Perceptions of Blended Learning in the High School Classroom

Kelli Murphy

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TEACHER PERCEPTIONS OF BLENDED LEARNING IN THE HIGH SCHOOL CLASSROOM

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In partial fulfillment of the requirements for

the degree of Doctor of Education

By

Kelli B. Murphy

December 2019
TEACHER PERCEPTIONS OF BLENDED LEARNING IN THE HIGH SCHOOL CLASSROOM

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ABSTRACT

TEACHER PERCEPTIONS OF BLENDED LEARNING IN THE HIGH SCHOOL CLASSROOM

By
Kelli B. Murphy
December 2019

Dissertation supervised by Dr. David D. Carbonara

As innovative technologies and accessibility increase in the K-12 environment, teachers are offered opportunities to rethink the paradigm of the instructional and learning process. They are at the forefront of instructional change. One type of change is the use of technology as an instructional strategy. Blended learning is a type of instructional strategy which incorporates both online and face-to-face instruction.

The instructional choices a K-12 teacher makes under their own volition to present new content in a technology-rich school is the focus of this study. A quantitative research study was performed in a high school with high technology accessibility. Teachers’ intention to use blended learning was measured using the Technology Acceptance Model and its two constraints—perceived ease of use and perceived usefulness. Computer self-efficacy, previous online learning experiences, and teaching beliefs were used as independent variables to
determine if a relationship exists towards teachers’ intention to use blended learning in their high school (grades 9-12) classes. Findings indicated a relationship exists between teaching beliefs and teachers’ intention to use blended learning instructional strategies in their high school classes.
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My journey to complete this dissertation, like many before me, was long and arduous. There were many times when I wanted to walk away and move ahead with other facets of my life and forget this path. I allowed myself to get continually distracted and disheartened in my ability to finish. However with the support of some special people around me, they strengthened my confidence when I needed it and pushed me forward when I fell behind. I would like to acknowledge their efforts and support on my behalf as I FINALLY completed this monumental step in my life.

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The rest of my Murphy family, including my former in-laws (Jack and Maisie Godfrey), showed me love and endless patience. When I finally immersed myself into dissertation writing, occasionally, I canceled seeing them so I could continue to write. They always responded with understanding and the hope that I would complete writing sooner than later.

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# Table of Contents

ABSTRACT ...............................................................................................................................iv

ACKNOWLEDGEMENTS ............................................................................................................vi

List of Tables .............................................................................................................................xi

List of Figures ..........................................................................................................................xii

CHAPTER 1 ................................................................................................................................1

Introduction ...............................................................................................................................1

Statement of the Problem .......................................................................................................2

Conceptual Framework ........................................................................................................3

Statement of Purpose .............................................................................................................5

Instructional Models ...............................................................................................................7

Technology in the Classroom ...............................................................................................9

Research Questions ...............................................................................................................12

CHAPTER 2 ................................................................................................................................14

Technology-Enhanced Learning .........................................................................................14

Instructional Uses ................................................................................................................16

Productivity Uses ................................................................................................................17
Administrative Uses ........................................................................................................... 18

Technology Acceptance Model (Framework) ........................................................................ 19

The Evolution of TAM .......................................................................................................... 20

The New TAM .................................................................................................................... 28

Components of the New TAM ............................................................................................. 32

Current Study ..................................................................................................................... 34

Blended Learning ................................................................................................................. 35

Defining Blended Learning ................................................................................................. 37

Working Blended Learning Definition ................................................................................ 54

CHAPTER 3 .......................................................................................................................... 56

Introduction ......................................................................................................................... 56

Research Design ................................................................................................................. 57

Research Questions ............................................................................................................ 58

Participants and Setting ...................................................................................................... 59

Procedures .......................................................................................................................... 61

Data Collection ................................................................................................................... 63

Limitations and Delimitations ............................................................................................. 65
List of Tables

1. Frequency Distribution - Teaching Experience ...............................................................72
2. Frequency Distribution Technology Confidence Level .....................................................73
3. Survey Questions Descriptives ........................................................................................74
4. Test for Survey Reliability ...............................................................................................75
5. Pearson's Correlation .......................................................................................................77
6. Summary of Mean Results ..............................................................................................80
7. Summary Results of ANOVA ..........................................................................................82
8. ANOVA with Independent Variable Collapsed to Three Categories ...............................83
9. Summary of Mean Results with Three Categories ..........................................................83
## List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Technology Acceptance Model (Original TAM)</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Theory of Reasoned Action</td>
<td>21</td>
</tr>
<tr>
<td>3</td>
<td>Theory of Planned Action</td>
<td>22</td>
</tr>
<tr>
<td>4</td>
<td>Technology Acceptance Model (Original TAM)</td>
<td>24</td>
</tr>
<tr>
<td>5</td>
<td>TAM2</td>
<td>32</td>
</tr>
<tr>
<td>6</td>
<td>TAM3</td>
<td>33</td>
</tr>
<tr>
<td>7</td>
<td>TAM with Study Variables</td>
<td>59</td>
</tr>
<tr>
<td>8</td>
<td>Variable Testing of TAM Using ANOVA</td>
<td>67</td>
</tr>
<tr>
<td>9</td>
<td>Survey Questions Mapped to TAM Framework</td>
<td>71</td>
</tr>
<tr>
<td>10</td>
<td>TAM with Study Variables</td>
<td>95</td>
</tr>
</tbody>
</table>
CHAPTER 1

Introduction

It is rare these days to walk by a K-12 classroom and not see some sort of technology present. The abundance of access, including to the Internet, results in the endless supply of “up-to-date, uninterrupted, limitless supply of information to the students within a short span of time” (Singh, 2013). The presence of technology shifts the paradigm of the K-12 classroom, teaching and learning. In addition, as innovations continue to evolve and increase in accessibility it challenges teachers to rethink their pedagogical practices in this technological world.

Districts look to see how the investment of technology affects student performance. There is an expectation that teachers would use technology to meet the educational needs of the 21st century learner (Ertmer & Ottenbreit-Leftwich, 2010; Kopcha, 2012; Sadaf & Johnson, 2017). “Teaching with technology requires teachers to expand their knowledge of pedagogical practices across multiple aspects of the planning, implementation, and evaluation process” (Ertmer & Ottenbreit-Leftwich, 2010, p. 260). The availability of technology does not always lead to usage. Let’s face it, the adoption of any new technology innovations would depend upon teachers’ acceptance ultimately affecting its usage and implementation.

Acceptance and then subsequently adopting new processes and/or technologies is key towards change. As districts seek to introduce new initiatives that include technologies in the hopes of addressing performance gaps, gaining teacher acceptance will be important. “In neglecting teachers’ perspectives, policymakers, intent upon transforming how teachers teach, have a serious credibility problem in mobilizing teachers to support their reform agenda” (Cuban, 2013, p. 116). Therefore, it is important to determine factors that influence teacher’s perspectives towards technology usage in order to mitigate acceptance.
TEACHER PERCEPTIONS OF BLENDED LEARNING

Statement of the Problem

The attempt to find the most effective and engaging mode of learning for students with respect to individual differences, subject matter and learning objectives has attracted many K-12 teachers towards using blended learning (Neumeier, 2005; Gough, DeJong, Grundmeyer, & Baron, 2017; Kuo, Belland, Schroder, & Walker, 2014). Blended learning incorporates elements of traditional brick and mortar classroom and face-to-face instruction with the use of technology for online instruction. This change in the paradigm of instruction has become a topic of interest to many.

This new model of incorporating both instructional strategies has grown in popularity and usage at the university level (Kuo, Belland, Schroder, & Walker, 2014). There is increased interest in the K-12 levels for blended learning as well. According to the International Association for K-12 Online Learning, “K-12 blended learning is one of the fastest growing areas in the educational system today” (Kellerer, et al., 2014). Consequently, there is evidence of popularity and growth of blended learning through the increase of research.

An analysis of research trends divides into context levels—K-12, higher education, and corporate. An analysis of blended learning research topics in dissertations by Drysdale, Graham, Spring and Halverson (2013) found that 77% of research was conducted in the higher education context level. Blended learning research in K-12 context level has not kept pace in the higher education creating a gap (Halverson, Graham, Spring, & Drysdale, 2012; Drysdale, Graham, Spring, & Halverson, 2013; Spring & Graham, 2017).

In addition to a review of research based on context levels, blended learning can also be divided into various categories. Spring and Graham (2017), through research analysis, were able to categorize the most cited blended learning research into nine main categories. They found that
the most commonly researched blended learning categories were: learner outcomes (42.1%), instructional design (31.6%), disposition/perceptions/intentions (27.6%), exploration (21.1%), technology (21.1%), interaction (10.5%), regional (10.5%), comparison (7.9%), and other (5.3%) with some articles falling in more than one category. In addition, they concluded that the majority of the research focused on student or learner perceptions with only 3.9% on faculty perceptions (Spring & Graham, 2017). While 27.6% of the research represents studies on intention, these studies most often were taken from the student or learner point of view.

There is a need to further explore faculty and teacher dispositions of blended learning practices. Research conducted on blended learning is most often conducted in the higher education context level, the K-12 context level has not been explored as often (Horn & Staker, 2011; Halverson, Graham, Spring, & Drysdale, 2012; Drysdale, Graham, Spring, & Halverson, 2013; Ertmer & Ottenbreit-Leftwich, 2010; Spring & Graham, 2017). In fact, the research that was included in the study of high impact publications on blended learning Halverson, Graham, Spring, & Drysdale (2012) found that the top cited publications focused on pre-service and in-service K-12 teachers in graduate courses. This study will focus on K-12 teachers who are actively teaching in a K-12 school.

**Conceptual Framework**

“There is an apparent gap between the amount of technology available in today’s classrooms and teachers’ use of that technology for instructional purposes” (Kopcha, 2012, p. 1109). Access does not always lead to usage. The ability to predict and mediate adoption would be a great assistance to districts who continue to purchase innovative technologies with the expectations for usage. This study will utilize the Technology Acceptance Model (TAM) to study teacher acceptance of blended learning instructional practices.
TAM was developed by Fred Davis (1989) as a better measure for predicting technology adoption and usage. The original model used two main constructs, perceived ease of use (PEU) and perceived usefulness (PU), as predictors for an individual’s behavioral intention to adopt of technology in the business environment which then is a predictor towards actual usage (see Figure 1). The distinction between PEU and PU “is similar to the distinction between subjective decision-making performance and effort” (Davis, 1989, p. 321). In addition, “TAM posits that PU will be influenced by PEU because, other things being equal, the easier the technology is to use, the more useful it can be” (Venkatesh, 2000, p. 343). This relationship is defined in Figure 1 of the original model of TAM.

In the last two decades of TAM usage, it has proven to be an empirically sound model that is valid, reliable, and easy to administer for the study of technology adoption (Venkatesh, Davis, & Morris, 2007). The versatility of this model shows in the range of technologies that have been researched. “TAM can be used to evaluate new technologies, by measuring the behavioral intention to use; and/or (b) currently used technologies, by measuring usage behavior
TEACHER PERCEPTIONS OF BLENDED LEARNING

(UB—e.g., actual use)” (Holden & Rada, 2011, p. 344). Recent research studies using TAM have included examining variables that may influence technology adoption such as: technology self-efficacy (Holden & Rada, 2011), learning management systems (Alharbi & Drew, 2014), and faculty perceptions teaching online (Wingo, Ivankova, & Moss, 2017).

In this study, the focus will be high school teachers’ perception of using blended learning instructional practices with traditional classes. TAM will be used to examine whether teachers perceive blended learning as a relevant and useful instructional strategy as well as the level of difficulty towards developing blended learning opportunities. Their perceptions will be examined between the TAM determinants with respect to three variables—computer self-efficacy, previous online learning experience, and teaching beliefs. Often it is the teacher in a K-12 classroom who is left with the choice to decide how technology is utilized in their instructional practices (Cuban, 2013).

**Statement of Purpose**

The presence of technology offers opportunity for educators to rethink the paradigm of the teaching and learning process. Technology may be used in all, some or no parts of the instructional process. Blended learning includes the use of online learning in addition to face-to-face for teaching new content, also known as direct instruction. The focus for this study is the choice of which instructional strategy the teacher would choose to present new content. They may choose traditional pedagogical methods of a teacher-centered classroom or with technology providing instruction in addition to traditional practices creating a blended teaching strategy.

The role of technology in the instructional process may take two forms—enhances or replacement. If technology enhances instruction, the teacher provides direct instruction but may use technology towards this goal. If technology replaces direct instruction by the teacher. All
new content is then presented through using technology. Online learning in the K-12 classroom is a shift from traditional teacher-centered classrooms. Combining the two instructional practices of traditional teacher-centered instruction and online learning creates a blended learning environment.

The purpose of this study is to investigate teacher acceptance of blended learning instructional practices in order to more fully understand the evolution of teaching patterns as technology becomes more imbedded in the educational process. The influence of technologies in education may influence teachers to explore alternative instructional methods to meet the needs of their students. However, the potential of technologies may be stymied by lack of acceptance of them into the learning process while still be used in other areas of education.

The influence of technology can be seen in some areas in education. However, not all processes changed by technology are readily accepted by teachers. Reluctance to use technology is on-going. According to Kirkwood and Price “teachers’ conceptions of teaching have significant and interrelated impacts upon how they employ technology and upon students’ learning” (2013, p. 2).

Online systems designed to deliver, enhance, support and track learning for an online or distance learning course or in conjunction are available to be used with traditional classroom learning. A Learning Management System (LMS) provides a secure online environment for the teacher to design learning that is accessible 24/7 to learners with Internet access. It allows the teacher to present and manage course material, provide communication forums and deliver and track student evaluations via multimedia inputs, online discussions, live chat sessions, assessments and assignments and the ability to push third-party applications. As a result, it has become a key tool towards online and blended learning (Al-Busaidi & Al-Shihi, 2012).
One of the key factors for using an LMS in education is its design towards universal accessibility. Many of today’s LMS are designed to run on any WiFi or Internet-based device such as computers, laptops, tablets and smartphones. Easy access and multi-device accessibility increase learning opportunities in and out of the physical classroom. The use of LMS as tool for pedagogical practices allows K-12 teachers more opportunities to engage the students. Content can be delivered face-to-face, by the computer with the physical presence of the teacher and in alternate locations with virtual classrooms. If K-12 teachers chose to create and deliver content using a combination of these methods, then they are creating a blending learning experience for the student.

**Instructional Models**

The teacher’s role in the 21st century classroom may evolve as the capabilities of technology grow. One common view of K-12 education incorporates aspects of traditional practices with modern technology. It places the teacher at the center of providing content using instructional practices with low levels of technology. This is known as teacher-centered learning. Student desks are faced towards the teacher and class activities structured by the teacher.

In this scenario, the addition of technology in the classroom has not necessarily changed teaching from this model. It is not uncommon to see traditional teachers using technology to present content or as a tool for students to type papers—low levels of technology. The teacher often controls the technology in learning in respects to which type, how and when it is incorporated (Florida Center for Instructional Technology at the University of South Florida, School of Education, 2018).
In contrast to teacher-centered is the student-centered instruction model. This model puts the student as the center of instructional activities supporting student responsibility in learning activities. The International Society for Technology in Education (ISTE) defines student-centered learning as the process to “move students from passive receivers of information to active participants in their own discovery process” (2018). This model focuses on the individuality of the student and their learning needs (International Society for Technology in Education, 2018; Tomlinson & McTighe, 2006; Beetham, 2013).

For the purposes of this study, the focal point for research is from the teacher’s perspective and their instructional practices. The adoption of any new innovations, resources, and practices depend on a teacher’s acceptance and usage for their success. Teacher-centered instruction refers to instructional practices where technology is used to enhance the activities of teacher and reinforce learning. All instruction is directed and delivered by the teacher. This type of instruction is also referred to as traditional.

In contrast, a student-centered instruction is less centered on the role of the teacher and more of the individual learner. The teacher’s role is more of a facilitator and mentor to the student during the learning process. There may be a variety of resources used for instruction in a student-centered classroom, including technology. Teacher technology usage for this type of instruction tends to be at a higher level of integration.

The levels of teacher integration of technology are congruent with their evolving pedagogical practices. The Technology Integration Matrix (TIM) has five clearly delineated levels of technology integration by the teacher of which are helpful in this study (Florida Center for Instructional Technology at the University of South Florida, School of Education, 2018). The levels move from an entry level of usage which is reminiscent of traditional classrooms with
TEACHER PERCEPTIONS OF BLENDED LEARNING

the center of instruction generates from the teacher presenting content towards a transformational learning environment where the role of the teacher has transformed to guide or mentor of learning.

The five levels of TIM reflect the role of technology in the active learning process. The beginning level of integration, Active Entry, sees the majority of technology usage by the teacher to support delivery of information or to reinforce skills. The Adoption and Adaption levels sees the role of the teacher shift with usage of technology. The teacher moves from the center of the room presenting content and shifts towards directing student exploration and facilitating student independence in learning.

The fourth level of Infusion sees more student independence in their use of technology with the teacher as a guide. The last level of Transformation encourages students to engage in higher order activities which would not have been possible in a traditional classroom or without the use of technology. The teacher is able to guide and mentor the student in their learning as well as acting as a model for technology integration.

Technology in the Classroom

“Technological innovations have been drafted often into the task of altering teacher-centered practices” (Cuban, 2013, p. 112). However, access to technology does not guarantee usage or integration by the teacher though it is the first step towards transforming instructional strategies beyond the focus on just the technology itself (McKnight, O'Malley, Ruzic, Horsley, & Franey, 2016). A major influence in the adoption of any new process in the classroom is the teacher. “Teachers’ conceptions of teaching have significant and interrelated impacts upon how they employ technology and upon students’ learning” (Kirkwood & Price, 2013, p. 537).
TEACHER PERCEPTIONS OF BLENDED LEARNING

The CoSN Horizon Report states that one of the challenges towards technology adoption in K-12 education is the need to rethink the roles of teachers stating that “educators are moving beyond dispensing information and assessing students’ knowledge, which are tasks that can be increasingly outsourced to machines” (Freeman, Adams Becker, Cummins, Davis, & Hall Giesinger, 2017, p. 24). How teachers accept technology and use it in the learning process means new models of instruction. Ertmer and Ottenbreit-Leftwich stated that “if teachers are going to adopt new beliefs about teaching and learning, they need to understand how these beliefs translate into innovative classroom practices” (2010, p. 275).

Blended education involves a combination of multiple instructional delivery modes incorporating technology and face-to-face interactions for purposes of meeting learning objectives. “Pedagogically, blended learning encourages active learning, student-centered learning, as well as peer-to-peer interactions” (Tandoh, Flis, & Blankson, 2014). In addition, it is hoped that the utilization of selected technologies such as learning management systems coupled with face-to-face learning interactions that educators use will provide to our students authentic learning experiences (Bullock, 2015).

The need to incorporate online tools and learning with traditional teaching practices cannot be overstated as educators prepare their learners for the skills, knowledge and abilities of 21st century jobs. “Teachers need to know how and why to use technology in meaningful ways in the learning process for technology integration to work” (Gorder, 2008). Technology empowers educators to meet the initiatives outlined by the Partnership for 21st Century Skills to develop good communicators, critical thinkers, good collaborators, and information and technology literate (21st Century Partnership, 2009).
According to Ertmer & Ottenbreit-Leftwich (2010), “professionals of the 21st century think and act differently than those of previous centuries, due at least in part to the radically different tools they use to perform their jobs.” In previous decades, schools relied heavily on books, papers and writing utensils. The priority for student and educator access to “robust and comprehensive infrastructure when and where they need it for learning” (2018) is an articulated goal of U.S. Department of Education, Office of Educational Technology. As a result, we find large district investments in WiFi infrastructure to support district and individual devices which can be used with innovative software in the learning process.

In the traditional brick and mortar classroom, technology-enhanced indicates the presence of some computer technology. It does not, however, define how the technology is used in the classroom or by whom. For example, a single computer may see more use by the teacher for purposes such as presentation of content, communications (towards educators, parents, and perhaps students), creation of learning materials and research.

The hope for the investment of classroom technologies is that an increase in the quantity of computers would translate to its integration into learning. The increase of technology would mean the availability of technology to use in teaching and learning practices. “The success of any initiatives to implement technology in an educational programme depends strongly upon the support and attitudes of teachers involved” (Teo, Lee, & Chai, 2008, p. 128).

