A SURVEY OF TEACHERS REGARDING CURRENT IMPLEMENTATION OF 
BLENDED-LEARNING BEST-PRACTICES 

By 

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Abstract

This study was completed to find if there were significant differences in the level of conceptual familiarity of blended learning, the level of technological self-efficacy, and the level of implementation of blended learning best-practices between teachers who have Master’s degrees and teachers who do not have Master’s degrees. The level of teacher education was used as the independent variable to divide the group and be able to perform cross-tab contingency calculations using Chi-Square to search for significant differences. The only significant difference found in the research was in the level of technological self-efficacy of the teachers. It appears the higher the level of education of a teacher, the higher their level of technological self-efficacy. The level of education of a teacher does not however appear to impact their level of conceptual familiarity with blended learning, or the implementation of identified blended learning best-practice components. The sample size for this study was small, so the results should be reviewed with the understanding that the data could be invalid. More research on the subject needs to be done to produce legitimate conclusions.
INTRODUCTION

Background, Issues and Concerns

A suburban school district in the Midwest has developed a plan to implement a one-to-one (student-to-laptop) initiative for its students. This specific school district shall hereafter be referred to as LPS in this paper and any reference to a one-to-one learning environment shall be assumed to describe the idea that every student and teacher shall be issued a laptop computer for their educational use. One-to-one may also be described in this paper by the ratio 1:1. In the 2013-2014 school year, LPS will begin this transition to a one-to-one environment by issuing laptops to all teachers and students of grades 9-12. The plan for the future is that all teachers and students of grades 6-8 will also receive these same devices for the 2014-2015 academic year. This paper will analyze the results of a survey of middle level teachers of grades 6-8 from one school regarding their opinions of their technological self-efficacy and familiarity with blended-learning environment best practices. The analysis of survey data shall clarify the priorities for administrators and trainers which to focus professional development over the 2013-2014 academic year, and pre-service for the following year. The ultimate goal is to ensure administrators and teachers can transition to this one-to-one environment effectively according to blended-learning instructional design best practices, and do so with great confidence.

Practice under Investigation

The practice under investigation is how to best train teachers to be confident educators in a future 1:1 (student-to-laptop) learning environment. There will be an
investigation to see whether teachers’ level of education creates any significant
differences between their technological self-efficacy and their familiarity with best
practices in blended-learning environments.

School Policy to be Informed by Study

LPS has only begun the process of implementing the one-to-one environment,
with the exception of some pilot group implementations in certain grades. This study
shall hopefully provide insight as to what current middle school teachers already know
about how to most effectively utilize the technology they will be given.

Conceptual Underpinning

The most commonly utilized example of a blended-learning class environment is
one in which students and teachers meet face-to-face, but are also able to communicate
and access classroom materials online. The literature describing best practices for the
facilitation of blended-learning classroom environments expresses polarized opinions as
well as many popular common beliefs. It is the assumption of the author of this paper
that veteran teachers who already hold Master’s degrees will not possess any significantly
higher degree of technological self-efficacy or familiarity with blended-learning
environments than those teachers who do not possess Master’s degrees.

Statement of the Problem

The problem is twofold. First of all, middle school teachers of LPS are not yet
equipped with best practice instructional design strategies to provide their students with
the best possible blended-learning environments. Second, many middle school teachers have low technological self-efficacy and avoid using technology in the classroom as an instructional and learning medium. A clear definition of what a blended-learning environment looks like needs to be provided along with some strategies for designing and creating the essential components of successful blended classes.

**Purpose of the Study**

To find out the current technological self-efficacy levels and amount of blended-learning best practices being implemented by LPS middle school teachers in order to determine future training needs to prepare for 1:1 implementation.

**Research Question(s)**

RQ#1: Is there a significant difference in degree of familiarity with the concept of blended-learning between middle level teachers who have a Master’s degree and those who don’t?

RQ#2: Is there a significant difference in the level of technological self-efficacy between middle level teachers who have a Master’s degree and those who don’t?

