14. Using technology enhances student learning.			

15. My school provides staff development to assist with technology integration, including flipped classrooms.			
16. Flipped classrooms is a technology strategy that I use.			
17. I would feel uncomfortable using a flipped classroom model.			
18. I feel confident in my ability to use technology.			
19. I expect my technology activities to be successful.			
20. I keep working even when there are problems with technology.			
21. My school administrators are supportive in the area of technology integration, including flipped classrooms.			
22. I'm confident that I could create a unit, utilizing the flipped classroom strategy.			

23. The following questions are intended to gage your proficiency level within your classroom.			
Directions: Place a check in the box that corresponds to your comfort with the following. Please check only one box per statement.			
Program names in parenthesis are examples only	I'm proficient	With help I can use it	I know little about this
Basic computer			
Word Processing (word, google docs)			
Spreadsheets (excel, google sheets)			
Presentation Software (MS PowerPoint, Google Slides)			
Graphics (Photoshop, Illustrator)			
Computer input devices (scanners, document cameras)			
Learning Management Systems (Google Classroom)			
Video recording (YouTube, Camtasia, Panopto)			

Flipped Classroom instruction			
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<p>24. The following questions are intended to gage your usage level within your classroom.</p> <p>Directions: Place a check in the box that corresponds to your comfort with the following. Please check only one box per statement.</p>			
Program names in parenthesis are examples only	I use it in my class often (daily/weekly)	I use it in my class occasionally (monthly)	I never use this in my class
Basic computer			
Word Processing (word, google docs)			
Spreadsheets (excel, google sheets)			
Presentation Software (MS PowerPoint, Google Slides)			
Graphics (Photoshop, Illustrator)			
Computer input devices (scanners, document cameras)			
Learning Management Systems (Google Classroom)			
Video recording (YouTube, Camtasia, Panopto)			
Flipped Classroom instruction			

<p>The following open-ended questions are intended to offer an opportunity for self expression in your attitude towards the use of technology within your classroom.</p> <p>Directions: Please type in your response to the following questions:</p>	
25. What has enabled you to be successful in integrating technology into your classroom?	

<p>26. Describe your level of confidence in your ability to implement a Flipped Classroom lesson.</p>	
<p>27. Describe the professional development training you have received that has supported your integration of technology, including Flipped Classrooms.</p>	
<p>28. What professional development success have you experienced in preparing to integrate technology into your classroom?</p>	
<p>29. Describe the types of professional development that you have received in regards to technology implementation in your classroom, especially PD centered around the flipped classroom model.</p>	
<p>30. Describe the reason(s) why you have either chosen to or not chosen to implement the flipped classroom model into your classroom?</p>	

ITCS Survey Recipients

Survey sent to following schools		
Suburban		
Bolivar R-I	Lebanon R-III	Reeds Spring R-IV
Branson R-IV	Logan- Rogersville R-VIII	Republic R-III
Carl Junction R-I	Neosho R-V	Stafford R-VI
Carthage R-IX	Nixa Public Schools	Webb City R-VII
Hollister R-V	Ozark R-VI	Willard R-II
Rural		
Ash Grove R-IV	Fordland R-III	Monett R-I
Aurora R-VIII	Forsyth R-III	Mountain Grove R-III
Ava R-I	Gainesville R-V	Mt. Vernon R-V
Bakersfiled R-IV	Galenna R-II	Nevada R-V
Billings R-IV	Golden City R-III	Niangua R-V
Blue Eye R-V	Greenfield	Northeast Vernon Co. R-I
Bradleyville R-I	Halfway R-III	Norwood R-I
Bronaugh R-VII	Hartville R-II	Pierce City R-VI
Cassville	Humansville R-IV	Pleasant Hope R-VI
Chadwick R-I	Hurley R-I	Purdy R-II
Clever R-V	Jasper Co. R-V	Sarcoxie R-II
Crane R-III	Laclede Co. R-I	Seneca R- VII
Dadeville R-II	Lamar R-I	Seymour R-II
Dallas Co. R-I	Liberal R-II	Sheldon R-VIII
Diamond R- IV	Lockwood R-I	Southwest R-V
Dora R-III	Lutie R-VI	Sparta R-III
East Newton Co. R-VI	Mansfield R-IV	Spokane R-VII
El Dorado Springs R-II	Marion C. Early R-V	Stockton R-I
Everton R-III	Marionville R-IX	Verona R- VII
Exter R-VI	Marshfield R-I	Walnut Grove R-V
Fair Grove R-X	McDonald Co. R-I	Wheaton R-III
Fair Play R-II	Miller R-II	

Link, Philip

From: Johnson, Paul <pjohnson@pagecounty.k12.va.us>
Sent: Wednesday, August 12, 2015 5:30 AM
To: Link, Philip
Subject: Re: Dissertation Survey

Philip,

As discussed on the telephone last week, I have no problem with you using the survey tool that I used in my doctoral work. I wish you the best.

Dr. Paul Johnson
Director of Human Resources & Administration
Page County Public Schools
540-743-4591

On Mon, Aug 10, 2015 at 2:14 PM, Link, Philip <PhilipLink@mail.ozark.k12.mo.us> wrote:

Dr. Johnson,

I was curious if I may have permission to use the survey tool you created for your dissertation? If I'm given permission I will report the findings back to you. Thanks for the consideration!

Philip Link

Assistant Principal and JH AD

Ozark Junior High

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