There are expectations for student use in learning in the 1:1 laptop model in meeting 21st century skills. In addition, schools provide a variety of online learning resources for teachers to utilize with students. As technology innovations continue so do the usage of technology in many classrooms. However, whether the school mandates usage of said technology, process or application, the effectiveness of the implementation will still reside with the teacher.
TEACHER PERCEPTIONS OF BLENDED LEARNING

Teachers are in the front line of education with direct responsibility for the learners in their classroom. They influence the initiatives that directly affect the learning in their classroom. Teacher satisfaction and acceptance of new technologies, processes and how they integrate into their teaching is significant towards acceptance and subsequent usage (Gough, DeJong, Grundmeyer, & Baron, 2017; Al-Busaidi & Al-Shihi, 2012; Means, 2010; Teo, Lee, & Chai, 2008). Consequently, there is a need to understand the perceptions of teachers as they make the choice to adopt a new technology or instructional strategy.

Research Questions

The focus of this study is to explore teachers’ perceptions of using blended learning in their high school courses. The teachers’ use blended learning for instruction will be contrasted with face-to-face instruction with technology support. During the exploration, it will be important to differentiate between use of technology as an enhancement to instruction or in a primary role of delivering instruction in their high school courses.

The study will look to study teachers who are not currently scheduled to teach online or blended courses for the school district. The choice to use blended learning is voluntary. This study will take the perspective of the teacher on the challenges of technology integration into content delivery. It will also compare teacher perceptions of blended learning based on personal characteristics (age, years of paid teaching service, years teaching in current school district, previous experience of online teaching/learning, Pennsylvania certification, role as an administrator or a supervisor, confidence level of technology, previous online teaching/learning experience and whether they current create instruction). The specific research questions are:

RQ1: What is the relationship between computer self-efficacy and high school teachers’ intentions to use blended learning instructional practices?
RQ2: What is the relationship between prior experience with online learning and high school teachers’ intentions to use blended learning instructional practices?

RQ3: What is the relationship between high school teachers’ teaching beliefs and high school teachers’ intentions to use blended learning instructional practices?

RQ4: What are high school teachers’ perceptions towards blended learning instructional practices can meet their instructional objectives (perceived usefulness)?

RQ5: What are high school teachers’ perceptions towards creating blended learning instructional practices to meet their instructional objectives (perceived ease of use)?
CHAPTER 2

Technology-Enhanced Learning

Technology innovations have changed the dynamics of teaching and learning in the classroom. Access to powerful technologies with Internet no longer limit instruction to the teaching presenting in the physical classroom. Technology allows teachers to provide an extension to their learning beyond the four walls. Ultimately, technology can offer the teacher increased teaching environments and the learner increased learning opportunities.

“Teaching with information and communication technologies has become required practice at all levels of education, and [technology] tools are evolving and multiplying at a frantic pace” (Bhati, Mercer, Rankin, & Thomas, 2009, p. 5). Accessibility does not always lead towards the intended uses. Studies have indicated that the availability and capability of technology does not always translate to a change in pedagogical practices in the classroom (Cuban, 2013; Means, 2010).

It may be that technology is used to supplement traditional teacher-centered pedagogy. The teacher still controls the pace and style of learning in the classroom though technology may be included in their presentation of content. This resembles traditional teaching of the 20th century but with 21st century technologies. Technology is present in the classroom, but it is used to support teacher instruction.

In their work on blended learning, Horn and Staker (2015) define technology-rich instruction as a classroom with a variety of digital tools but where the teacher still employs traditional teacher-centered pedagogy. While the presence and availability of technology is essential towards usage, it does not always lead to innovation in teaching for learning. Efforts for integration and effectiveness “must focus on teachers (not technology); what they believe
TEACHER PERCEPTIONS OF BLENDED LEARNING

comprises good instruction and good learning; how they put those beliefs into practice; and how they can be supported by the contextual, cognitive, and affective factors that exist in their school environment” (Ertmer & Ottenbreit-Leftwich, 2013, p. 180). Therefore, it is important to research teaching beliefs as a factor toward technology usage and integration.

“Therefore, it is important to research teaching beliefs as a factor toward technology usage and integration.

“Teachers’ beliefs, practices and attitudes are important for understanding and improving educational processes” (Dehghayedi & Bagheri, 2018). They reflect a teacher’s pedagogical training and experiences through which decisions and actions are made. “Teachers’ conceptions of teaching have significant and interrelated impacts upon how they employ technology and upon students’ learning” (Kirkwood & Price, 2014, p. 2). In their study on teachers’ pedagogical beliefs and technology usage, Palak and Walls (2009) found that “teacher use of technology is most frequent for preparation, administration, and management purposes, but rare when it comes to facilitating student-centered pedagogy even among those teachers who work in technology-rich schools and are comfortable with technology.”

There have been many technological advances in education in the years since this study which may change teacher perceptions on how technology can be used in instruction. New technology innovations have meant new uses in education. “Although previous media technologies generally placed children in the role of passive observers, these new technologies make content construction much more accessible to students, and research indicates that such uses of technology can have significant positive effects” (Roschelle, Pea, Hoadley, Gordin, & Means, 2000, p. 80). But it has not always led to significant usage in the instructional process by the teacher.

Continual technology innovations warrant continued research on technology acceptance to anticipate adoption. Researching the factors for technology acceptance would help transition
towards adoption. One factor which may influence teachers’ pedagogical beliefs may be their feelings on whether these technologies will meet their needs as an educator. Ball and Levy (2008) used three categories to describe classroom technology use—instructional, productivity, and administrative. A further exploration of each of these categories will help define the use of technology in instruction.

**Instructional Uses**

The goal of instruction is to provide students with opportunities for effective learning. “In effective classrooms, teachers consistently attend to at least four elements: whom they teach (students), where they teach (learning environment), what they teacher (content), and how they teach (instruction)” (Tomlinson & McTighe, 2006, p. 2). The content, resources, and pedagogies employed by the teacher contribute towards this goal. How the technology is utilized to support or to provide instruction differentiates its purpose.

The same technologies used for productivity and administrative tasks can be used by the teacher to support learning. For example, a math teacher plans to introduction a lesson on parameter and area. The teacher writes the equations for perimeter and area on the board. Then directs the students in a discussion on the differences between the two. Another choice could be that she uses technologies to illustrate the differences and complete the calculations.

The teacher has the students measure the walls of the room. In real time the teacher demonstrates the steps to solve the problem using her computer which is connected to a multimedia projector and interactive board. She creates a quick blueprint of the classroom using Microsoft Word draw tools with gridlines turned on to resemble graph paper and demonstrates the differences between perimeter and area of the classroom. The students watch the demonstration.
TEACHER PERCEPTIONS OF BLENDED LEARNING

Once the teacher has completed the presentation of content, she directs the students to apply the concepts. They will use the same equations with a host of other numbers to practice their application of the concepts. The students may use a calculator or a spreadsheet using Microsoft Excel to provide quick calculations for the problems with changing values.

This is an example of a lesson enhanced or enriched by the technology available to the teacher and students in the classroom. Technology supports the presentation of content by the teacher. The new concepts are reinforced by the students as they practice calculations individually. Other tools such as tablets and clickers may be considered instructional tools for learning as well. The main usage of instructional technologies is to support the teacher as they provide the content in a face-to-face learning modality.

**Productivity Uses**

Technology in the classroom may also be used as a productivity tool to prepare for learning. This type of technology usage may see technology as research tools to gather materials or to create curriculum materials to support teaching activities. Programs such as word processing, desktop publishing, spreadsheets and presentations have been the mainstay for any organizational environment and also used in the educational environment as well. Worksheets, graphs, and essays are common outputs with use of office suite tools which may be completed during class or as an at-home assignment.

The preparation for learning is not limited to the use of technology for printed outputs. Specialized programs for such as screen casting, may also be used to create learning materials. Screen casting allows a user to create videos of movements and content from a computer screen. This type of technology allows a teacher to create content videos for self-paced learning and
even how-tos. Other specialty programs to create learning materials may include video and audio editing. These are all examples of productivity uses of technology for learning.

**Administrative Uses**

Administrative uses of technology indirectly affect student performance. Technology and the Internet have increased a teacher’s capability to effectively communicate. Teachers use computers to calculate grades, send student progress updates, communicate with students, parents and school personnel and professional peers. Technology has provided an effective tool for all to provide information and timely responses.

Student information systems maintain information on many aspects of the student. Grades, attendance, medical, disciplinary and biographical data of students are kept in this system. Teachers enter grades in the online gradebook and the student is notified immediately. Parents and students are able to keep informed of student progress though the real-time capabilities of the electronic gradebook.

These are all examples of administrative uses of technology. These include the use of technologies to support and to evaluate learning but not that are not directly used in instructional activities. The teacher is not interacting with students and fostering learning while completing administrative tasks. They are, however, important tasks that support learning. Administrative use of technology will not be included in this research.

Function and purpose of technology is often determined not just by the technology but also by the usage. “Technology integration is not about the availability of technology, but more about the teachers’ effective use of technology that makes a difference in reforming a classroom” (Gorder, 2008, p. 65). The process to use technology not just as a support to teaching but as the provider of instruction would mean a change and shift in pedagogical practices. However,
change does not happen without acceptance. Therefore, it is important to isolate the factors of acceptance to mitigate the barriers of change—most specifically in instructional practices.

**Technology Acceptance Model (Framework)**

The major purpose of this study is to identify factors that influence teacher’s decisions to voluntarily adopt blended learning as an instructional practice to their traditional class schedule. In this study, teachers given access to a learning management system (LMS) in a 1:1 computing environment were encouraged but not mandated to incorporate it in their face-to-face courses. Professional development was provided to all teachers on the new system. They are able to incorporate new instructional strategies utilizing available technologies of laptops, internet access and learning management systems.

Teachers’ beliefs about technology and its application towards instructional delivery would influence their usage. The choice of whether they to incorporate these resources may depend on their perceptions about whether these technologies will meet their instructional needs and whether students learn from digital delivery of instruction. The technology chosen by the educational institution may have been allocated for usage in learning, but the success of its usage would remain with the teachers. Technology integration and performance would improve if the institutions could minimize the barriers for usage.

This study seeks to study teacher perceptions about the use of learning management systems towards creating blended learning opportunities. One of the most significant and popular acceptance models present in research is the Technology Acceptance Model (TAM) developed by Fred Davis for doctoral thesis in 1986 (Davis, et al,1989; Venkatesh and Davis, 2000; Venkatesh and Balla, 2008; Fatherma, Shannon, and Ross, 2015). “Numerous empirical studies have found that TAM consistently explains a substantial proportion of the variance
TEACHER PERCEPTIONS OF BLENDED LEARNING

(typically about 40%) in usage intentions and behavior, and that TAM compares favorably with alternative models such as the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB)” (Venkatesh & Davis, 2000, p. 186).

This research uses the extended version of TAM, also referred to as TAM3, to understand the teacher propensity to incorporate blending learning techniques in their high school courses voluntarily. TAM was developed for the purposes of developing “better measures for predicting and explaining [information technology] use” (Davis, 1989, p. 320). It was originally developed to predict technology (email) usage in the business environment. The widespread usage of TAM has included education to help predict technology adoption by teachers and students.

The Evolution of TAM

TAM’s premise is an evolution from the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975) and the Theory of Planned Behavior (TPB) (Ajzen, 1991) both of which focused on the cognitive self-regulation towards prediction of behavior. TRA, TPB and TAM are examples of acceptance models in social behavioral studies. “The goal of technology acceptance research is to understand what technology acceptance factors influence the behavior outcome of an individual’s choice to use (or not use) the technology, and focuses largely on the decision to adopt a technology for subsequent usage” (Buche, Davis, & Vician, 2012, p. 42). TAM was initially presented as an adaption to TRA, which is a more general social psychology model (Venkatesh, Davis, & Morris, 2007). The journey from TRA to TAM is worth further exploration as how TAM became a dominant model in technology adoption and acceptance research.

The central tenant of TRA is an individual’s intention towards completing a specific behavior. “Intentions are assumed to capture the motivational factors that influence a behavior;
they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior” (Ajzen, 1991, p. 181). In this model, intention is affected by the control an individual has in completing that action, beliefs about the behavior, and perceptions of socially expected behavior. These are the components in the TRA model (see Figure 2).

![Figure 2. Theory of Reasoned Action (Fishbein, 1979) was used as a model to predict behavioral intentions (Madden, Scholder Ellen, & Ajzen, 1992). Reprinted by permission.](image)

“The success of [TRA] in explaining behaviors depends on the degree to which a particular behavior is under volition control (that is, the individuals can exercise a large degree of control over the behavior)” (Montano & Kasprzyk, 2015, p. 98). However, the components of TRA are less effective in predicting behavior when the participant is mandated in their behavior, less of a voluntary choice. Consequently, Ajzen (1991) updated the model by adding perceived control.

Ajzen created TPB as an extension of TRA dealing with the limitations of the models in dealing with voluntary choice. He found that choice is a factor in whether in predicting whether a person completes a behavior. TPB incorporates planned behavior into the model using the
constructs of attitude, subjective norm and ability to determine the likelihood or intention of a person completing an action or behavior, see Figure 3. Again, the central component of TPB is intention. “Intentions are assumed to capture the motivational factors that influence a behavior; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior” (Ajzen, 1991, p. 181).

There is a direct relationship between intention and behavior. The deeper the intention a person has towards a behavior the more likely they are to perform the behavior. For example, if a person wanted to play a game of tennis, we can measure their efforts to do so in a variety of ways. They may be influenced by friends who also play tennis and encourage them to participate. This results in them purchasing the appropriate equipment as well as enrolling in tennis lessons. Their motivation can be measured by the efforts taken with purchasing the

![Figure 3. Theory of Planned Behavior created as an extension of Theory of Reasoned Action to include subjective norm (Ajzen, 1991). Reprinted by permission.](image-url)
equipment and taking lessons. There is a high probability that the behavior to play a game of tennis will happen due to the efforts made towards this end.

There are some commonalities and differences between the three frameworks—TRA, TPB and TAM. The focus of TRA and TPB have been on attitude and subjective norm towards the intention to perform a specific behavior. “Consistent with TRA, TAM suggests that the effect of external variables (e.g., system design characteristics) on intention is mediated by the key beliefs (i.e., perceived ease of use and perceived usefulness)” (Venkatesh, 2000, p. 343). Whereas, TAM focuses more on the relationship of the behavior that affects their job. The use of a specific information technology which may be helpful or a hindrance in some aspect of their job. “A key purpose of TAM is to provide a basis for tracing the impact of external variables on internal beliefs, attitudes, and intentions” (Legris, Ingham, & Collerette, 2003, p. 192). More specifically, the conceptual framework of TAM focuses on the users’ behavioral intentions as important factors towards the use of information technology. It is specifically designed to measure predictability of the adoption of technology. The Components of TAM

TAM states that adoption of information technology is based upon user perceptions. The adoption, or intention, is based upon two key predictors of behavior—perceived usefulness and perceived ease of use as seen in Figure 4. The hypothesis is that a user’s intention is a close predictor of user’s behavior with intention affected by user’s attitude and perceived value of the system (Lee & Lehto, 2013). “The emphasis [of TAM] is placed on understanding users’ usage behaviors towards technology through usability testing and evaluation methods, which are targeted to ensure that users can operate a technology efficiently, effectively, and satisfactory” (Holden & Rada, 2011).
The TAM framework measures the degree to “which a person believes that using a particular [technology or process] would enhance his or her advantageously” (Davis, 1989, p. 320) which implies choice. The user’s choice may be to accept this new technology or process or not to accept it. This choice may be in agreement with their organization or in disagreement. An organizational initiative may be successful or not depending on whether its workers accept a change or not. The ability to adapt and prepare employees for changes would be of importance to any organization.

Davis, Bagozzi and Warshaw (1989) adjusted the original TAM further with the elimination of attitude as a determinant. The link between attitude and perceived usefulness was found to be weak as users may still intend to use a technology despite not having a good attitude towards it (Venkatesh, 2000). Users may be willing to overcome difficulty in learning and using a new technology if they perceive it to have a positive effect on their job. “The omission of
attitude helps better understand the influence of perceived ease of use and perceived usefulness on the key dependent variable of interest—intention” (Venkatesh, 2000, p. 343). The resulting framework focused on two determinants with influences from external variables. Defining the determinants further will illustrate the relationships between the elements of the framework.

TAM Determinants. There are two key predictors of TAM, perceived usefulness and perceived ease of use, which represent the individual’s view of how a technology may affect their job performance. Collectively they define whether a person is more willing to make a change through use of a technology or remain status quo. Their perception of the change may vary over time increasing their acceptance of the change or rejection. Organizations seeking to push change through use of technology would want to mitigate the issues associated with low perceptions into order to increase usage.

The first key predictor of TAM is perceived usefulness (PU). PU is defined as the extent a user believes that using the new technology will add benefit to their job (Davis, 1989). For example, a teacher is introduced to email as a way of communicating to co-workers, administrators, and parents. Using email promises to increase the timeliness of receiving and responding to information. In order to gain the benefit from using email, they would need to add the steps of logging in more frequently. This is a change of practice which may discourage teachers to use email in the first place.

Schools have sought to become more responsive to the needs of learners in a globalized society (Tomlinson & McTighe, 2006). “Many changes in schools today can be credited to the utilization of computer technology” (Hampton, Anderson, & Sigman, 2002, p. 3). Teachers have been introduced to many technology tools and processes that have directly and indirectly affected their job performance. Some of these technology implementations were of voluntary
distribution and some were of mandatory use. If the usage of some technology was reflective in job evaluation, then there may be a higher level of perceived usefulness to the implementation.

Technology bridges the gap offering a partnership between the school, students and parents by offering an immense amount of information in a timely manner such as student graded performance, attendance, and learning objectives (Hampton, Anderson, & Sigman, 2002). Since the implementation to schools, many administrations have mandated that scores be entered into the electronic gradebook within 48 hours of a graded assignment.

Tracking progress with electronic gradebooks increases the ability of teachers to adjust instruction or pace as needed. Some gradebooks also include analytics on whether the ability to track student progress towards meeting learning standards. The access to this type of information creates a partnership between the teachers, students and parents. The communication capabilities of many of the systems keeps all parties informed in the learning process.

The electronic gradebook provides an example to illustrate some of the determinants or variables that can affect PU. Prior to full implementation of electronic gradebooks schools allowed teachers the choice of using one to track student progress. In this example, the extent that the teachers believe that using electronic gradebook will benefit their teaching may change their intentions to be receptive in using it. Variables such as social pressures to use or not to use from other teachers are a contributing factor.

It may be the social group within the school that the teacher identifies with is progressive in their adoption of technological practices in education. Their acceptance and use of electronic gradebooks can influence this specific teacher’s use of it. “Across the many empirical tests of
TAM, perceived usefulness has consistently been a strong determinant of usage intentions, with standardized regression co-efficient typically around 0.6” (Venkatesh & Davis, 2000, p. 187).

A variety of variables have been studied to identify influences of PU, in TAM research studies. Sagers and Grover (1993) included six variables (work more quickly, makes job easier, useful, increase productivity, effectiveness and job performance) in their factor analysis of the TAM framework. In their research into student adoption of e-textbooks, Van Horne, Henze, Schuh, Colvin and Russell (2017) focused on how the e-textbook was in completing major class assignments, preparation for exams and in developing a deeper understanding of course content. Behrend, Wiebe, London, and Johnson (2011) utilized accessibility, ease of travel, technology anxiety and reliability as determinants for PU in their study.

The second key predictor of TAM is perceived ease of use (PEU). It is defined as the belief that a user has that the technology or process will be free of effort or relatively simple to learn (Davis, 1989). The two key predictors of user’s behavior in TAM are interrelated. Vankatesh states that “TAM posits that PU will be influenced by PEU because, other things being equal, the easier a technology is to use, the more useful it can be” (Venkatesh, 2000, p. 343). The adoption of the technology is more likely to take place if it is perceived to be easy to use.

Personal experiences may dictate the adoption rate of a user towards the new technology. “Perceived ease of use has been theorized to be closely associated with individual’s self-efficacy beliefs and procedural knowledge, which requires hands-on experience and execution of skills” (Venkatesh & Bala, 2008, p. 279). For example, a teacher who willingly uses technology in various aspects of their life (banking, media, communications, health care, etc.) may find less difficulties with adopting another technology.
External variables may affect a user’s intention to use. They are referred to as those influences outside of the user and more related to the environment such as professional development or training, accessibility to the technology, stability of the technology, support, and quality of the systems. A user’s experience with the technology would also be considered to be a PEU variable. These variables are considerations as to whether the users believe that the technology is user-friendly and would be free from trouble to use.

The perception that a new process or technology tool may be easy to learn and master, though, may be a different measurement for each user. Previous experience is one of the many determinants that could affect the technology adoption. The level of ease may be dependent on previous experiences which can affect perspective and ability towards this new item. Learning a new technology tool or process may involve individual time and effort on varying levels. “Most educators will expend the effort needed to integrate technology into instruction when, and only when, they are convinced that there will be significant payoffs in terms of student learning outcomes” (Means, 2010, p. 287).

The original model of TAM focused on these two keys as a predictor of technology use—PU and PEU. In the past few decades since its original introduction, TAM has been continually used as a theoretical framework for predicting technology adoption. It has, however, gone through numerous studies as well as redevelopments.

The New TAM

The application of TAM in a multitude of situation is made easy to apply due to its economy of design with its predictive power (Venkatesh, 2000). Consequently, TAM has been used in numerous technology adoption studies in education as well as the business environments. Buchanan, Sainter, and Saunders (2013) explored Internet self-efficacy in higher education
TEACHER PERCEPTIONS OF BLENDED LEARNING

faculty. Chen, Sivo, Seilhamer and Sugar (2013) sought to evaluate and predict the use of mobile technologies with Blackboard in higher education. Research conducted by Wingo, Ivankova and Moss (2017) explored faculty perceptions of teaching online courses at the university level.

Over time, though, changes have been made to the framework to broaden its findings with the determinants of the PEU. Venkatesh and Davis (2000) continued to update TAM to further explore how variables affect the key determinants to PU and PEU. They added external variables such as internal beliefs, personal abilities, attitude, mind-set affect intention to use the technology, see figure 3. The variables were explored to seek a more detailed relationship between factors that may contribute towards technology acceptance.

The new version, referred to as TAM2, “incorporates social influences (subjective norm, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived ease of use)” (Venkatesh & Davis, 2000, p. 187). TAM2 incorporated additional factors of technology knowledge and experiences as well as perceptions towards the adoption of technologies from the original TAM framework. Self-efficacy appeared as a factor for Davis and Venkatesh in the TAM2 update.

Social influence plays a role in the user’s voluntariness. Acceptance of technology by co-workers may influence an individual’s adoption of the same technology. “TAM2 theorizes that, in a computer usage context, the direct compliance-based effect of subjective norm on intention over and above perceived usefulness and perceived ease of use will occur in mandatory, but not voluntary, system usage settings” (Venkatesh & Davis, 2000, p. 188). Therefore, it is added as a factor towards intention to use technology.
The development of further editions of TAM included various determinants of technology adoption and use. Venkatesh (2000) proposed that a new framework was needed to present alternate perspectives based upon anchors and adjustments to PEU and PU. The determinants represented a user’s general beliefs about technology and technology usage. He labels the anchors for PEU as computer self-efficacy, perceptions of external control, computer anxiety and computer playfulness.

These determinants may be positive or negative experiences they have had with other technologies unrelated to the current one. Whether it was easy to learn and use technology, computer self-efficacy is an individual perspective that plays an important role in the adoption process. “Computer self-efficacy, facilitating conditions, computer playfulness, and computer anxiety are system-independent, anchoring constructs that play a critical role in shaping PEU about a new system, particularly in the early stages of user experience with the [new technology]” (Venkatesh, 2000, p. 346).

User control is an important contributor technology acceptance and adoption. This may entail the access to resources as well as the ability to use them. The interaction with the organization in terms of facilitating the technology implementation and training also contributes to control within the user towards the specific technology. The availability of resources and opportunity to use them account towards the perception of ease of use. There are also examples of external control variables.

Computer playfulness is a term that Venkatesh (2000) uses to describe use of technology by the individual independent of their job. The user indulges in interacting with the technology for the sake of it. This variable is an intrinsic motivator. There is no reward for use but rather an
innate need to use it. As opposed to an extrinsic motivator where a user is rewarded for use of the specific technology.

The next determinant sides with a more negative emotion—anxiety. Computer anxiety is the user’s apprehension when faced with the event of interacting or using the specific technology (Davis, 1989). In other words, the level of difficulty a user feels the new technology may be to learn may prevent them from fully adopting it. Computer anxiety may elicit an emotional and a cognitive response by the user affecting their perception. Adjustments Venkatesh and Davis (2000) have been added to the new model to account for user’s enjoyment from the technology and the technology’s ability to satisfy the stated objectives of its use.

Venkatesh and Davis (2000) extended TAM by proposing to incorporate various social and cognitive influences on PU. They are subjective norm, image (the concern a user feels they portray with use of the technology), job relevance, output quality and demonstrated results from usage of technology (Figure 5). These are all factors that are related to the use of the technology for the benefit in the user’s job. For example, a digital gradebook is applicable to a teacher’s job but the digital sound system in the auditorium may not be unless they are a music or theatre teacher.
There are four determinants that have been added to the TAM3 model which influence PU and PEU. These new determinants are the results of Venkatesh and Balla (2008) synthesizing the usage of TAM over the years. These new determinants are Individual Differences, System Characteristics, Social Influence and Facilitating Conditions, see figure 6.

Individual Differences refer to the individual characteristics of the user. Gender, usage experience, age, and other personality demographics may influence a user’s perception for and thus their intended behavior towards the new technology. Previous experience or lack thereof can encourage or discourage a behavior towards technology (Fathema, Shannon, & Ross, 2015). In the original version of TAM, demographics of the user were not measured.
System characteristics refers to the technologies themselves. A technology that is so complex with many steps, may discourage application and influence the potential user’s frequency to use. Venkatesh and Bala (2008) refer to them as the “salient features of a system that can help individuals’ perceptions of perceived usefulness and perceived ease of use”

![Diagram](image)

**Figure 6.** TAM3 presents the synthesis of prior studies using TAM as of 2008 (Venkatesh & Bala, 2008). Adapted by permission.

(p. 276). For example, there are an abundance of software choices available to create and edit digital videos from the simplistic to the complex. While some software can produce professional results, the ease and simplicity of the point and shoot video capabilities of most cell phones lessen the need for editing.

Social Influence, also known as subjective norm, was first introduced by Fishbein (1979) in his work with the Theory of Reasoned Action (TRA) and then in the subsequent model of Theory of Planned Behavior (TPB) with Ajzen (1991). It is defined as the influence of those around the user towards completion of the behavior based upon the user’s perception. Whom the
user feels are important with respect to their intention to or not to do the behavior. For example, a new technology of an interactive whiteboard is available in some classroom placements. Some teachers are excited for its integration and some are highly resistant to its use. To measure a specific person on their individual behavior to use or not use this new technology may be reflective of which group they most identify with.

Facilitating characteristics represent the organizational support as new technologies are introduced and systems implemented (Venkatesh & Bala, 2008). These characteristics include the organizational side which represents those that make the decision for purchase of specific technologies, implementation plans, training, support and other areas which make it available to the user. A great product can remain unused without adequate implementation and support.

**Current Study**

TAM can be used for a plethora of technology-related areas; such as the use of a specific hardware or application to a process that includes technology. For example, a teacher may have a multimedia project in their classroom for use to show videos on history topics. However, they are not using the multimedia projector for presenting lessons. The use of the technology is limited in its instructional uses by the teacher. The strategy of whether to utilize the projector may be predicted based on the teacher’s perception of ease of use and usefulness in their classroom.

In this study, teacher’s perceptions delivering instruction in an online environment as well as in a traditional face-to-face will be evaluated. The practice of teaching online as well as face-to-face creates a blended learning environment if students have some control of their learning. In addition, content is introduced in one environment without a duplication to the next. The flow of instruction shifts from one environment to the next. However, blended learning
strategy does not include posting of class materials online with all instruction remaining in the face-to-face classroom. This type of educational situation would be considered traditional teaching with enhanced technology.

An understanding of how technology and the resulting instructional practices are incorporated by teachers in K-12 schools as well as higher education would assist in organizational planning and design for user acceptance and usage of new technologies. As noted by Ertmer and Ottenbriet-Leftwich (2013), “although teachers may believe that technology helps them accomplish professional and/or personal tasks more efficiently, they are reluctant to incorporate the same tools into the classroom for a variety of reason including lack of relevant knowledge (Lawless and Pellgrino, 2007).” The new technology is the use of blended learning strategies in the high school classes.

**Blended Learning**

Technology has influenced education and redefined learning. Innovations and accessibility have led to the increased usage of technology in the classroom (Roschelle, Pea, Hoadley, Gordin, & Means, 2000). Capabilities of technology have expanded its capabilities to become tools in society and in education (Cox, 2013). Opportunities for learning have expanded beyond the walls of the classroom and the school day. Whereas a few decades prior, technology was often relegated to office tasks it is now migrated towards a tool for learning.

According to Education Week (2017) the growth of technology access in K-12 classrooms has increased by 363 percent over seven years with purchases of mobile devices in K-12 schools such as laptops, tablets, netbooks and Chromebooks. The “spread of the Internet has increased the quality of digital classroom resources and has spurred the creation of district-level programs that blend online learning and face-to-face instruction” (Watson, 2008, p. 3). In
TEACHER PERCEPTIONS OF BLENDED LEARNING

2000, the average number of computers with Internet access in public school was 6.6 students per device. The ratio in 2009 decreased to 3.1 students per device (U.S. Department of Education; National Center for Education Statistics, 2010). Mobile devices increased in personal accessibility with the introduction of the Blackberry in 1999 and iPhone in 2007.

“Most professionals and many students have a mobile device in their pockets with more computing power than the early supercomputers” (U.S. Department of Education: Office of Educational Technology, 2013, p. 1). Home access to technology and Internet are just as essential to 21st century learning as access in school. According to the 2013 U.S. Census Bureau, home computer at household computer ownership and Internet use have both increased steadily over time from 8.2% in 1984 to 83.8% household computer ownership in 2013 and 78.4% with household Internet use (File & Ryan, 2014).

“These technological advances hold great potential for improving educational outcomes, but by themselves, hardware and networks will not improve learning” (U.S. Department of Education: Office of Educational Technology, 2013, p. vii). There is overwhelming research that suggests that computer-based technology is not the sole determinant towards education reform, but rather an element in a coordinated approach that also includes changes in pedagogy, assessments, curriculum, teacher development and educational policies (Roschelle, Pea, Hoadley, Gordin, & Means, 2000). It is the purposeful use of technology intertwined with purposeful pedagogy that will have the greatest impact (Dziuban, Moskal, & Hartman, 2005). Technology used towards teaching and learning.

The development of the Internet has spawned the growth of online as a tool for learning. “Learning and teaching in an online environment are, in many ways, much like teaching and learning in any other formal educational context; learning activities are orchestrated; and
learning is assessed” (Anderson, 2008, p. 273). Technology affords many varieties of instructional delivery. “Traditional face-to-face instruction involves interactions between instructors and learners who are in the same place, whereas technology-mediated [online] instruction uses information and communication technologies (ICT) to mediate the learning experience and interactions without requiring that learners and instructors be located together” (Graham & Dziuban, 2008, p. 270).

The use of online and technology resources has increased opportunities to cultivate new and engaging learning experiences with interactive content, communication efficiency, more immediate feedback (U.S. Department of Education: Office of Educational Technology, 2013). “Technology-enhanced teaching and learning models have now become the ‘new normal’ in [education]” (Pechenkina & Aeschliman, 2017, p. 26). How technology is used in the education may depend on its usage in either enhancing learning in a traditional classroom or as the primary mode of instructional delivery. The combination of online instruction and traditional face-to-face teaching is at the core of blended learning

**Defining Blended Learning**

An instructional shift due to the technology has proliferated education creating a multitude of options for both the student and educational institution. “[Blended learning] represents a fundamental reconceptualization and reorganization of the teaching and learning dynamic starting with various specific contextual needs and contingencies (e.g. discipline, developmental level, and resources)” (Garrison & Kanuka, 2004, p. 97). There are a multitude of definitions for blended learning that are crafted from all the various perspectives of learning.

One definition of blended learning is, simply, a “thoughtful integration of classroom face-to-face learning experiences with online learning experiences” (Garrison & Kanuka, 2004, p. 97).
This is a vague definition of blended learning. It does not provide a determination as to whether lesson-driven activities using technology can considered to be blended learning or technology-enhanced. It is simply a mix between two distinct instructional modalities—face-to-face or online. Published in 2004, Garrison and Kanuka may not have been able to foretell the many innovations in technology making it ubiquitous in society today. This research will classify blended learning definitions into three categories: Quantitative Approach, Learner Checklist Approach and Instructional Delivery Approach.

The Quantitative Approach. The quantitative approach to defining blended learning focuses on the blend or mix of brick and mortar classroom with face-to-face teaching and online instructional delivery. These two choices, brick and mortar and online, are considered to be learning environments. The quantity of the blend between both learning environments is often a determination for classification of a course. This definition attempts to quantify the amount of face-to-face time a student receives as opposed to the amount of time they receive instruction that is technology-based or online to determine the learning modality.

There has been much research on the use of analytics to determine the teaching modality. In their study of teacher perceptions of blended learning, Kuo et al. (2014) utilizes a blueprint for online and face-to-face sessions of 33% to 67% respectively as suggested in his article on blended learning. These are very precise and distinct measurements for determining whether a course using technology may be classified as blended within a formal education program. The amount of content delivered in an online environment describes the type of course in these examples.

These percentages are similar to those defined by Allen and Seaman in their 2013 report. For example, a traditional or face-to-face course contains 0% of online content delivery.
Whereas an online course has 80% of its content delivered online. The next two categories are web facilitated with 1-29% of content delivered online and hybrid or blended learning with 30 to 79% of content delivered online (Allen & Seaman, 2013). The measurement of time is the key factor to classifying which instructional strategy is more prevalent.

The degree by which each instructional modality is utilized, however, may vary depending on the instructor, curriculum, the technology or program design. Ultimately it is about rethinking the relationship between the teacher and learning in a new environment (Garrison & Kanuka, 2004). “The most important aim of a Blended Learning design is to find the most effective and efficient combination of the two modes of learning for the individual learning subjects, context and objectives” (Neumeier, 2005, p. 164).

Quantifying time in each environment to classify or define the model of learning has faults. This definition seeks to count time in an online environment versus time physically in a classroom (seat time) to determine the perfect blend. It does not, however, take into account the learning experience itself nor how online is used to incorporate with the experiences of face-to-face learning. It is these varied experiences and needs of the student as well as the types of activities that have relevancy in the definition of blended learning.

The individual learning needs of students are personal and vary. They are not factored into this definition. The rate in which students meet learning objectives may vary per student. For example, a teacher uses a prescribed computer program to deliver instruction. Once the students complete their computer-delivered assignment, they are to switch to classroom mode for instructional activities.

Students learn at different paces. If one student breezes through the online portion of the class and spends much more time in face-to-face environment, then they may be considered to be
TEACHER PERCEPTIONS OF BLENDED LEARNING

a face-to-face student with some web/online learning or in the now range of blended learning. Likewise, for the student who needs much more time to complete the online learning. As a result, they spend less time in face-to-face activities. The second student may be an example of online learning using the Quantitative Approach. Yet both students are assigned to the same classroom.

The second issue with this type of definition is lack of differentiation between the activities performed in the face-to-face environment as opposed to the online environment. Measuring the time within a specific environment does not account for the types of activities associated with each environment. For example, a teacher presents all new curriculum in a face-to-face format and uses her online environment for assessments and hosting her syllabus. Depending on the frequency or length of the assessments, her class may be considered blended using the Quantitative Approach. As a consequence, this Approach is too broad to be used as a definition of Blended Learning.

The learner checklist approach. One of the most widely used definition of blended learning was developed by Horner and Staker (2012) in their seminal paper Classifying K-12 Blended Learning. Their definition is taken from the view of the student. How learning is delivered to the student. They define it as “a formal education program in which a student learns at least in part through online delivery of content and instruction with some element of student control over time, place, path and/or pace in part at a supervised brick-and-mortar location away from home” (Staker & Horn, 2012, p. 1). Digging into blended learning definition more deeply, there are various uses of terms that require deeper synthesis which sets the foundation for this research.
**Formal versus informal education.** The first phrase of “a formal education program” creates the context for blended learning. The significance of differentiating context is that it describes the type of environment for the student in which they receive instruction. According to Horn and Staker (2015, p. 34) “the reference [of this phrase] is important because it excludes instances when a student plays an educational Xbox game at home or browses a learning app in the grocery story line, independent of her formal school program.” Digging deeper into this definition would necessitate a need to focus on the differences between formal and informal in terms of learning.

Czerkawski defines formal learning as synonymous with “learning in educational institutions and leads to a degree or certification whereas informal learning occurs leisurely outside the classroom and is not assessment-driven” (2016, p. 139). The structure of the formal education is distinctive with specific learning objectives, assessments and a certified educator or teacher. All materials and learning activities are highly structured and facilitated by the teacher. It is also commonly referred to as schooling in grades K-12 and in higher education.

Informal education, on the other hand, is created at the discretion of the student. Eshach (2007) and Greenfield (2009) define informal learning as learning that happens outside of the classroom or out of school. The spontaneity of learning outside of formal education translates to learning that is less structured and more dependent on a person’s surroundings and experiences. Lai, Khaddage, and Knezek summarize that if “the learner has more control on the opportunities to learn, as well as having the freedom to choose what to learn, and how learner is evaluated, then learning is more informal” (2013, p. 415).

Evaluation in informal learning is not congruent with assessments in formal learning. Evaluations and assessments are used to determine a learner’s skills, abilities and knowledge
within a given area. It can also be used to determine progress. A student may have a need or want to increase their knowledge on a specific topic. Their acquisition of said knowledge may not be evaluated as in a formal education program. Informal learning is more intrinsically motivated and evaluated.

The content of formal learning is structured by the teacher and shaped by the educational institution. As opposed to the learner-centered and informality of informal learning where learners can begin and end at will, formal education in a school requires enrollment and completion of courses and grades. Schools, by definition, have prescribed curriculums aligned with local and state standards. They are considered to be formal educational institutions.

In the United States, formal education is defined by compulsory education laws requiring children to enroll in recognized education programs. Formal education is twelve years though some states only require enrollment until age sixteen, such as Pennsylvania. The intent of a formal schooling, a term which is used interchangeable with formal learning program, is to prepare all students with skills and knowledge for future growth and employment in American society. At the completion of the prescribed curriculum through twelve grades students are granted credit through completion of diploma or an equivalency degree.

There are a range of choices in formal K-12 education programs or schools that satisfy the mandatory enrollment laws in the United States. They are public, private, charter, and online schools as well as homeschooling in some states. Public schools represent the largest student population (85%) in the United States (Gemin, Pape, Vashaw, & Watson, 2015). Traditional schools are synonymous with public and private schools. For the sake of this study, only teachers in formal education programs will be studied.
Traditional schools are often associated with a physical location. The locations of schools, commonly referred to as brick and mortar, contain learners which are physically near their teachers and other learners divided into grades. A charter school may resemble a traditional school or may take a non-traditional appearance such as a magnet school focusing on performing arts school. Educational resources may be physically present in the classroom or school as well as use of technology for virtual resources. The bulk of the instruction has been traditionally delivered in a face-to-face context.

Private and parochial schools would be considered traditional schooling as well. While they differ in their source of funding and reporting, they remain essentially like traditional brick and mortar or public schools. The main location for private and parochial schools is in a physical building with the teacher present with the student. In this respect, they are classified like public schools as formal education programs.

Another type of formal education program is the online school. They are also referred to as cyber charter and virtual schools. “In the online setting, instruction occurs using the Internet [whereas] in the offline setting instruction occurs in a traditional, face-to-face (Kumi-Yeboah & Smith, 2014, p. 3). The learning environment of online learning is diversely different from a traditional classroom. Online learning is synonymous as learning where the computer delivers content and the teacher may be not physically present with the student. Resources for learning may also be contained online creating a self-contained virtual classroom.

Homeschooling is accepted in some states as a choice for school age students to satisfy matriculation requirements. However, it differs from other formal programs in that homeschooling does not require a certified teacher for the student. Pennsylvania, like some states, allows for an adult with proof of completion of their high school program to be allowed to
homeschool their own children. The taught curriculum may range from robust to very weak depending on the choice by the parent.

The blended learning definition by Horn and Staker (2015) includes a phrase which specifically excludes learning programs such as online learning and homeschooling. They state that “the student learns at least in part in a supervised brick-and-mortar location away from home” (Staker & Horn, 2012, p. 3). A supervised location away from home was added to eliminate the possibility of learners sitting in locations such as coffee shops with adult attendees present to be included in the blended learning definitions. A learning center that may be in a commercial place of business may be included if there is a teacher or educational professional present (Staker & Horn, 2012). Therefore, homeschooling does not meet the criteria of blended learning.

Online schools utilize technologies of the web to provide instruction, communication, assessment and resource materials to learners creating a virtual school environment. Each aspect of education in online learning includes technology beginning with the learning environment. According to John Watson, “[online learning] has evolved from traditional distance learning programs and represent the latest evolution in distance learning, from the days of correspondence course, to video courses and real-time two-way video, and now to more convenient and efficient online delivery” (Watson, 2008, p. 3).

The reliance on innovative technologies in online instruction has defined their existence as the physical presence of the learners and teachers has defined traditional education. The instruction and supervision of the online student is provided by the virtual school. As opposed to the traditional student, the teacher is not physically present with the student. Consequently, online learning is also excluded from the blended school definition.
TEACHER PERCEPTIONS OF BLENDED LEARNING

Student control. Horn and Staker’s (2015) blended learning definition seek to define the student experience through an element of student control over time, place, path and pace. Each of these is an element that factor into a student’s control over their learning. Learning can be classified as both an individual experience as well as a group experience. Collectively they help define the instructional strategy in either a face-to-face classroom as well as the online environment. If each of these elements are separated and explored individually, we would see the interdependence between them.

Time. The first element of student control that has an effect on instructional strategy is time. It refers to the period when a student is actively engaged in formal learning. It can be measured per day or year or the entire school career. For the purposes of blended learning we will be measuring time in respects to formal education. A school year is a wider view of learning time. A micro view is the amount of time during instruction.

Time is a measurement that has finite dimensions, easily measured. For a traditional secondary class, time is measured by a pre-defined meeting day, time and location. In addition, this pre-defined meeting must include the presence of the teacher of record. Instructional time may not be time passing in the halls or in the lunch room though these are included in the secondary school day in American schools. Time may be defined by the physical presence of the teacher and students in the online environment presence is redefined.

For example, a French class meets five days a week at 1:20 to 2:05 in room 203. Each student can expect that during those days and at that time they will be learning French as facilitated by the teacher. Each student has an equal share of those forty-five minutes of the content with the associated activities. It may take some students less time to complete the learning activities or more time. But if all instructional activities for French are confined to
TEACHER PERCEPTIONS OF BLENDED LEARNING

those forty-five minutes, then all students are limited to learn during that time regardless of individual needs.

Time can be modified by the student for instructional delivery and/or learning activities with technology. If the delivery of instructional and accompanying learning activities is available online and outside of the school day, the student may then choose when is best for them to learn. If they prefer a time of day which suits them individually, they can choose with web-based access. This contrasts with a traditionally scheduled course. In addition, if a student uses online learning during the school day then they are confined to allocated time to spend on their course, but they have more flexibility to progress at their own speed. Thereby adjusting time to their individual needs or preferences.

Place. The next part of Horn and Staker’s (2015) blended learning definition refers to the location of learning. They specifically state that a student must learn “at least in part through online delivery of content and instruction… and at least in part in a supervised brick and mortar location away from home” (Staker & Horn, 2012, p. 3). This definition specifically describes two distinct locations—one is a virtual location with online instruction and the other is physical location, like a traditional brick and mortar school. In their definition, brick-and-mortar location is a setting with supervision other than a parent or guardian.

A traditional education program has been long defined by the physical structures of the brick-and-mortar school building and classroom. These formal learning institutions first introduced to meet the demands of the Industrial Age society. These physical structures are often what is used to define education. The physical setting where the student is assigned to a teacher(s) who is physically present to provide instruction and content.
In this traditional classroom setting, though, there is a collection of very different students. Each with their own perspectives, styles and abilities but all are subjected to the same learning experience in a classroom setting with the same teacher. Yet they are gathered in the same classroom receiving their formal education, often at the same time, path and pace. The educational opportunity is the same for each student in the classroom, no differentiation.

The online classroom offers more choice to the location of the student. Learning is delivered online and is not rooted to a physical space. The teacher may be physically present in the classroom while the computer delivers instruction or not present while technology delivers instruction outside of the school location. The traditional school and online learning are instructional programs; however, blended learning is an instructional strategy which alternates between instructional delivery of technology and the teacher. Ultimately the combination of the two learning locations has given rise to the phenomena known as blended learning.

Blended learning shifts from simply considering the location of learning, from traditional brick and mortar school or online, towards a focus on the process and synergy of blending between the two (Suprabha & Subramonian, 2015). This blend of instructional modalities has proliferated education creating a multitude of options for both the learner and educational institution. Technology has been essential with making the blend possible. As innovative technologies have become more accessible and easier to use, educators are experimenting with courses using both instructional deliveries (Dziuban, Moskal, & Hartman, 2005). Technology has allowed the instructors to increase learning access both in and outside of the classroom.

The portability of technology, though, has enabled science classrooms to move behind the four walls of the classroom and lab. Digital probes as well as laptops have expanded what was considered the classroom for a science. Interactive simulations can even be conducted
completely online such as animal dissections for a biology class. The location of learning is not limited to the classroom but may be used in conjunction with the classroom or as a replacement to the classroom.

_Pace._ The next factor for defining a learning environment is pace. It is defined as the rate of how a student learns. Pace is an individual characteristic of the learner. A teacher may have a class with a wide variety of learning paces making whole group instruction difficult. “When learning challenges are already substantial, it is sensible to allow students to work in ways that best suit them” (Tomlinson & McTighe, 2006, p. 19).

Instructional strategies using technology allow for variations to student pace. It is defined as the individual rate a student moves towards completion of educational tasks to meet learning objectives. The student is limited to the speed of instructional delivery of the teacher as well as finite time of the class which may not meet the needs of the individual student. “The goal of differentiated instruction is providing opportunity and support for the success of far more student than is possible in one-size-fits- all approaches to teaching and learning” (Tomlinson & McTighe, 2006, p. 100).

One such example is the use of videos to present new content using individual digital devices. This strategy allows for the student to start and stop the video to meet their individual needs as opposed to a single lecture mode at a teacher’s pace. Where the student views, the video is less important as the ability to control the rate of information flow. Allowing the student, the ability to control the pace is not limited to a location outside of the brick-and-mortar school. This instructional strategy was common in classrooms until the arrival of technology.

_Path._ The direction that a student takes to learn a concept or achieve learning objectives is defined as the learning path. One student’s path may not take the same route as the next. The
inclusion of the Internet as a tool for instruction allows students to determine their individual routes for learning. The ability to control the learning path is one of the factors that defines the online learning environment. In “today’s educational paradigm is no longer one of knowledge transfer but one of knowledge creation and curation” (Sheninger & Murray, 2017, p. 111).

**The instructional delivery approach.** The core of blended learning is instruction and the use of technology in providing instruction. “[Blended learning] represents a fundamental reconceptualization and reorganization of the teaching and learning dynamic starting with various specific contextual needs and contingencies (e.g. discipline, developmental level, and resources)” (Garrison & Kanuka, 2004, p. 97). It has provided an avenue for instructors to meet the needs of the learners individually as well as in whole group.

A common use of technology in K-12 schools today is “where online or local digital instructional content issued to augment courses that are offered on a traditional daily and semester schedule, with the teacher of record located on the school campus” (Gemin et al, 2015, p. 17). “Today’s technologies offer powerful capabilities for creating high-quality learning resources, such as capabilities for visualization, simulation, games, interactivity, intelligent tutoring, collaboration, assessment and feedback” (Office of Educational Technology, 2013, p. vii). Technology is enhancing the teacher’s efforts to deliver content and facilitate learning in the classroom.

Online learning, however, is not limited to locations outside of physical schools. A teacher may use computer-assisted learning (CAL) to alternate between teacher-centered instruction. CAL are programs which are designed to deliver instruction to the individual student via the computer. They are often subscription-based programs which are utilized for learning in a lab or classroom setting but may also be used to for online courses.
The blended learning model “represents a cultural shift in instruction and learning… offering the possibility to dramatically change how teachers and administrators optimize and maximize student productivity in a face-to-face setting” (Powell, et al., 2015, p. 6). There is a paradigm shift in teacher’s instructional strategies. According to Marzano (2003, p. 78), “instructional strategy is a teacher-level factor that affects student achievement.” Technology may become a partner in the delivery of instruction allowing the teacher more flexibility to meet student needs.

The intentional use of technology to deliver content is an instructional strategy. Thus, blended learning is an instructional strategy. “The real test of blended learning is the effective integration of the two main components (face-to-face and Internet technology) such that we are not just adding on to the existing dominant approach or method” (Garrison & Kanuka, 2004, p. 97). According to the 2015 annual report Keeping Pace with K-12 Digital Learning, “the most prevalent use of digital content is in the classrooms where online or local digital instruction content is used to augment courses that are offered on a traditional daily and semester schedule, with the teacher of record located on the school campus” (Gemin, Pape, Vashaw, & Watson, p. 17).

In a higher education setting, there are benefits to dividing classroom hours between face-to-face components and online learning. One benefit is that it gives students more flexibility in their schedules while still maintaining interaction with classmates and the teacher (Dziuban, Moskal, & Hartman, 2005). Another benefit is the ability to move away from “purely classroom interaction, lecture style mode or instruction to a more student-centered style” (Suprabha & Subramonian, 2015, p. 1).
The flexibility of the higher education classroom is not always transferable to the K-12 classroom. Higher education instructors have more autonomy in their schedules allowing for changes in their schedule from face-to-face and online formats, a K-12 classroom adheres to the schedule as defined by the district. Even though instruction may be delivered through online formats during the K-12 school day or at discretion of the student outside the school day, their attendance may still be mandatory during that same school day. Therefore, the models for blended learning in K-12 environments vary from higher education.

The use of technology to delivery instruction and content varies in the K-12 environment where daily attendance is required. It is not necessarily the case of one environment over another, such as it can be in higher education. The K-12 student must still physically attend school. It is rather the creative use of time and instructional models that vary in the K-12 classroom. Specifically, it is a matter of which model the teacher uses to present new content; either using online learning or through face-to-face direct instruction during the assigned time in class or beyond the school day.

**Blended Learning Models.** According to their research on K-12 blended learning, Horn and Staker (2015) describe four models—Rotation Model, Flex Model, A La Carte Model and Enriched Virtual Model. All of these models dictate that there are some aspects of instruction provided online and face-to-face. They also vary with respect to time, path and pace of instruction. However, they all take place during the school day and while on campus. Location remains the same in all models. Further exploration is needed of these K-12 blended learning models.

Each of the models include online learning in addition to face-to-face within the location of the school. The models differ with respect to schedule and teacher’s role—Rotation (students
TEACHER PERCEPTIONS OF BLENDED LEARNING
	note within a fixed schedule or at the teacher’s discretion between instructional environments),

Flex (online learning is the backbone of student learning with the teacher of record being on-
site), Self-Blend (students take some courses completely online with an online teacher and some
courses face-to-face), and Enriched Virtual (time is divided between attending face-to-face and
learning remotely via online delivery of content and instruction) (Staker & Horn, 2012). The
same elements of learning are experienced by the students as the modality changes.

In the Rotation Model, students alternate between different learning environments one of
which is online. The learning environments may include whole group or direct instruction. The
students may also be split into smaller groups for project work, discussion or instruction.
Another learning environment may also be individual work at their desk or on the computer.
Online learning must be one of the learning environments included. The location of instruction,
however, is not limited to the classroom for any of the examples above.

There are four sub-models of the Rotation Model according to Horn and Staker (2012).
Each of the sub-models follows the format of some instruction give in a face-to-face delivery and
some instruction is delivered in an online format. The location of the instruction, whether at the
physical school or at some other location outside the school campus, varies between the models.

One popular example of the Rotation Model is the flipped classroom. Flipped classroom
is an instructional model that utilizes online to deliver the initial introduction of a topic online
prior to the face-to-face classroom meeting, preloading of instruction. It is then followed by in-
class supporting activities. The online and then face-to-face instructional strategy work in
conjunction with each other and not as a repetition.

It was popularized following the successes of high school science teachers Aaron Sams
and Jonathan Bermann, though it is not a new instructional strategy and lending itself towards
TEACHER PERCEPTIONS OF BLENDED LEARNING

pre-loading of instruction. They flipped their science lectures into YouTube videos and while using class time for application of concepts. This is an example of how online instruction is utilized in addition to classroom work. However, there is no substitution for time in the classroom.

Station Rotation and Lab-Rotation are sub models which deliver online instruction to the students in the confines of the brick and mortar school. The students rotate between face-to-face and online instruction during the school day at different learning stations. For example, one station may include independent work while another is small group instruction and another the online learning station. The students rotate between face-to-face instruction and a computer lab for online instruction. The period of rotation may be at the teacher’s discretion or on a formal schedule.

The last Rotation sub model is Individual Rotation. This model includes an individually customized and fixed schedule model (Horn & Staker, 2015). This model is designated to a student who has an individual rotation. The student has a schedule delegating when they have face-to-face instruction and when they have online. This is a customizable solution for a single student. They do not rotate with other students.

The Flex Model uses online learning as the main delivery mode of instruction. This model is used for providing credit recovery and targeted skill assistance/tutoring. Students may alternate between face-to-face and online learning according to their individual needs. The delivery of instruction may be the student’s choice as well as the pace at which they learn. However, the location is always at the brick and mortar school. The teacher of record remains on-site guiding the individual student and their individual learning path.
In the À La Carte Model, the student may rotate between two instructional deliveries within their school schedule. Their schedule shows some courses delivered in a tradition matter as well as courses taken completely in an online format. The online portion of instruction does not alternate with face-to-face instruction, it is the entire course delivered online. The teacher of record for the online course is an online teacher. For example, they may take Biochemistry as an online course period 2 in a lab and then has a traditional History course period 3. The Biochemistry course teacher of record is online while the teacher of record for the History is present in the room during the class.

Lastly, the Enriched Virtual Model has a rotation between the two instructional deliveries. There may be some required face-to-face instruction but at other times the student learns online at an off-campus location. This model has the rotation within a specific course rather than one course delivered online and another delivered face-to-face. There may be periods of time where the student does not work with the teacher of record face-to-face and all communication and instruction is conducted online. It is the same teacher for both learning modalities.

**Working Blended Learning Definition**

This study will use an adapted version of the learner checklist and instructional approaches for defining blended learning. The learner checklist states that the student exercises some control over their learning with respect to location, time, place, path and/or pace approach as defined by Staker and Horn (2012). This definition uses the perspective of the student but will be adapted to present the view of the teacher. It will provide survey participants with a concrete definition which will assist them in classifying their own use of technology for student learning. The clarity will help them determine how they personally use technology to deliver new content.
This research seeks to study the intentions of high school teachers towards using blended learning in their traditional courses. As accessibility of technologies increase with items such as student laptops, Internet access and a learning management system, there is an expectation of use. The instructional choices of the teacher influenced by the accessibility of technology are the focus in this research.

The two instructional modalities will be researched with respect to how new content is presented to the student. Will the teacher use technology to enhance traditional teaching methods (whole group instruction with teacher-centered classrooms)? Or will the teacher incorporate technology to deliver new content online in conjunction with traditional teaching strategies to create a blended learning model? The teachers’ instructional choices using technology are completely voluntary. There are no administrative directives for either method of instructional delivery that would influence their instructional choice.
This purpose of this study is to identify factors which predict teacher perceptions of blended learning instructional practices. Blended learning is a combination of teaching in a traditional classroom setting with the teacher as the focal point of instruction as well as using online to deliver instruction. The teacher may or may not be present when the student receives instruction using the computer. This blend of instructional delivery represents a shift from traditional teaching practices.

Teachers are at the forefront of change with innovative technologies that can redefine teaching and learning. However, the choice to utilize the capabilities of the technology in this manner lies with the teacher, should they adopt the use of them. What influences the decision of a teacher to adopt new instructional practices? In their research on teacher technology acceptance, Holden and Rada state that “teachers who demonstrate positive attitudes and perceptions as well as high self-confidence toward technology usage may be more likely to utilize technology for instruction” (Holden & Rada, 2011, p. 348). There is a need for more research in the K-12 environment of teacher acceptance of new instructional practices using technology.

Despite the rapid growth of blended learning as a practice in higher education, K-12 schools and corporate training, there is a proportional lack of K-12 studies (Halverson, Graham, Spring, & Drysdale, 2012). It is estimated that over $100 billion was spent on technology for American K-12 schools in the last few decades which points toward a need to determine the return on the investment (Horn & Staker, 2015). This research hopes to add to the dialogue on online instructional practices using technology from the teachers’ perspective at the K-12 level.
This chapter will introduce the methodology for this quantitative study exploring variables that influence teachers’ intention to use blended learning instructional practices. This approach would help administration develop interventions for technology adoption to avoid the underutilization of technology in order to maximize productivity. This chapter will also include the primary components’ sections that include Research Design, Research Questions, Participants and Setting, Procedures, Data Collection, Limitations and Delimitations, Data Analysis, and the Summary.

**Research Design**

A quantitative research methodology will be adopted for this study. In order to collect data about teacher perceptions and opinions a non-experimental research design approach will be used. Previous TAM studies have used questionnaires to measure user perceptions of various technologies (Venkatesh & Davis, 2000; Tsai, 2015; Gough, DeJong, Grundmeyer, & Baron, 2017). In this study, the variables are those which may or may not influence teachers towards usage of blended learning instructional practices. This method is best used for describing phenomena and examining relationships between variables without any direct manipulation of conditions (McMillan & Schumacher, 2010).

The study will determine if a relationship exists between teachers’ intention to use blended learning and three independent variables (computer self-efficacy, previous online learning experience and teaching beliefs). Teachers’ intention to use blended learning will be studied using the framework of Technology Acceptance Model (Davis, 1989). Teachers’ opinions about technology as a method for instructional delivery in addition to face-to-face will be examined.
In order to illicit teacher opinions, surveys were used to gather data in this quantitative study. At issue was whether high school teachers in a traditional classroom were maintaining the traditional teaching strategies with use of technology or evolving towards incorporating technology to deliver instruction. Consequently, the dependent variable chosen was the teachers’ behavioral intention to the use of blended learning instructional strategies.

Descriptive statistics were gathered from survey participants as well. They included age, total years of paid teaching, total years teaching in the district, Pennsylvania certification, role as an administrator or a supervisor, previous online teaching/learning experience, whether they currently created instruction and confidence level of technology. Curriculum area and grade level were dropped out of the survey.

Confidence level of technology was included to reflect usage of technology in both professional and personal lives. As many technologies are common to both areas with ubiquitous technologies such as digital cameras, email, Internet and productivity (word processing, presentation, and graphic) tools. The use of descriptive data allowed the researcher the ability to characterize survey participants into groups based on the demographic information (McMillan & Schumacher, 2010).

**Research Questions**

The following research questions were posed for this study:

RQ1: What is the relationship between computer self-efficacy and high school teachers’ intentions to use blended learning instructional practices?

RQ2: What is the relationship between prior experience with online learning and high school teachers’ intentions to use blended learning instructional practices?
TEACHER PERCEPTIONS OF BLENDED LEARNING

RQ3: What is the relationship between high school teachers’ teaching beliefs and high school teachers’ intentions to use blended learning instructional practices?

RQ4: What are high school teachers’ perceptions towards blended learning instructional practices that can meet their instructional objectives (perceived usefulness)?

RQ5: What are high school teachers’ perceptions towards creating blended learning instructional practices to meet their instructional objectives (perceived ease of use)?

TAM provided the framework to understand the determinants of teacher adoption of instructional strategies through the incorporation of technology to delivery content. This research tested whether external variables of computer self-efficacy, online learning experience and teaching beliefs influenced TAM determinants Perceived Usefulness (PU) and Perceived Ease of Use (PEU). These determinants then were related to teachers’ behavioral intention to use blended learning in their high school classrooms (Figure 7). They were the independent variables for this study.

![Figure 7. Original Technology Acceptance Model (Davis, 1989) with study variables (Venkatesh & Davis, 2000). Reprinted with permission.](image)

**Participants and Setting**

This study focused on the K-12 teaching environment, specifically high school teachers in an American public school. They were the population for this research. American public high
TEACHER PERCEPTIONS OF BLENDED LEARNING

schools traditionally contain grades nine through twelve. Teachers are certified to teach in specific curriculum and subject areas by the Department of Education within the state they reside.

The sample chosen high school was located in a public-school district in south-central Pennsylvania. The district contained seven elementary schools for Kindergarten through fifth grades, two middle schools for grades six through eighth, and one comprehensive high school for grades nine through twelfth. The high school had 1529 enrolled students with 164 teachers as of 2018. There were 28.17% students participating in the free and reduced lunch program at the time of study.

Most of district teachers were certified to teach in their curriculum area and grade levels by the Pennsylvania Department of Education with the exception of teachers with emergency certifications. The subject areas included math, science, social studies, language arts, physical education, health, world languages, art, music and support services. In addition to these subjects, the high school also contained vocational education programs. All vocational teachers were certified in their respective fields such as: computer networking, business, child care, culinary, auto mechanics, construction trades, graphics and communications, health careers, and engineering. These teachers were also be included in the surveyed population.

The majority of the courses offered at the high school were scheduled as traditional courses. All students maintained daily attendance and schedule. However, five of the courses also offered online to full-time brick and mortar students, taught by six teachers. The teachers who facilitated or taught online were not be included in this research. An important factor in this study was the teacher’s willingness to use blended learning by choice. Thus, the perspective of
TEACHER PERCEPTIONS OF BLENDED LEARNING

teachers who taught online would be influenced by their contractual assignment of teaching online.

Approximately 13.91% of district student enrollment changes yearly due to a changing population from the nearby professional ballet school and a military college. The yearly changing population also included international students as a result of international fellows who attend the military college bringing their families. Consequently, high school teachers often sought to meet the unique needs of the diverse population. Technology plays, to some degree, a role in teaching and learning in every high school classroom.

Technology access was pervasive in the high school. It was readily available to faculty and staff in the high school. All faculty were assigned a laptop which was connected to the classroom projection and printing capabilities. In the fall of 2014, the high school began a 1-to-1 laptop program for all students in grades 9-12. Students were required to have their laptop with them throughout each day at school.

In addition to the hardware, teachers and students had access to learning portals, included with recent textbook purchases, and learning management systems. How technology was used instructionally was to the discretion of the teacher. Consequently, instructional usage of technology varied based on the teacher, content area and students. Consistently was lacking with technology under utilized by many teachers. In order to promote better usage identifying factors which influence teachers’ perceptions and behavioral intentions towards technology would be helpful.

Procedures

The study began with the IRB approval process at Duquesne University. Once IRB approval was obtained from Duquesne University a formal request was submitted to the School
Board of the school district chosen for the study. This request was for approval to survey high school teachers in the district. A survey was used to obtain the data.

The request included the study purpose, description of survey procedures, time period for data collection, letter of consent to participate, and assurance of confidentiality of the participants. Upon obtaining School Board approval a formal information packet was sent to the Superintendent detailing the purpose and objectives of the research study, script for the email notification to the teachers eliciting participation, letter of introduction of the study and detailed instructions for survey participation.

The survey was included with a letter of introduction sent to the Superintendent for dissemination to high school faculty. Previously, it was a common procedure for research studies performed within the district. The Superintendent sent an email with an introduction to the faculty inviting them to participate in the study. It was the expected method for contacting participants for this study as well.

Prior to full survey dissemination, content validity was be conducted. The purpose was to verify the structure and content of the survey. It was necessary to ensure that the survey questions and terminology utilized provided clear intent of the research study to the teachers. Three high school teachers were given the survey for this purpose. They were chosen due to their combined position as a teacher and department chair which would disqualify them from full participation in the survey. Their interpretations of the survey questions were essential towards avoiding confusion, irrelevancy, and to confirm whether it was representative of the K-12 environment. Participation was strictly voluntary. Once the test of survey content was completed, the survey was distributed to all high school teachers
Data Collection

The instrument for collecting data was be a four-point Likert-scale survey (Appendix 1). The scale that will be used are strongly agree, agree, disagree, strongly disagree. It will be created in and data collected using Microsoft Forms Office 365 (O365) account, maintained by Duquesne University. Study participants completed questions in two areas: individual demographics and study focus. The study focus included questions on the original constructs of the Technology Acceptance Model (Davis, 1989)—perceived usefulness and perceived ease of use. The questions also targeted three research variables—computer self-efficacy, previous online learning experience, and teaching beliefs.

The data collection time period, in which the survey was open for participation, was one week. The survey was available electronically 24/7 until the close date of 11:59 pm on the 7th day. Teachers who choose to participate entered the survey site via link address listed in the letter of introduction for the study. Once the teacher clicked on the link to begin the study, they were taken to the informed consent.

Informed consent included the purpose of the study, procedures for data collection, anticipated time to complete survey, assurance for confidentiality, description of potential risks to the participants and a detailed statement that participation was voluntary with the right to refuse to participate at any time. It was explicitly stated that participation in the study was voluntary and no compensation was offered for participation. The opportunity for a participant to pull their data was given at the beginning of the survey prior to the survey questions and again at the end prior to final submission.

A detailed explanation about the storing of the survey data was provided to all participants. They were provided with the Microsoft O365 Privacy Policy detailing the privacy
of information stored in online O365 environment. All participants remained anonymous and data confidential to the researcher at all times. Collected data will remain on the Duquesne University secure O365 site and stored for six months following the conclusion of the study. Following this time period, it will be promptly erased.

At the conclusion of the informed consent, all participants were asked to make a choice between consenting to the study or refusal of consent. Participants were reminded that refusal to participate may be made after data collection as well as before. Choice was made by the participants by clicking on a check box labeled I Agree to Participate, or I Do Not Agree to Participate. Those who declined to participate were sent, via survey branching, to exit the study. Those who consented to participate were branched to the beginning of the survey.

The survey was divided into two sections of questions—demographics and blended learning instructional strategies. The demographic information included age, gender, total years of teaching experience, total years of teaching experience within the district, area of PDE certification, content area taught, and whether they currently taught a blended or online course. Participating teachers who were teaching an online or blended course in the high school were excluded from data analysis. There were six (6) teachers that fall into this category.

Once the demographic section was been completed, participants were presented with the definition of blended learning that was used in the study. They were directed to use this definition when answering the questions in the second section of the survey. Upon completion of the second section of the survey, participants were asked once again whether they would consent to their data to be used in the study. If they choose to withdraw their participation, they were be branched to the exit page of the survey. Those participants affirmed their choice to participate choose submit to complete the survey. Their information was included in the data analysis.
Limitations and Delimitations

The external conditions for this study posed a limitation and thus were necessary to identify. One condition that was the essential element for blended learning is technology. Blended learning, by nature, refers to learning with technology. The location of the study was chosen due to the availability of technology to both teachers and students. Therefore, technology must be present teachers to utilize blended learning with their students.

A limitation that could have affected this study was the performance of the technology. The reliability of the technology would have an effect on intention to use as well as actual use of blended learning. Broken equipment and/or lack of Internet access presents a barrier to usage. The district used in the study provides all teachers and secondary students with laptops. The laptops are maintained by the district technology staff ensuring equal access and functionality.

The last limitation could have affected the study was the influence of the researcher on the participants of the study. The researcher has worked in the district for six years in the role as an instructional technology specialist assisting the teachers to incorporate various technologies in teaching and learning. Consequently, the relationship of the researcher to the district teachers may have an effect on perceptions of the teacher towards technology. It would be difficult to isolate the influence of the researcher to the teacher with respects to their acceptance of technology. Due to this fact, it was stressed to all teachers that the researcher would have no access to identifying information of the survey subjects.

Data Analysis

There were two types of statistical methods utilized to analyze the data—descriptive and inferential. Descriptive survey questions included information of the participants such as gender, age, total years of K-12 teaching, subject area, and confidence level of technology. Descriptive
and inferential methods was to be used for analysis of information gained from survey data. Statistical analysis using means and standard deviation will allow the researcher to summarize the data and determine relationships between the teachers and their perceptions of blended learning as an instructional strategy.

The scale of measurement was both nominal and ordinal for the descriptive survey questions. Nominal data received from questions on gender, subject area, and computer self-efficacy were assigned numbers. This conversion allowed for the data to be categorized for further analysis.

The data gained from descriptive allowed the researcher to calculate central tendency and measure of variability as well as answer research questions. Multiple regression analysis were used to evaluate the relationship between computer self-efficacy, previous online learning experience and teaching beliefs. It is the most appropriate test to evaluate whether the three variables contribute to the teacher’s intention to use blended learning by itself or a duplication of another variables’ influence (Gravetter & Wallnau, 2013).

Inferential statistics gained from the questions on the survey directed towards teacher perceptions. The TAM framework, as stated above, measures teachers’ behavioral intention to use a specific technology—in this case it was blended learning instructional strategies. Behavioral intention to use blended learning was based upon the teachers’ perceptions of blended learning. Perceptions were obtained using a four-point Likert scale survey questions on specific facets of their teaching and use of technology for instruction.

The study design used a two-factor analysis of variance (ANOVA) to study the mean differences of the three independent variables—computer self-efficacy (CSE), online learning experience (OLE), and teaching beliefs (TB) against years of the TAM determinants (Figure 8).
TEACHER PERCEPTIONS OF BLENDED LEARNING

This test is most appropriate towards determining the influence of the variables on PU and PEU which would help determine subject’s intention to use blended learning as an instructional strategy in their traditional classroom. The use of an ANOVA allowed the researcher to analyze each variable individually with respect to the TAM framework as well as interactions between each variable. The results provided a larger picture of the possible influences of teachers’ intention to use the technology.

![Variable testing of TAM using ANOVA](image)

*Figure 8. Variable testing of TAM using ANOVA*

**Summary**

The study of teacher’s intentions to use a specific method of instruction is challenging as we look at the variables which may affect their perceptions. In this study blended learning, which includes the use of technology towards providing an alternative instructional delivery and teaching environment in addition to traditional teaching methods, was brought to the forefront of teaching methods. The question was would teachers voluntarily transform their teaching behaviors to include technology as a sort of partner in their teaching practices. Or would technology remain in a relegated role of enhancing traditional teaching practices which are highly dependent on the physical presence of the teacher in the classroom with students?

The intention of this chapter was to lay the foundation to identify the relationship between variables which may affect teacher acceptance of using blended learning instructional
TEACHER PERCEPTIONS OF BLENDED LEARNING

practices. As stated earlier, the importance of this study was to explore teacher perceptions towards blended learning instructional practices. Instructional practices refer to the role of the teacher in creating and using blended learning with their students. In surveying variables which may be related to their perceived ease of use and the perceived usefulness towards voluntarily using blended learning, schools would be able to proactively work towards limiting the barriers towards adoption of blended learning in the future.

The intentions of teachers was studied for this research. As the subjects of this study, it was important to state that this study assumed that high school teachers have a choice for technology adoption. Intention to use referred to their choice of action rather than a directive or a scheduling choice by administration. This study hoped to identify variables or combination of variables which influence high school teachers’ intention to use or not use this teaching strategy given the readily available technology resources to do so.
CHAPTER 4

Introduction

The purpose of this study was to explore teacher intentions to use blended learning instructional strategies. Utilizing the Technology Acceptance Model (TAM) developed by Davis (1989) as a framework, this research sought to determine if teacher perceptions towards blended learning are influenced by their computer self-efficacy, previous online learning experience, and teaching beliefs. TAM postulates that using the constructs of perceived usefulness and perceived ease of use lead to one’s intention to use a technology. In this research, the technology being measured was blended learning instructional strategies.

The results sought to answer the following research questions:

RQ1: What is the relationship between computer self-efficacy and high school teachers’ intentions to use blended learning instructional practices?

RQ2: What is the relationship between prior experience with online learning and high school teachers’ intentions to use blended learning instructional practices?

RQ3: What is the relationship between high school teachers’ teaching beliefs and high school teachers’ intentions to use blended learning instructional practices?

RQ4: What are high school teachers’ perceptions towards blended learning instructional practices that can meet their instructional objectives (perceived usefulness)?

RQ5: What are high school teachers’ perceptions towards creating blended learning instructional practices to meet their instructional objectives (perceived ease of use)?

Data Collection

The research study with the survey were introduced through the school email by the high school principal. In previous years and studies, the introduction came from the superintendent of
the district. However, the change in administrative personnel brought new procedures towards research in the district. The principal invited the high school faculty to participate in the survey and included the pre-written letter from the researcher (Appendix A). The letter contained the objectives of the research as well as the link to the survey. The faculty was given a specific time period (seven days) of when the survey would be open for participation.

The survey questions were divided into two sections—descriptive and blended learning. A series of questions were created to determine whether the participant was part of the targeted population were certified to teach in Pennsylvania, teachers of high school grade levels, current online instructors, and whether they had any administrative roles in their schedule. The descriptive survey questions include demographics of the participants such as age, total years of K-12 teaching, total years teaching in current district, and confidence level of technology which would be used in the analysis.

In the final version of the survey, the subject area and gender were ultimately eliminated from the final version of the survey. The relationship between the researcher and the role within the organization may have appeared to have influence in the participation by the teachers. In order to ensure the complete lack of ability to determine who participated, these descriptive questions were removed.

The second section of the survey contained 4-point Likert scale questions about blended learning using the framework of the Technology Acceptance Model (Davis, 1989). Upon entering this section, the working definition of blended learning was posted. Participants were directed to use this definition to complete the next set of questions.

_If technology replaces direct instruction by the teacher and all new content is then presented virtually, then it is considered to be ONLINE LEARNING._
TEACHER PERCEPTIONS OF BLENDED LEARNING

BLENDING LEARNING is defined as “a formal educational program in which a student learns at least in part through online delivery of content and instruction with some element of student control over time, place, path and pace and at least in part in a supervised brick-and-mortar location away from home.” (Horn & Staker, 2015)

There were seventeen questions which aligned to either one of two TAM key constructs—perceived ease of use (PEU) or perceived usefulness (PU). Three independent variables of computer self-efficacy (CSE), online learning experience (OLE), and teaching beliefs (TB) were used to determine the relationship to PEU and PU (Figure 9). The questions were tailored towards teaching in the K-12 context rather than higher education. They were compiled from TAM studies completed by Davis (1989), Venkatesh and Bala (2008), Gough, DeJong, Grundmeyer, and Baron (2017), and this researcher.

![Figure 9. Survey questions mapped to TAM framework.](image)

**Participants**

Thirty-eight participants completed the informed consent and submitted the survey. There were two partial survey entries in which participants appeared to have quit the survey prior to informed consent. Two respondents were eliminated from the data set due to their position teaching an online or blended learning class. They are formally scheduled to teach online or
blended learning courses which would not meet the study focus of voluntarily using blended learning in their classes.

The remaining 36 participants were certified to teach in Pennsylvania. However, four respondents also have an administrative or supervisory role. This role may have included the department chairs who have a partial teaching schedule in addition to their administrative role. This dual role may offer a perspective that is not congruent with teachers. Consequently, their data was eliminated leaving the total submissions at 32 participants.

The mean age of the participants was 42.72 years old with a median of 40.00 years old and standard deviation of 9.703 (Table 1). This result indicates a symmetrical distribution of the ages and closely resembles the national statistics as indicated. Participants chose between five ranges to express their level of teaching experience—less than 1 year, 1 to 5 years, 6 to 10 years, 11 to 15 years and more than 15 years. Frequency distribution of teaching experience showed that 37.5% of the respondents had more than 15 years’ experience. However, only 15.6% of those teachers worked within the district more than 15 years.

Table 1

<table>
<thead>
<tr>
<th>Length of Teaching Experience</th>
<th>Total Teaching Experience (yrs)</th>
<th>District Teaching Experience (yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 year</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>1 to 5 years</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>6 to 10 years</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>11 to 15 years</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>More than 15 years</td>
<td>12</td>
<td>5</td>
</tr>
</tbody>
</table>

The participants were asked to determine their level of technology confidence. The levels used were basic, proficient, advanced and expert. The majority of the participants, 65.6%,
stated that their level of confidence was proficient. While 28.1% of the participants felt they had
obtained a more advanced level in their technology confidence (Table 2). There was only one
participant in each of the extreme levels of basic and expert.

Table 2

Frequency Distribution - Technology Confidence Level

<table>
<thead>
<tr>
<th>Level</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum. Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>Proficient</td>
<td>21</td>
<td>65.6</td>
<td>65.6</td>
<td>68.8</td>
</tr>
<tr>
<td>Advanced</td>
<td>9</td>
<td>28.1</td>
<td>28.1</td>
<td>96.9</td>
</tr>
<tr>
<td>Expert</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Results

In preparation for analysis, the 17 questions of Part II were renamed according to their
variable, TAM constraint and question number (Figure 9). The renaming helped identify the
questions and allowed for groupings by variable that would be used to determine the
relationships. These questions used a 4-point Likert scale to indicate perceived levels.

All Likert scale answers were re-coded in order to run descriptive analysis. Most Likert
scale answers, 13 in total, were converted using the following format—strongly disagree = 1,
disagree = 2, agree = 3, and strongly agree = 4. However, this format was reversed for five
questions which were worded opposite or negatively than the majority of Part II survey
questions—strongly disagree = 4, disagree = 3, agree = 2 and strongly agree = 1.

Central tendency was calculated for each survey question in Part II. Mean, standard
deviation and variance were calculated for each question. The three variables (CSE, OLE and
TB) were mapped to each of the TAM determinants (PEU and PU) to create a total of 6 sub-
variables—CSEPEU, CSEPU, OLEPEU, OLEPU, TBPEU, and TBPU. The mean was
calculated within each of these sub-variables. Lastly, the mean was calculated for each variable—CSE, OLE and TB (Table 4).

A Cronbach’s alpha was run to determine reliability of the survey for internal consistency. The questions were grouped by variable in order to run the test (Table 3). The results indicate a low value for OLE, Cronbach’s $\alpha = 0.215$, which may be indicative of the few survey questions, four in total, listed for OLE variable as compared to the other variables (Table 4). CSE had six questions and TB had a total of eight survey questions. Both CSE and TB showed a fairly high reliability with Cronbach’s $\alpha$ results at 0.687 and 0.683 respectively.

Table 3

Survey Questions Descriptives

<table>
<thead>
<tr>
<th>Question #</th>
<th>Variable NAME</th>
<th>MEAN</th>
<th>STD DEV</th>
<th>VARIANCE</th>
<th>N</th>
<th>MEAN/TAM CONSTRAINT</th>
<th>MEAN/VARIABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>CSEPEU16</td>
<td>2.25</td>
<td>0.672</td>
<td>0.452</td>
<td>32</td>
<td>2.137</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>CSEPEU23</td>
<td>2.22</td>
<td>0.659</td>
<td>0.434</td>
<td>32</td>
<td>2.137</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>CSEPEU25</td>
<td>1.94</td>
<td>0.801</td>
<td>0.641</td>
<td>32</td>
<td>2.137</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>CSEPU22</td>
<td>2.53</td>
<td>0.761</td>
<td>0.580</td>
<td>32</td>
<td>2.613</td>
<td>2.375</td>
</tr>
<tr>
<td>24</td>
<td>CSEPU24</td>
<td>2.34</td>
<td>0.653</td>
<td>0.426</td>
<td>32</td>
<td>2.613</td>
<td>2.430</td>
</tr>
<tr>
<td>30</td>
<td>CSEPU30</td>
<td>2.97</td>
<td>0.474</td>
<td>0.225</td>
<td>32</td>
<td>2.613</td>
<td>2.500</td>
</tr>
<tr>
<td>18</td>
<td>OLEPEU18</td>
<td>2.38</td>
<td>0.609</td>
<td>0.371</td>
<td>32</td>
<td>2.520</td>
<td>2.518</td>
</tr>
<tr>
<td>20</td>
<td>OLEPEU20</td>
<td>2.66</td>
<td>0.701</td>
<td>0.491</td>
<td>32</td>
<td>2.520</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>OLEPU14</td>
<td>2.94</td>
<td>0.619</td>
<td>0.383</td>
<td>32</td>
<td>2.500</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>OLEPU29</td>
<td>2.06</td>
<td>0.716</td>
<td>0.512</td>
<td>32</td>
<td>2.500</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>TBPEU13</td>
<td>2.47</td>
<td>0.671</td>
<td>0.451</td>
<td>32</td>
<td>2.573</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>TBPEU17</td>
<td>2.84</td>
<td>0.628</td>
<td>0.394</td>
<td>32</td>
<td>2.573</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>TBPEU21</td>
<td>2.41</td>
<td>0.756</td>
<td>0.572</td>
<td>32</td>
<td>2.573</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>TBPU15</td>
<td>2.62</td>
<td>0.751</td>
<td>0.565</td>
<td>32</td>
<td>2.518</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>TBPU19</td>
<td>2.28</td>
<td>0.772</td>
<td>0.596</td>
<td>32</td>
<td>2.518</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>TBPU26</td>
<td>2.34</td>
<td>0.653</td>
<td>0.426</td>
<td>32</td>
<td>2.462</td>
<td></td>
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<tr>
<td>27</td>
<td>TBPU27</td>
<td>2.41</td>
<td>0.615</td>
<td>0.378</td>
<td>32</td>
<td>2.462</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>TBPU28</td>
<td>2.66</td>
<td>0.745</td>
<td>0.555</td>
<td>32</td>
<td>2.462</td>
<td></td>
</tr>
</tbody>
</table>
### Table 4

*Test for Survey Reliability*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach’s alpha (α)</th>
<th>Number of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Self-Efficacy (CSE)</td>
<td>.687</td>
<td>6</td>
</tr>
<tr>
<td>Online Learning Experience (OLE)</td>
<td>.215</td>
<td>4</td>
</tr>
<tr>
<td>Teaching Beliefs (TB)</td>
<td>.683</td>
<td>8</td>
</tr>
</tbody>
</table>

## Research Questions

The first three research questions sought to determine the relationship between the three variables (computer self-efficacy, online learning experience, and teaching beliefs) and high school teachers’ intentions to use blended learning instructional practices. A linear regression was conducted for each variable in order to predict the use of blended learning with each the variable. The intention to use blended learning was defined through the TAM determinants of perceived ease of use (PEU) and perceived usefulness (PU).

RQ1 sought to examine the relationship between computer self-efficacy (CSE) and blended learning. CSE was mapped to each constraint creating two predictors—CSEPU and CSEPEU. The dependent variable was the mean total score of the survey responses. Overall, there is a moderately strong positive relationship between computer self-efficacy and blended learning, \( r = +.638 \). The regression equation for predicting intention to use blended learning for RQ1 is

\[
\text{Predicted CSEPEU} = +3.302 \quad \text{Predicted CSEPU} = +2.040 \quad \text{Total Survey} = +39.050
\]

We can see that there is a significant prediction shown with computer self-efficacy and perceived ease of use and perceived usefulness, \( b = 0.593, t = 4.107, p < .001 \). There is not a statistically significant result for computer self-efficacy and perceived usefulness; consequently,
TEACHER PERCEPTIONS OF BLENDED LEARNING

no linear relationship. Teachers’ computer self-efficacy accounted for 40% of the variation in
the ease of use of blended learning with an adjusted $R^2 = 37\%$.

RQ2 sought to examine the relationship between previous online learning experience
(OLE) and blended learning. OLE was mapped to each constraint creating two predictors—
OLEPU and OLEPEU. A moderate positive relationship between previous online learning
experience and blended learning, $r = +.482$. Again, the dependent variable was the mean total
score of the survey responses. The regression equation for predicting intention to use blended
learning for RQ2 is:

$$\text{Predicted OLEPEU} = +4.129 \quad \text{Predicted OLEPU} = +2.90 \quad \text{Total Survey} = +54.016.$$  

The results indicate that previous online learning experience and perceived ease of use
predicts intention to use blended learning in the model, $b = 0.381, t = 2.340, p = .026$. There is
not a statistically significant result for previous online learning experience and perceived
usefulness; consequently, no linear relationship.

RQ3 sought to examine the relationship between teaching beliefs (TB) and blended
learning. TB was also mapped to each of the TAM determinants creating two predictors—
TBPEU and TBPU. As with the previous variables, the dependent variable was the mean total of
the survey responses. The regression equation for predicting intention to use blended learning for
RG3 is:

$$\text{Predicted TBPEU} = +4.129 \quad \text{Predicted TB} = +2.90 \quad \text{Total Survey} = +54.016.$$  

We can see a significant result that teaching beliefs statistically predicted teachers’
perceived ease of use of blended learning, $b = 0.652, t = 5.067, p < .001$. However, there was a
weak prediction for teaching beliefs and teachers’ perceived usefulness, and $b = 0.289, t = 7.066,$
According to McMillan and Schumacher (2010, p. 227) “a regression determines how well scores from the independent variable predict scores on the dependent variable.” In RQ1, RQ2, and RQ3 each of the external variables of CSE, OLE and TB were measured against the total population score. Overall, computer self-efficacy and teaching beliefs showed to be predictors on teachers’ perceptions towards using blended learning as an instructional method.

A Pearson’s Correlation (Table 5) was computed to test the relationship between the six sub-variables. Taking a look at the results for each variable mapped to a TAM constraint, there were two statistically significant positive relationships found. As one of the sub variables increase its mapped TAM constraint increases as well.

Table 5

*Pearson's Correlation*
A correlation for the data revealed a positive moderate relationship between computer self-efficacy-perceived ease of use and computer self-efficacy-perceived usefulness, \( r = +0.614, n = 32, p < .01, \) two tails. The result indicates a correlation with moderate strength. As one sub TAM constraint increases of computer self-efficacy, so does the other.

In addition, there was a relationship indicated between the TAM determinants as mapped to teaching beliefs. A correlation for the data revealed a significant positive result between teaching beliefs perceived ease of use and teaching beliefs perceived usefulness, \( r = +0.527, n = 32, p < .01, \) two tails. This result indicates a less moderate strength though a correlation is still present.

Analysis of the relationships amongst the TAM determinants, PEU and PU, and the variables showed some statistically significant relationships as well. A statistically significant positive relationship was found between online learning experience perceived ease of use and computer self-efficacy perceived ease of use, \( r = +0.692, n = 32, p < .01, \) two tails.

The most significant relationship was found amongst the variables that included reference to technology. The variables with their mapped TAM determinants are between online learning experience perceived ease of use and computer self-efficacy perceived usefulness. The data indicated a strong positive relationship between the sub variables, \( r = +0.724, n = 32, p < .01, \) two tails.

However, no relationship exists between two sub variables as indicated from the value of 0 in the correlation results. Computer self-efficacy perceived ease of use had no association between previous online learning experience perceived usefulness. There is no relationship indicated between the sub variables with the sample data.
TEACHER PERCEPTIONS OF BLENDED LEARNING

RQ4 and 5 focused on the determinants of TAM—perceived usefulness and perceived ease of use. RQ4 sought to determine teachers’ perceptions towards blended learning instructional practices that can meet their instructional objectives (perceived usefulness). Whereas, RQ5 sought to determine high school teachers’ perceptions towards creating blended learning instructional practices to meet their instructional objectives (perceived ease of use). As each of these TAM determinants were grouped with the three variables of computer self-efficacy, previous online learning experience and teaching beliefs, the results relationships would be examined pairwise.

A one-way analysis of variance was conducted to evaluate the relationship between blended learning and the years a teacher has been working within the school district. Blended learning was again broken down into six groups representing the sub variables created from the variables mapped to each TAM constraint. They are the dependent variables.

The independent variable in this test was the years in district which included five groups: *less than one year* (n = 3), *1 to 5 years* (n = 9), *6 to 10 years* (n = 7), *11 to 15 years* (n = 8), and *more than 15 years* (n = 5) of teaching within the district. The Tukey HSD was conducted to determine where the differences lie. Assumptions for the Tukey are equal within-group variance across all groups associated with the means.

Data was presented as mean ± standard deviation. Group sizes ranged from 3 to 9 members. The variables were mapped to the TAM determinants as dependent variables to years taught in the district. The results were reported for each sub variable (Table 6).
## Table 6

**Summary of Mean Results**

<table>
<thead>
<tr>
<th>Sub Variable</th>
<th>Grouping</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSEPEU</td>
<td>Less than one year</td>
<td>$n = 3, 7.33 \pm 1.15$</td>
</tr>
<tr>
<td></td>
<td>1 to 5 years</td>
<td>$n = 9, 6.89 \pm 0.93$</td>
</tr>
<tr>
<td></td>
<td>6 to 10 years</td>
<td>$n = 7, 6.86 \pm 1.07$</td>
</tr>
<tr>
<td></td>
<td>11 to 15 years</td>
<td>$n = 8, 7.13 \pm 1.13$</td>
</tr>
<tr>
<td></td>
<td>More than 15 years</td>
<td>$n = 5, 6.80 \pm 0.84$</td>
</tr>
<tr>
<td>CSEPU</td>
<td>Less than one year</td>
<td>$n = 3, 8.00 \pm 0.00$</td>
</tr>
<tr>
<td></td>
<td>1 to 5 years</td>
<td>$n = 9, 7.67 \pm 0.86$</td>
</tr>
<tr>
<td></td>
<td>6 to 10 years</td>
<td>$n = 7, 8.00 \pm 0.58$</td>
</tr>
<tr>
<td></td>
<td>11 to 15 years</td>
<td>$n = 8, 7.75 \pm 0.46$</td>
</tr>
<tr>
<td></td>
<td>More than 15 years</td>
<td>$n = 5, 7.60 \pm 0.89$</td>
</tr>
<tr>
<td>OLEPEU</td>
<td>Less than one year</td>
<td>$n = 3, 5.00 \pm 1.00$</td>
</tr>
<tr>
<td></td>
<td>1 to 5 years</td>
<td>$n = 9, 4.89 \pm 0.78$</td>
</tr>
<tr>
<td></td>
<td>6 to 10 years</td>
<td>$n = 7, 4.86 \pm 0.69$</td>
</tr>
<tr>
<td></td>
<td>11 to 15 years</td>
<td>$n = 8, 4.50 \pm 0.76$</td>
</tr>
<tr>
<td></td>
<td>More than 15 years</td>
<td>$n = 5, 4.40 \pm 0.55$</td>
</tr>
<tr>
<td>OLEPU</td>
<td>Less than one year</td>
<td>$n = 3, 5.33 \pm 0.58$</td>
</tr>
<tr>
<td></td>
<td>1 to 5 years</td>
<td>$n = 9, 5.11 \pm 0.78$</td>
</tr>
<tr>
<td></td>
<td>6 to 10 years</td>
<td>$n = 7, 4.57 \pm 0.98$</td>
</tr>
<tr>
<td></td>
<td>11 to 15 years</td>
<td>$n = 8, 5.00 \pm 0.76$</td>
</tr>
<tr>
<td></td>
<td>More than 15 years</td>
<td>$n = 5, 5.80 \pm 0.84$</td>
</tr>
<tr>
<td>TBPEU</td>
<td>Less than one year</td>
<td>$n = 3, 8.00 \pm 1.00$</td>
</tr>
<tr>
<td></td>
<td>1 to 5 years</td>
<td>$n = 9, 7.22 \pm 0.67$</td>
</tr>
<tr>
<td></td>
<td>6 to 10 years</td>
<td>$n = 7, 7.86 \pm 1.35$</td>
</tr>
<tr>
<td></td>
<td>11 to 15 years</td>
<td>$n = 8, 7.00 \pm 0.76$</td>
</tr>
<tr>
<td></td>
<td>More than 15 years</td>
<td>$n = 5, 6.20 \pm 1.10$</td>
</tr>
<tr>
<td>TBPU</td>
<td>Less than one year</td>
<td>$n = 3, 14.00 \pm 3.61$</td>
</tr>
<tr>
<td></td>
<td>1 to 5 years</td>
<td>$n = 9, 12.67 \pm 1.66$</td>
</tr>
<tr>
<td></td>
<td>6 to 10 years</td>
<td>$n = 7, 13.43 \pm 1.72$</td>
</tr>
<tr>
<td></td>
<td>11 to 15 years</td>
<td>$n = 8, 11.00 \pm 1.93$</td>
</tr>
<tr>
<td></td>
<td>More than 15 years</td>
<td>$n = 5, 11.20 \pm 3.56$</td>
</tr>
</tbody>
</table>

Perceived ease of use as measured by computer self-efficacy towards blended learning showed a high mean with new teachers in the district which then decreased after one year of teaching within the district. The mean increased with teachers who had **10 to 15 years** of
TEACHER PERCEPTIONS OF BLENDED LEARNING

teaching experience within the district only to decrease again when they had more than 15 years teaching within the district. The perceived usefulness of blended learning as influenced by computer self-efficacy showed a similar pattern. However, the increase in the mean showed for the teachers who taught in the district 6 to 10 years and then decreased for teaching more than 10 years in the district.

Perceived ease of use as influenced by previous online teaching experience had the highest mean with new years to the district. Thereafter, as experience was gained the mean decreased. Perceived usefulness showed more variability with respect to previous online experience within teaching experience than perceived ease of use. Again, the highest mean showed for the newest teachers to the district. The mean decreased until teachers had been with the district at least 11 years. At this threshold the mean began to increase.

Teaching beliefs showed a similar pattern with a high mean for the newest teachers to the district for both of its sub variables. There was a decrease in the mean for teachers who worked in the district between 1 to 5 years and then an increase for 6 to 10 years. As teaching experience in the district increased more than 10 years in teaching experience in the district, the mean decreased for perceived ease of use.

Perceived usefulness of blended learning as influenced by teaching beliefs had an up and down pattern for the five categories of teaching experience within the district. The mean was the highest for the newest group of teachers with less than one year of teaching within the district. Then the mean dropped only to increase again for the mid-range of teaching experience, 6 to 10 years in the district. It decreases again for the next experience category only to increase for the teachers with more than 15 years of teaching experience within the district.
TEACHER PERCEPTIONS OF BLENDED LEARNING

There were no statistically significant differences between years taught in the current school district and five of the six sub variables (Table 7). However, the results for TBPEU showed some statistically significant difference between group mean. A Tukey HSD was performed to determine where statistically significant was located within the five categories. The test showed statistical significance between teaching experience of 6 years and more than 15 years within the district differed significantly at p < .05.

Table 7

Summary results of ANOVA

<table>
<thead>
<tr>
<th>Sub Variable</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSEPEU</td>
<td>$F(4, 27) = 0.21$, $p = 0.930$</td>
</tr>
<tr>
<td>CSEPU</td>
<td>$F(4, 27) = 1.92$, $p = 0.801$</td>
</tr>
<tr>
<td>OLEPEU</td>
<td>$F(4, 27) = 0.69$, $p = 0.607$</td>
</tr>
<tr>
<td>OLEPU</td>
<td>$F(4, 27) = 0.72$, $p = 0.585$</td>
</tr>
<tr>
<td>TBPEU</td>
<td>$F(4, 27) = 2.75$, $p = 0.049$</td>
</tr>
<tr>
<td>TBPU</td>
<td>$F(4, 27) = 1.82$, $p = 0.155$</td>
</tr>
</tbody>
</table>

The independent variable, years teaching in the school district, had low number of responses per category which may have led to limited results of the ANOVA. Consequently, it was decided to collapse some of the categories within the independent variable together and rerun the tests. The first test rerun collapsed the original five categories into three increasing the total number of responses (Table 8).

The resulting data is again represented as mean ± standard deviation. Data is presented as mean ± standard deviation. The larger group sizes ranged from 7 to 13 members. The variables were mapped to the TAM determinants as dependent variables to years taught in the district. The results were reported for each sub variable (Table 9).
## Table 8

**ANOVA with Independent Variable Collapsed to Three Categories**

<table>
<thead>
<tr>
<th>Original Category</th>
<th>Size</th>
<th>New Category</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than one year in district</td>
<td>3</td>
<td>0 – 5 years in</td>
<td>12</td>
</tr>
<tr>
<td>1 to 5 years in district</td>
<td>9</td>
<td>district</td>
<td></td>
</tr>
<tr>
<td>6 to 10 years in district</td>
<td>7</td>
<td>6 – 10 years in</td>
<td>7</td>
</tr>
<tr>
<td>11 to 15 years in district</td>
<td>8</td>
<td>More than 10</td>
<td></td>
</tr>
<tr>
<td>More than 15 years in district</td>
<td>5</td>
<td>years in district</td>
<td>13</td>
</tr>
</tbody>
</table>

## Table 9

**Summary of Mean Results with Three Categories**

<table>
<thead>
<tr>
<th>Sub Variable</th>
<th>Grouping</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSEPEU</td>
<td>0 – 5 years in district</td>
<td>( n = 12, 7.00 \pm 0.95 )</td>
</tr>
<tr>
<td></td>
<td>6 – 10 years in district</td>
<td>( n = 7, 6.86 \pm 1.07 )</td>
</tr>
<tr>
<td></td>
<td>More than 10 years in district</td>
<td>( n = 13, 7.00 \pm 1.00 )</td>
</tr>
<tr>
<td>CSEPU</td>
<td>0 – 5 years in district</td>
<td>( n = 12, 7.75 \pm 0.75 )</td>
</tr>
<tr>
<td></td>
<td>6 – 10 years in district</td>
<td>( n = 7, 8.00 \pm 0.58 )</td>
</tr>
<tr>
<td></td>
<td>More than 10 years in district</td>
<td>( n = 13, 7.69 \pm 0.63 )</td>
</tr>
<tr>
<td>OLEPEU</td>
<td>0 – 5 years in district</td>
<td>( n = 12, 4.92 \pm 0.79 )</td>
</tr>
<tr>
<td></td>
<td>6 – 10 years in district</td>
<td>( n = 7, 4.86 \pm 0.69 )</td>
</tr>
<tr>
<td></td>
<td>More than 10 years in district</td>
<td>( n = 13, 4.46 \pm 0.67 )</td>
</tr>
<tr>
<td>OLEPU</td>
<td>0 – 5 years in district</td>
<td>( n = 12, 5.17 \pm 0.72 )</td>
</tr>
<tr>
<td></td>
<td>6 – 10 years in district</td>
<td>( n = 7, 4.57 \pm 0.98 )</td>
</tr>
<tr>
<td></td>
<td>More than 10 years in district</td>
<td>( n = 13, 5.08 \pm 0.76 )</td>
</tr>
<tr>
<td>TBPEU</td>
<td>0 – 5 years in district</td>
<td>( n = 12, 7.42 \pm 0.79 )</td>
</tr>
<tr>
<td></td>
<td>6 – 10 years in district</td>
<td>( n = 7, 7.86 \pm 1.35 )</td>
</tr>
<tr>
<td></td>
<td>More than 10 years in district</td>
<td>( n = 13, 6.69 \pm 0.95 )</td>
</tr>
<tr>
<td>TBPU</td>
<td>0 – 5 years in district</td>
<td>( n = 12, 13.00 \pm 2.17 )</td>
</tr>
<tr>
<td></td>
<td>6 – 10 years in district</td>
<td>( n = 7, 13.43 \pm 1.72 )</td>
</tr>
<tr>
<td></td>
<td>More than 10 years in district</td>
<td>( n = 13, 11.08 \pm 2.53 )</td>
</tr>
</tbody>
</table>
Newer teachers \((less \ than \ five \ years)\) as for teachers who have been in the district longer than 10 had similar mean and variability towards their perception of the ease of use for blended learning based on their computer self-efficacy. Whereas the results differed for perceived usefulness. Teachers who had been with the district more than 10 years had a lower mean than newer or mid-range teachers.

The results for newer teachers indicated a higher mean in their perceptions of blended learning as influenced by previous online learning experience for both TAM determinants. The mean decreased for perceived ease of use as teachers gained experience in the district. However, the results indicate the after a decrease in the mean at the mid-range group, the mean increased for perceived usefulness as teachers stayed longer in the district.

The largest mean for teaching beliefs were for teachers in the mid-range of teaching experience--in the district more than 10 years. As teachers gained more experience in the district their teaching beliefs influenced their perceptions of blended learning. However, the data shows that a threshold appears after their teaching experience within the district increases beyond 10 years. Then their perceptions of blended learning begin to decrease as influenced by teaching beliefs.

The ANOVA results showed there were no statistically significant differences between years taught in the current school district and four of the six sub variables (Table 10). However, there was statistically significance difference shown between teaching beliefs and both TAM determinants—PEU and PU. A Tukey HSD test showed that TBPEU and increased teaching experience of more than 6 years within the district differed significantly at \(p < .05\). This result was consistent with the result prior to collapsing the groups to gain a larger sample size.
Table 10


Summary Results of ANOVA with Three Categories

<table>
<thead>
<tr>
<th>Sub Variable</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSEPEU</td>
<td>$F(2, 29) = 0.056, p = 0.946$</td>
</tr>
<tr>
<td>CSEPU</td>
<td>$F(2, 29) = 0.501, p = 0.366$</td>
</tr>
<tr>
<td>OLEPEU</td>
<td>$F(2, 29) = 1.415, p = 0.259$</td>
</tr>
<tr>
<td>OLEPU</td>
<td>$F(2, 29) = 1.344, p = 0.277$</td>
</tr>
<tr>
<td>TBPEU</td>
<td>$F(2, 29) = 3.518, p = 0.043$</td>
</tr>
<tr>
<td>TBPU</td>
<td>$F(2, 29) = 3.386, p = 0.048$</td>
</tr>
</tbody>
</table>

A second rerun was completed collapsing the five sub categories of years teaching in the district into two categories additionally increasing the size. An independent sample t-test was chosen as it is most appropriate for determining the means between two groups, years teaching in the district. The division into two was split between new teachers to mid-range of experience at 10 years and then more than 10 years of experience (Table 11).

Table 11

Sample t-test with Independent Variable Collapsed to Two Categories

<table>
<thead>
<tr>
<th>Original Category</th>
<th>Size</th>
<th>New Category</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than one year in district</td>
<td>3</td>
<td>0 – 10 years in district</td>
<td>19</td>
</tr>
<tr>
<td>1 to 5 years in district</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 to 10 years in district</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 to 15 years in district</td>
<td>8</td>
<td>More than 10 years in district</td>
<td>13</td>
</tr>
<tr>
<td>More than 15 years in district</td>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The resulting data are mean ± standard deviation. The variables were mapped to the TAM determinants as dependent variables to years taught in the district. The results were
reported for each sub variable. The data presented the results for each sub variable per grouping of teaching experience (Table 12).

Table 12

*Summary of Mean Results for Two Groupings*

<table>
<thead>
<tr>
<th>Sub Variable</th>
<th>Grouping</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSEPEU</td>
<td>0 – 10 years in district</td>
<td>( n = 19, 6.95 \pm 0.97 )</td>
</tr>
<tr>
<td></td>
<td>More than 10 years in district</td>
<td>( n = 13, 7.00 \pm 1.00 )</td>
</tr>
<tr>
<td>CSEPU</td>
<td>0 – 10 years in district</td>
<td>( n = 19, 7.84 \pm 0.688 )</td>
</tr>
<tr>
<td></td>
<td>More than 10 years in district</td>
<td>( n = 13, 7.69 \pm 0.630 )</td>
</tr>
<tr>
<td>OLEPEU</td>
<td>0 – 10 years in district</td>
<td>( n = 19, 4.89 \pm 0.737 )</td>
</tr>
<tr>
<td></td>
<td>More than 10 years in district</td>
<td>( n = 13, 4.46 \pm 0.660 )</td>
</tr>
<tr>
<td>OLEPU</td>
<td>0 – 10 years in district</td>
<td>( n = 19, 4.95 \pm 0.848 )</td>
</tr>
<tr>
<td></td>
<td>More than 10 years in district</td>
<td>( n = 13, 5.08 \pm 0.760 )</td>
</tr>
<tr>
<td>TBPEU</td>
<td>0 – 10 years in district</td>
<td>( n = 19, 7.98 \pm 1.017 )</td>
</tr>
<tr>
<td></td>
<td>More than 10 years in district</td>
<td>( n = 13, 6.69 \pm 0.947 )</td>
</tr>
<tr>
<td>TBPU</td>
<td>0 – 10 years in district</td>
<td>( n = 19, 13.16 \pm 1.98 )</td>
</tr>
<tr>
<td></td>
<td>More than 10 years in district</td>
<td>( n = 13, 11.08 \pm 2.53 )</td>
</tr>
</tbody>
</table>

Computer self-efficacy showed higher means with less variability for the sub variable CSEPU. There was a slightly higher mean for teachers were had more experience teaching in the district which contributed towards their perception of blended learning ease of use. This result was opposite for perceived usefulness of blended learning as influenced by computer self-efficacy. Results were showed that teachers will less than 10 years of experience found their computer self-efficacy contributed to their perception of blended learning usefulness to their teaching more than teachers who were with the district longer than 10 years.

Perceived ease of use as mapped to previous online learning experience showed more variability than previous results. New teachers with less than 10 years of experience were more likely to perceive blended learning was easy to use based on their previous online learning
TEACHER PERCEPTIONS OF BLENDED LEARNING

experience than teachers with more than 10 years of teaching experience. Previous online learning experience also indicated that teachers with less than 10 years of experience perceived blended learning to be useful as influenced by their previous online learning experiences.

Mean sizes were much higher with higher variability within teaching beliefs, as compared to the two previous variables. Whereas, the data presented by perceived usefulness influenced by teaching beliefs showed a decrease in the mean as teachers taught longer in the district. As teachers gained more teaching experience in the district, their perceptions of blended learning were less influenced by their teaching beliefs.

A Welch independent t-test was run to determine if there were differences between teachers with less than 10 years of teaching experience and teachers with more than 10 years of teaching experience were more likely to be influenced in their intention to blended learning (Table 13). Intention was again measured using the six sub variables as in previous tests. A statistically significant difference was found for teaching beliefs within both TAM determinants at the 95% confidence interval.

Table 13

<table>
<thead>
<tr>
<th>Sub Variable</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSEPEU</td>
<td>( t(30) = -0.149, p = .883 )</td>
</tr>
<tr>
<td>CSEPU</td>
<td>( t(30) = 0.625, p = .537 )</td>
</tr>
<tr>
<td>OLEPEU</td>
<td>( t(30) = 1.701, p = .099 )</td>
</tr>
<tr>
<td>OLEPU</td>
<td>( t(30) = -0.442, p = .661 )</td>
</tr>
<tr>
<td>TBPEU</td>
<td>( t(30) = 2.488, p = .019 )</td>
</tr>
<tr>
<td>TBPU</td>
<td>( t(30) = 2.608, p = .014 )</td>
</tr>
</tbody>
</table>

The participation rate of the survey yielded a low number. Therefore, it was necessary to explore the results of regrouping the levels by collapsing and increasing group size within groups.
of the independent variable—years taught within district. The results appeared to have substantiated the results of the original ANOVA for statistical significance between of five groupings and ANOVA with three groupings as well as with the independent t-test with two groupings.

The first run of ANOVA used the original five groups as presented on the survey to the participants—less than one year, 1 to 5 years, 6 to 10 years, 11 to 15 years and more than 15 years teaching within the district. As stated previously, the Tukey HSD test showed a statistically significant result between teaching beliefs perceived ease of use and increased teaching experience in the district. This result was confirmed as group sizes were increased creating less groups. However, the two subsequent ANOVA tests with collapsed groupings revealed statistically significant results with both TAM determinants and teaching beliefs. Sample size had a direct effect on the results of the tests with the three variables and TAM determinants.
CHAPTER 5

Introduction

This research sought to identify the variables of teachers’ intentions to use blended learning voluntarily in their high school classrooms. Although “there have been large investments made to integrate technology into K-12 classrooms to equip students with skills needed to prepare for college and a career, the practical use of this investment has not been impressive” (Delgado, Wardlow, McKnight, & O’Malley, 2015, p. 408). The introduction of new technologies in education has changed in learning resources and materials which may also have an effect on instructional practices. Teacher acceptance is a key element towards the use and adoption of new technologies. Consequently, it is important to research which variables influence teachers’ perspectives of technology leading to their intention to use or not use them.

The purpose of this research was to explore K-12 teachers’ perceptions of blended learning as a voluntary instructional strategy. Blended learning is defined as “a formal educational program in which a student learns at least in part through online delivery of content and instruction with some element of student control over time, place, path and pace and at least in part in a supervised brick-and-mortar location away from home” (Horn & Staker, 2015, p. 34). In an attempt to determine high school teachers’ perceptions of blended learning instructional practices, a quantitative study was performed.

Specific variables were used to determine if a relationship existed between teachers’ intention to use blended learning as part of their traditional high school classes. Computer self-efficacy (CSE), previous online teaching experience (OLE), and teaching beliefs (TB) were chosen as independent variables coupled with the determinants of Technology Acceptance Model (TAM) (Davis, 1989), perceived ease of use (PEU) and perceived usefulness (PU), to
TEACHER PERCEPTIONS OF BLENDED LEARNING

determine the influence of teacher’s intention to use blended learning in their high school classrooms. “TAM can be used to evaluate (a) new technologies, by measuring the behavioral intention to use (BI); and/or (b) currently used technologies, by measuring usage behavior (UB—e.g., actual use)” (Holden & Rada, 2011, p. 343).

The researcher’s personal experience with the surveyed school district influenced the variables chosen for this study. Teacher adoption of new technology initiatives has been a discussion in the past within the district. As an instructional technologist, the researcher has been responsible for the development and training of various aspects of technology as an instructional and management tool in the surveyed district for almost a decade. This role has been influenced by the promises of many technology innovations and district initiatives to use them.

The first variable in the study was represented by computer self-efficacy in the survey, the usage of technology by teachers in the district. It is often referred to as technological skills and ability of the user to complete needed tasks (Venkatesh, Davis, & Morris, 2007; Holden & Rada, 2011). The level of computer self-efficacy, however, is not dependent on teaching experience but rather on the comfort level of the teacher in learning and using technology.

A teacher’s previous online learning experience was the next variable analyzed. This variable explored the experiences of the teacher as a learner or facilitator in an online learning environment. Teachers in the surveyed district have taken required online trainings on topics such as child abuse and sexual harassment over the past few years. Any additional experiences learning or teaching in the online environment were not known. This research sought to determine if these previous experiences had any effect on behavioral intentions to use blended learning in their classroom.
The last variable used in the research was teaching beliefs. It was chosen by the researcher following an experience in which some teachers expressed strong thoughts about the ability of technology, e-learning days, to replace weather make-up days or. There were some negative opinions expressed about the capability of students to learn from technology as opposed to being in a traditional classroom setting in the presence of teachers. While these informal comments made are related to another situation, it brought to mind the question of how technology usage may be affected by a teacher’s belief of how students learn.

Educators who have been teaching for about two decades have experienced teaching both with and without the use of technology. Traditional views of teaching with teacher-centered practices contradict more innovative instructional design methodologies creating student-centered learning environments. How technology is utilized as a learning tool may have affected their views on teaching was an interest to this researcher. In addition, the researcher was interested whether prior teaching experiences were a factor towards adopting technology to create blended learning.

The introduction of new technologies and applications offer many promises to increase student achievement and engagement. However, the use of new technologies often results in a change of practice to the teacher which the teacher may or may not readily accept. The efforts of the surveyed district towards integrating technology into the teaching and learning experiences are apparent with the introduction of individual Internet-ready devices for both teachers and students.

The surveyed district provides portable technology devices to both teachers and students. These devices used in conjunction with online learning environments allow for blended learning to be utilized as an instructional strategy. However, the use of technology towards blended
learning would be an instructional change of practice. Currently, there is no mandate for teachers to use blended learning within their traditional classrooms and any use of blended learning instructional practices are voluntary.

**Summary of Findings**

A survey of high school teachers located in a south central Pennsylvania was utilized to collect data. The study analyzed surveys of 32 high school teachers in a district comprised of 164 teachers. The teachers had a mean age range of 42.72 years with a median range of 40.00 years indicating a normal distribution. Formal teaching experience of the survey participants ranged between teachers in their first year to those who have taught for more than 15 years. Teachers with less than five years of teaching experience comprised of 25% of the survey participants. Whereas 63% of the survey participants had more than 10 years of teaching experience. Teachers within the mid-range of teaching experience encompassed the remaining 12% of the survey participants.

Five research questions were created to investigate the relationship using the Technology Acceptance Model (Davis, 1989) between teachers’ intentions to use blended learning instructional strategies and independent variables—computer self-efficacy, previous online learning experiences and teaching beliefs. The results sought to answer the following research questions:

RQ1: What is the relationship between computer self-efficacy and high school teachers’ intentions to use blended learning instructional practices?

RQ2: What is the relationship between prior experience with online learning and high school teachers’ intentions to use blended learning instructional practices?
RQ3: What is the relationship between high school teachers’ teaching beliefs and high school teachers’ intentions to use blended learning instructional practices?

RQ4: What are high school teachers’ perceptions towards blended learning instructional practices that can meet their instructional objectives (perceived usefulness)?

RQ5: What are high school teachers’ perceptions towards creating blended learning instructional practices to meet their instructional objectives (perceived ease of use)?

The three independent variables were mapped to the two TAM determinants (perceived usefulness and perceived ease of use) creating six sub variables—CSEPU, CSEPU, OLEPEU, OLEPU, TBPEU, and TBPU. Use of the six sub variables allowed the researcher to determine if a relationship exists between each of the sub variables in terms of teaching experience within the district. Teaching experience within the district was used to create five groupings—less than one year, 1 to 5 years, 6 to 10 years, 11 to 15 years, and more than 15 years teaching experience within the district.

The low number of survey participants presented some challenges for this study. The five groups had low frequencies which may have affected the results from the ANOVA tests. Therefore, it was necessary to try collapsing the survey groups to confirm the results. This process led to larger frequencies and then the tests were repeated.

The first-round analysis of the data used the original five groups of teaching experience within the district as indicated in the survey. The results of the ANOVA showed a positive relationship between teaching beliefs and perceived ease of use towards blended learning with teachers who have been teaching more than six years in the district. Experienced teachers were more likely to use blended learning and did not find it difficult to create blended learning.
The results of this statistical analysis indicated a low frequency count within the survey groupings. While a relationship was exposed from the first-round analysis, the low participation rate may have affected the results and would need to be confirmed. The hope is these new results would be consistent and could be extrapolated with a larger frequency count.

In the second run of the test, the survey groupings were collapsed from five to three groups. An ANOVA was performed. The results confirmed a relationship exists between variable teaching beliefs and perceived ease of use. In addition, the results also indicated a relationship between for the second TAM determinant, perceived usefulness, and teaching beliefs. However, no relationship was identified between years of teaching in the district and the other two variables—computer self-efficacy and previous online learning experience.

When the grouping was collapsed further into two groups, a T-test was performed. The statistical results confirmed the ANOVA results from the previous runs. Once again, a positive relationship was revealed between teaching beliefs and both TAM determinants, ease of use as well as usefulness of blended learning instructional strategies. This result was especially prominent with the group of teachers whose teaching experience exceeded ten years in the district.

These results concur with the research of Kim, Kim, Lee, Spector and DeMeester (2013) who found that teachers’ attitudes of technology instructional integration are linked to teacher beliefs about its effectiveness in learning. Consequently, it can be confirmed that despite the low participation rate of the survey used in this study, there is a relationship between teaching beliefs and teachers’ intention to use blended learning for their high school classes. The research
questions presented in this study focused on the three independent variables as well as the determinants of the TAM framework (Figure 10).

![Figure 10. Original Technology Acceptance Model (Davis, 1989) with study variables (Venkatesh & Davis, 2000). Reprinted with permission.](image)

The first research question, RQ1, sought to determine whether a teacher's computer skills and knowledge (computer self-efficacy) had influence on their intention to use blended learning. It was expressed in terms of perceptions of usefulness and ease of use towards using blended learning instructional strategies in high school teachers’ classes. Access to technology has been readily available in the last decade in the surveyed district with individual devices for all students. The results indicated there was no relationship between computer skills and knowledge and teachers’ intention to use blended learning.

RQ2 sought to determine whether previous online learning experiences influenced teachers’ intention to use blended learning instructional strategies. Previous online learning experiences may include those amassed as a learner taking an online course or as a facilitator teaching an online course. The results indicated that no relationship exists between previous online learning experiences and intention to use blended learning instructional strategies.
TEACHER PERCEPTIONS OF BLENDED LEARNING

Teaching beliefs was the last independent variable and the focus for RQ3. It is represented as a collaboration between a teacher’s pedagogical training and personal experiences which is evident in their instructional practices. Teachers were provided with a definition of blended learning which was specific to teaching and learning practices of new content only. Consequently, they were able to contrast their current instructional practices with technology to that as listed in the definition.

The results indicated a positive relationship between high school teachers’ teaching beliefs and intentions to use blended learning instructional practices. As stated previously, the relationship was more pronounced with teachers with more teaching experience in the district. This was especially apparent with teachers whose teaching experience exceeded ten years at the district. Initially the tests, which used smaller sample sizes or frequencies, indicated a statistical relationship with ease of use over usefulness of blended learning. As the frequency was increased by collapsing smaller groups into larger ones, both ease of use and usefulness showed a strong relationship for teaching beliefs.

RQ4 and RQ5 refer to each of the determinants of the TAM framework which influence behavioral intentions towards technology usage. RQ4 focuses on the first determinant of the TAM framework—perceived usefulness. It is the teachers’ perception that blended learning instructional practices do meet instructional learning objectives.

For example, a math teacher decides to incorporate online learning for the unit on Pythagorean theorem. The initial introduction to the theorem is presented online outside of school allowing the students to have control over pace, time, path, and location during the learning process. Application of the theorem is then practiced in class and in further work following the initial introduction. This is an example of flipped learning, which is one example
TEACHER PERCEPTIONS OF BLENDED LEARNING

of blended learning. The decision to use online learning in conjunction with face to face practices is a pedagogical decision by the teacher to meet learning objectives.

The remaining TAM determinant is perceived ease of use which is represented in RQ5. It refers to the process or performance of using a specific technology, in this case it is blended learning instructional practices (Davis, 1989). Specifically, it is the creating, developing or even curating of learning materials for online instruction to manage learning experiences in the face to face classroom. The study did find a statistical relationship between teaching beliefs and perceived ease of use with teachers who had been with the district more than ten years. There was a positive relationship towards using blended learning instructional strategies.

Conclusions

This research sought to determine teachers’ perception of blended learning as an instructional strategy. The participants were grouped by their years of experience teaching in the district. The data indicated that teachers with more experience in teaching and exposure to technology have a positive relationship towards blended learning. Exposure to technology within the district as well as increased teaching experience was a factor in the perceptions of teachers to use blended learning.

The location of this study was chosen for its wide technology access for teachers as well as students and the district the researcher is employed at. The high school has provided students with individual devices since 2013. Additionally, teachers have had access to a student management system and teacher web pages for the last ten years. The use of technology is highly encouraged and all students are required to have a device either from the district or their own choice. Currently, the district does not mandate teachers to use blended learning.
TEACHER PERCEPTIONS OF BLENDED LEARNING

instructional practices for their classes. Therefore, any usage of it instructionally was through
the teacher’s own volition.

Limitations

One limitation to the research, as expressed in Chapter 3, was the lack of survey
participation. The research for this study was conducted at the same district where the researcher
is employed. The role of the researcher is to provide instructional technology training and
support for all grade levels and curriculum areas. The efforts to provide a perception that the
research was independent from the researcher’s professional role may not have been enough to
increase survey participation. Despite repeated statements of guaranteed anonymity, teachers
may still have been reluctant to participate or could have altered their responses as a result of a
relationship with the researcher.

Another limitation of this research is the generic use of the term teaching beliefs. The
data indicated averages of the three variables (CSE, OLT, and TB) were similar in their average
means. This could be indicative of the teachers thinking more broadly when answering the
questions. Pedagogical practices were not presented beyond defining the use of technology in
the instructional process. The survey questions focused on two areas: whether a teacher believed
a student can learn from technology and whether a teacher believed a student could learn out of
teacher presence using technology. The research focused on technology-mediated instruction
versus face-to-face instructional practices.

Future Research

There has been a lack of research on blended learning in the K-12 context and from
teachers’ perspectives (Drysdale, Graham, Spring, & Halverson, 2013, Oliver, 2014). The
research conducted in this study would add to the limited research on blended learning from the
teacher’s perspective in the K-12 context. Researching in the K-12 environment is important as it explores the variety of challenges that are not present in higher education.

For example, rigid time schedules and mandatory matriculation of students in K-12 schools do not allow the flexibility that is sometimes present in higher education classrooms. In addition, curriculum and assessment mandates drive many educational decisions that may not be present in higher education. The instructional decisions that K-12 teachers make may differ due to these factors. Consequently, it is important to study the K-12 environment as well because it is not always a one-to-one comparison with higher education.

Future studies to expand this research would include additional demographic information of the teacher. Expanding this study to include more districts with similar characteristics and the same level of technology access would allow for relationships to be explored and tested. A wider population sample, to include other districts, may transcend the personal connections of the sample size and allow for more information to be obtained of the participants.

The researcher chose to eliminate some descriptive questions which may have provided a deeper analysis of education with respects to blended learning. The additional data could have provided a larger perspective of whether teachers of specific subjects and grade levels are more or less likely to incorporate blended learning instructional strategies than others. For example, an analysis of the data could explore if high school English language arts teachers are more inclined to use blended learning in their classes than math teachers under their own volition.

A comparison could be made of the different curriculum areas, years of teaching experience and their intention to use blended learning. Obtaining this information would assist schools in developing programs which meet the needs of teachers specific to the curriculum areas as well as the level of teaching experience. As blended and online learning increases its
TEACHER PERCEPTIONS OF BLENDED LEARNING

presence in K-12 schools, teacher acceptance and adoption will be essential towards usage.

Studying the factors and variables that influence K-12 teachers’ perception to adopt blended learning instructional practices would add to overall blended learning research from the teachers’ perspective.

Lastly, this study sought currently practicing K-12 teachers to explore their perceptions of blended learning. Blended learning is one example of technology innovation that affects educational practices. Future school administrators and teachers will undoubtably face many future technology innovations which will influence or change their working environment. Therefore, it will be important for higher and continuing education programs to be proactive in offering teaching and learning experiences in a variety of environments, including online. As content, pedagogical, and technological experiences increase for preservice teachers and future administrators, educators may be less reluctant to accept future technology innovations.
References


TEACHER PERCEPTIONS OF BLENDED LEARNING


TEACHER PERCEPTIONS OF BLENDED LEARNING


TEACHER PERCEPTIONS OF BLENDED LEARNING


Kopcha, T. J. (2012). Teachers' perceptions of the barriers to technology integration and practices with technology under situated professional development. *Computers and Education, 1109-1121.*


TEACHER PERCEPTIONS OF BLENDED LEARNING


Measuring Blended Learning Intentions in the High School Classroom

1. CONSENT TO PARTICIPATE IN A RESEARCH STUDY ~ Part 1

RESEARCHER
Kelli B. Murphy | Duquesne University

ADVISOR
Dr. David D. Carbonara I School of Education, Department of Instruction and Leadership | Duquesne University

SOURCE OF SUPPORT
This study is being conducted as partial fulfillment of the requirement for the doctoral degree in Instructional Technology and Leadership at Duquesne University.

RESEARCH STUDY PURPOSE
You are being asked to participate in a research study that seeks to explore teachers’ perception of using Blended Learning instructional strategies for their courses. This study will utilize the Technology Acceptance Model developed by Fred D. Davis (1986) to study high school teacher acceptance of Blended Learning instructional practices using external variables of previous online learning experience, computer self-efficacy and teaching beliefs.

PROCEDURES
The questionnaire is offered to all high school teachers from the chosen district currently instructing in the curriculum area of their certification for students in grades nine through twelve. Their classes are traditionally scheduled with no formal element of online instruction. The use of technology as an instructional tool is by teacher choice and not the administration.

Participation in the research study will consist of completion of a two-part questionnaire which is contained online with the researcher’s O365 account with Duquesne University. Completion of the questionnaire is not expected to exceed twenty minutes. Participants may choose any location, date within the data collection period, time, and pace with which to complete the questionnaire. The questionnaire, however, must be completed in one sitting.
CONFIDENTIALITY
Your privacy and confidentiality are important to this researcher. Any personal information will be kept confidential at all times and to every extent possible. Once you have completed the questionnaire, the data is collected using Duquesne University’s Microsoft O365 Forms exporting to Excel. No email address, IP address or any other electronic information is requested or recorded. Responses to the questionnaire will be kept secure as per Microsoft privacy policy https://products.office.com/en-us/business/office-365-trust-center-privacy. Data will remain the property of the researcher according to Microsoft’s Data Policy. The coded and raw data will be kept for six months following the close of the study. At the conclusion of the six months, the data will be destroyed/deleted.

2. CONSENT TO PARTICIPATE IN A RESEARCH STUDY - Part 2

WHAT HAPPENS IF I SAY YES, BUT I CHANGE MY MIND LATER?
Your participation in this study is strictly voluntary. There are no penalties or consequences of any kind if you decide not to participate. Consent to participate will be asked at the beginning and end of the survey. At the completion of this survey, you will be asked a second time if you consent to participate. If you choose to withdraw your data, you will choose NO CONSENT. This choice will link to the end of the questionnaire with no data saved for research.

SUMMARY OF RESULTS
A summary of the results from this research will be supplied to the institution’s Academic Instructional Technologist who will provide it to you, at no cost, upon request.

STATEMENT OF VOLUNTARY CONSENT
When signing this form, I am agreeing to voluntarily enter this study. I have had a chance to read this consent form, and it was explained to me in a language which I use. I understand that I am free to withdraw for any reason from participation at the end of the questionnaire before submitting my answers which will delete all of my data.

I understand that if I have further questions about my participation in this research study, I may contact Kelli B. Murphy at irb@duq.edu. Should I have questions concerning protection of human subject issues, I may call Dr. David Delmonico, Chair of the Duquesne University Institutional Review Board at irb@duq.edu.

AUGUST 2021

○ I AGREE TO PARTICIPATE IN THE STUDY

○ I DO NOT AGREE TO PARTICIPATE IN THE STUDY
### Questions

3. What is your age? *  
   
Enter your answer:  

4. Do you currently teach in grades 9 - 12? *  
   - Yes  
   - No  

5. Are you certified to teach in Pennsylvania? *  
   - Yes  
   - No  

6. Do you create the instruction for the courses you are currently assigned to? *  
   - Yes  
   - No  

7. Does your schedule include any administrative or supervisory roles? *  
   - Yes  
   - No  

8. Are any of your classes designated as a Hybrid/Blended or as an Online Course? *  
   - Yes  
   - No  

9. How many years of public/private teaching experience will you have completed by the end of this school year? (Do not count student teaching or any positions that were non-paid) *  
   - Less than one year  
   - 1 to 5 years  
   - 6 to 10 years  
   - 11 to 15 years  
   - More than 15 years
10. At the conclusion of this school year, how many years have you taught in your CURRENT school district? *
   
   - Less than one year
   - 1 to 5 years
   - 6 to 10 years
   - 11 to 15 years
   - More than 15 years

11. What is your level of confidence with technology? *

   - Basic
   - Proficient
   - Advanced
   - Expert

12. The next series of questions will use the following definitions for ONLINE and BLENDED Learning:

   If technology replaces direct instruction by the teacher and all new content is then presented virtually, then it is considered to be ONLINE LEARNING.

   BLENDED LEARNING is defined as “a formal educational program in which a student learns at least in part through online delivery of content and instruction with some element of student control over time, place, path and pace and at least in part in a supervised brick-and-mortar location away from home.”


   I have read the definitions above.

13. Using Blended Learning would allow me to address instructional concerns more than would otherwise be possible. *

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Response:</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
### TEACHER PERCEPTIONS OF BLENDED LEARNING

<table>
<thead>
<tr>
<th>Questions</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>My previous experience with online learning influences my decision towards using Blended Learning.</td>
<td><img src="#" alt="Response Options" /></td>
</tr>
<tr>
<td>Blended Learning would enhance my teaching effectiveness.</td>
<td><img src="#" alt="Response Options" /></td>
</tr>
<tr>
<td>It is easy for me to create Blended Learning.</td>
<td><img src="#" alt="Response Options" /></td>
</tr>
<tr>
<td>Teaching would be more difficult if I did not use Blended Learning.</td>
<td><img src="#" alt="Response Options" /></td>
</tr>
<tr>
<td>I feel comfortable using Blended Learning as a result of my previous experience with online learning.</td>
<td><img src="#" alt="Response Options" /></td>
</tr>
<tr>
<td>Students can learn just as well with Blended Learning as they do face-to-face instruction.</td>
<td><img src="#" alt="Response Options" /></td>
</tr>
<tr>
<td>My previous online learning experiences were not positive.</td>
<td><img src="#" alt="Response Options" /></td>
</tr>
<tr>
<td>Questions</td>
<td>Responses</td>
</tr>
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</tr>
<tr>
<td>21. I find that I have more errors using Blended Learning than just using face-to-face teaching methods. *</td>
<td>![](Strongly Agree)</td>
</tr>
<tr>
<td>Your Response:</td>
<td><img src="" alt="" /></td>
</tr>
<tr>
<td>22. Blended Learning is frustrating to me. *</td>
<td>![](Strongly Agree)</td>
</tr>
<tr>
<td>Your Response:</td>
<td><img src="" alt="" /></td>
</tr>
<tr>
<td>23. Using Blended Learning in my classes requires more effort from me as opposed to using traditional teaching methods. *</td>
<td>![](Strongly Agree)</td>
</tr>
<tr>
<td>Your Response:</td>
<td><img src="" alt="" /></td>
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<tr>
<td>24. I find it is easy to use Blended Learning as an instructional strategy. *</td>
<td>![](Strongly Agree)</td>
</tr>
<tr>
<td>Your Response:</td>
<td><img src="" alt="" /></td>
</tr>
<tr>
<td>25. I find myself providing guidance to others on how to create Blended Learning to deliver content. *</td>
<td>![](Strongly Agree)</td>
</tr>
<tr>
<td>Your Response:</td>
<td><img src="" alt="" /></td>
</tr>
<tr>
<td>26. Students do not need the teacher present for direct instruction, but students need the teacher present for solving problems. *</td>
<td>![](Strongly Agree)</td>
</tr>
<tr>
<td>Your Response:</td>
<td><img src="" alt="" /></td>
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</tbody>
</table>
TEACHER PERCEPTIONS OF BLENDED LEARNING

27. Blended Learning removes passive learning from the classroom. *

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<tr>
<td>Your Response:</td>
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28. Blended Learning allows teachers more time to personalize instruction for students. *

<table>
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<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<td>Your Response:</td>
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29. Online Learning is an essential component of my teaching. *

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<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<td>Your Response:</td>
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</table>

30. My expertise with technology enables me to use technology for teaching and learning activities. *

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
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<tbody>
<tr>
<td>Your Response:</td>
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Research Proposal: Teacher Perceptions of Blended Learning in the High School Classroom
Kelli B. Murphy
Duquesne University

I. Statement of Research Questions

Teachers are at the forefront of change with innovative technologies that can redefine teaching and learning. Whether a teacher chooses to use technology in their instruction may be dependent on their acceptance of it. In their research on teacher technology acceptance, Holden and Rada state that “teachers who demonstrate positive attitudes and perceptions as well as high self-confidence toward technology usage may be more likely to utilize technology for instruction” (2011, p. 348).

Technology has had a presence in the K12 classroom for the past few decades. The use of technology in the classroom may range from administrative, productivity and instructional tasks. This research focuses on the instructional use of technology. Technology allows the K12 teacher to extend beyond the brick and mortar classroom to increase opportunities for learning.

The attempt to find the most effective and engaging mode of learning for students with respect to individual differences, subject matter and learning objectives has attracted many K12 teachers towards using blended learning (Neumeier, 2005; Gough, DeJong, Grundmeyer, & Baron, 2017; Kuo, 2014). Blended learning incorporates elements of face-to-face instruction with the use of technology for online instruction. Whether a teacher voluntarily chooses to incorporate online instruction with traditional instructional classroom practices or whether the choice to enhance traditional teaching with technology will be researched. This research seeks to discover:

RQ1: What is the relationship between computer self-efficacy and high school teachers’ intentions to use blended learning instructional practices?
RQ2: What is the relationship between prior experience with online learning and high school teachers’ intentions to use blended learning instructional practices?
RQ3: What is the relationship between high school teachers’ teaching beliefs and high school teachers’ intentions to use blended learning instructional practices?
RQ4: What are high school teachers’ perceptions towards blended learning instructional practices and the instructional objectives (perceived usefulness)?
RQ5: What are high school teachers’ perceptions towards using blended learning instructional practices to meet their instructional objectives (perceived ease of use)?

II. Purpose and significance of the study

The role of technology in the instructional process may take two forms—as an enhancement or replacement to face-to-face instruction. If technology enhances instruction, the teacher provides direct instruction but may use technology towards this goal. If technology replaces direct instruction by the teacher. All new content is then presented through using technology.

Online learning in the K12 classroom is a shift from traditional teacher-centered classrooms. Combining the two instructional practices of traditional teacher-centered instruction and online learning creates a blended learning environment.

The purpose of this study is to investigate teacher acceptance of blended learning instructional practices in order to more fully understand the evolution of teaching patterns as technology becomes more imbedded in the educational process. The presence of technologies in education may influence teachers to explore alternative instructional methods to meet the needs.
of their students. However, the potential of technologies may be stymie
of them into the learning process while still be used in other areas of education.

III. Research design and procedures

A quantitative research methodology will be adopted for this study. In order to collect data about teacher perceptions and opinions, a non-experimental research design approach will be used. This study will determine if a relationship exists between teachers' intention to use blended learning and three independent variables (computer self-efficacy, previous online learning experience and teaching beliefs) using the framework of Technology Acceptance Model (TAM) developed by Fred Davis (1989). The scale of measurement will be both nominal and ordinal for the descriptive survey questions. Nominal data received from questions on gender, subject area, and computer self-efficacy will be assigned numbers. This conversion will allow for the data to be categorized for further analysis.

The data collection time period will be one week, in which the survey will be open for participation. The survey will be available electronically 24/7 until the close date of 11:59 pm on the 7th day. Teachers who choose to participate will enter the survey site via link address listed in the letter of introduction for the study. Once the teacher clicks on the link to begin the study, they will be taken to the informed consent.

IV. Instrument

The instrument for collecting data will be a four-point Likert-scale survey. The scale that will be used is strongly agree, agree, disagree, strongly disagree. It will be created in and data collected using the researcher’s Microsoft Forms Office 365 (O365) account which is maintained by Duquesne University. Study participants will complete questions in two areas: individual demographics and study focus. The study focus will include questions on the original constructs of perceived usefulness and perceived ease of the Technology Acceptance Model (Davis, 1989) as well as questions which target the three research variables—computer self-efficacy, previous online learning experience, and teaching beliefs.

V. Sample selection and size:

The sample high school chosen is located in a public-school district in south-central Pennsylvania. The district contains seven elementary schools for Kindergarten through fifth grades, two middle schools for grades six through eighth, and one comprehensive high school for grades nine through twelfth. There are 164 teachers in the high school, as of fall 2018. Most district teachers are certified to teach in their curriculum area and grades by the Pennsylvania Department of Education with the exception of teachers with emergency certifications.

The subject areas may include math, science, social studies, language arts, physical education, health, world languages, art, and music. In addition to these subjects, the high school also contains vocational education programs. All vocational teachers are certified in their respective fields such as: computer networking, business, child care, culinary, auto mechanics, construction trades, graphic and communications, health careers, and engineering. These teachers will also be included in the sample to be surveyed.

Many of the courses offered at the high school are offered as traditional courses in a face-to-face format. All students maintain daily attendance and schedule. There are five courses also offered online to the full-time brick and mortar students which are taught by six teachers. The teachers who facilitate or instruct online will not be included in this research. An important
factor in this study is the teacher’s willingness to use blended learning. An initial perspective of teachers who are assigned to use online instruction would be influenced by their contractual assignment of teaching online.

Department Chairs teach a partial schedule and then switch into an administrative role. Their dual role as a teacher and as an administrator may present a conflict in the their willingness to use Blended Learning in their teaching. They would have insight to administrative directives which may influence choices made in their teaching.

VI. Recruitment of subjects

The request for participation will include the study purpose, description of survey procedures, time period for data collection, letter of consent, and assurance of confidentiality of the participants. Upon obtaining School Board approval a formal information packet will be sent to the Superintendent detailing the purpose and objectives of the research study, script for the email notification to the teachers eliciting participation, letter of introduction of the study and detailed instructions for survey participation.

VII. Informed consent procedures

Informed consent will include the purpose of the study, procedures for data collection, anticipated time to complete survey, assurance for confidentiality, description of potential risks to the participants and a detailed statement that participation is voluntary with the right to refuse to participate at any time. It will be explicitly stated that participation in the study is voluntary and no compensation will be given for participation. The opportunity for subject to pull their data will be given at the beginning of the survey following the informed consent prior to the survey questions and again at the end prior to final submission.

A detailed explanation will be provided to all participants about the storing of the survey data. All participants will be provided with the Microsoft O365 Privacy Policy detailing the privacy of information stored in online O365 environment. All participants will remain anonymous and data confidential to the researcher at all times. Collected data will remain on the Duquesne University secure O365 site. It will be stored for six months following the conclusion of the study and then will be promptly erased.

At the conclusion of the informed consent, all participants will be asked to make a choice consenting to the study or refusal of consent. Participants will be reminded that refusal to participate may be made after data collection as well as before. Choice will be completed by clicking on a check box labeled I Agree to Participate or I Do Not Agree to Participate. Those who decline to participate will be sent, via survey branching, to exit the study. Those who consent to participate will be branched to the beginning of the survey.

VIII. Data collection and method of data analysis

The data gained from descriptive will allow the researcher to calculate central tendency and measure of variability as well as answer research questions. Multiple regression analysis will be used to evaluate the relationship between computer self-efficacy, previous online learning experience and teaching beliefs. It is the most appropriate test to evaluate whether the three variables contribute to the teacher’s intention to use blended learning by itself or a duplication of another variables’ influence (Gravetter & Wallnau, 2013).

Intenational statistics will be gained from the questions on the survey directed at teacher perceptions. The TAM framework, as stated above, measures teachers’ behavioral intention to
use a specific technology—in this case, it is blended learning instruction. The intention to use blended learning is based upon the teachers’ perceptions of blended learning. Perceptions will be obtained using a seven-point Likert scale survey questions on specific facets of teaching and use of technology for instruction.

The study design will use a two-factor analysis of variance (ANOVA) to study the mean differences of the three independent variables—computer self-efficacy (CSE), online learning experience (OLE), and teaching beliefs (TB)—against years of the TAM determinants. There will be two types of statistical methods utilized to analyze the data—descriptive and inferential. Descriptive survey questions include information of the participants such as age, total years of K-12 teaching, total years teaching in the school district, whether participant is a Pennsylvania certified teacher, and whether the teacher is teaching in their area of certification, and confidence level of technology. Descriptive and inferential methods will be used to analyze the information gained from survey data. Statistical analysis using means and standard deviation will allow the researcher to summarize the data and determine relationships between the teachers and their perceptions of blended learning as an instructional strategy.

IX. Potential Issues

The researcher and sampling population work in the same high school. Due to this fact, it is important to reassure all high school teachers of the anonymous procedures and strict confidentiality of the data collected. The data that is collected will remain on separate systems (Duquesne University’s Microsoft O365 license). It is important to distinguish that Duquesne University’s license is separate from the school district’s despite being the same product.

The informed consent is contained online with the survey. Participants who choose to participate will encounter the informed consent from the link in the introductory email from the Superintendent. Clicking on the link will bring the participant to the online survey created using O365 Forms on the Duquesne University Microsoft license. The informed consent is posted in two parts due to the character limitations of the text field (see Appendix A). The participant must click continue to move forward to Part II of the informed consent. It is at the conclusion of the informed consent that the participant will determine I Agree to Participate or I Do Not Agree to Participate in the survey. A choice of I Do Not Agree to Participate will automatically end the survey.
Hi Kelli,

Congratulations on all your hard work! Your research is approved. Good luck as you gather and analyze your data. We look forward to hearing your results, findings, and recommendations for the District.

Sincerely,

Colleen M. Friend, Ed.D.
Assistant Superintendent
Carlisle Area School District

From: Kelli Murphy [mailto:murphyk2@dq.edu]
Sent: Tuesday, April 30, 2019 10:37 PM
To: SPIELBAUER, CHRISTINA <spielbauer@carlisle.k12.pa.us>; FRIEND, COLLEEN <friendc@carlisle.k12.pa.us>
Subject: Request for Carlisle School Board approval, Dissertation Research

Good evening,

First I would like to thank you for your support in my educational endeavors. It has been a long journey for me.

Attached documents include: Dissertation Summary, Letter for Research Introduction for Faculty Participants (Survey Link is in letter), IRB Approval, and Letter of Consent/Survey. The research begin date mentioned in the IRB approval may be adjusted as needed.

I would be happy to provide any information needed by you and/or the School Board which would assist in this process.

Yours in education,

Kelli Murphy

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