RQ#3: Is there a significant difference in the amount of best practice blended-learning components being utilized by middle level teachers who have a Master’s degree and those who don’t?

**Null Hypotheses**
Ho#1: There is no significant difference in degree of familiarity with the concept of blended-learning environments between middle level teachers who have a Master’s degree and those who don’t.

Ho#2: There is no significant difference in the level of technological self-efficacy between teachers who have a Master’s degree and those who don’t.

Ho#3: There is no significant difference in the amount of best practice blended-learning components currently being utilized by middle level teachers who have a Master’s degree and those who don’t.

Anticipated Benefits of the Study

To provide administrators, blended-learning coaches, and tech mentors with an understanding of what middle level teachers are already doing in terms of blended-learning best-practices, in order to best prepare for the adoption of a 1:1 student-to-laptop learning environment in the 2014-2015 school year.

Definition of Terms

- DESE: Department of Elementary and Secondary Education.
- Self-efficacy: one’s confidence in one’s own abilities.
- Blended-learning environment: combination of face-to-face and online teaching and learning.
- Blended-learning coaches: individuals employed by district to assist classroom teachers in implementing technology into their instructional design as well as assist with blended-learning environment best practices.
• Tech mentors: classroom teachers who also assist other classroom teachers in implementing technology into their instructional design.

• One-to-one (1:1): every teacher and student has a personal district issued laptop computer to utilize for educational purposes.

• Flipped classroom: lectures and other instructional materials are provided online for students to view at own pace, while face-to-face classroom time is spent for assessment, clarification, and differentiation.

• Web 2.0: current generation of World Wide Web tools that possess capabilities for communication, collaboration, interaction, and exploration.

**Summary**

Middle level teachers of a suburban Missouri school district were surveyed on a voluntary basis regarding their opinions of 1:1 student-to-laptop learning environments, their own technological self-efficacy, and their knowledge level of blended-learning environments. The district is in transition phase from a traditional learning environment where students come to class without personal technological devices, to one in which they will have their own laptop to perform educational tasks. This research looks into some potentially important considerations for administrators, blended-learning coaches, and tech mentors as the district moves forward with the transition.
REVIEW OF LITERATURE

Technology is having a significant impact on teaching and learning. The majority of classrooms today look much different than the typical classroom of a decade ago. In fact, the classroom of today is often not a physical room at all, but rather a curriculum hosted remotely on a website. The internet provides an opportunity for teaching and learning opportunities that were once not possible. Web 2.0 tools are being developed at a rapid rate, and are allowing for students and teachers to collaborate, construct, and communicate instantaneously from all across the globe. According to Paily (2013), Web 2.0 tools are different than traditional Web technologies in the fact that they provide better functionality, as well as opportunities for collaboration and communication. Much of the collaboration and communication can be carried out synchronously or asynchronously. This contributes to the construction of self-regulated learning communities amongst learners. (Paily, 2013)

There are many buzzwords used to define the many different scenarios by which teachers teach and learners learn using a mixture of old and new methodologies. One of these terms is blended learning. The term blended learning is challenging to define. The most common themes regarding the definition of blended learning are that learners and teachers meet in face-to-face environments as well as interact virtually. The frequency of these meetings depends on many different factors, and the virtual interaction may be synchronous or asynchronous (McGee & Reis, 2012).

A popular term in education today and a type of blended learning is the “flipped classroom.” In a way similar to how a traditional literature class might require students to read outside of school in order to use class time for discussion of literary topics, a
Blended-Learning Best Practices 9

flipped classroom uses technology to present information to students outside the
classroom with the intention of using class time to work with the information through
different forms of assessment and information processing. A simple way of thinking
about it is to consider the traditional lecture being delivered through a multimedia
presentation of some sort, viewed by learners outside of class, followed by an opportunity
to work with other students and teachers in class to reach mastery of the content. The idea
is that face-to-face classroom time could be used to more effectively assess learning and
most importantly help students (Kachka, 2012a).

Since the act of flipping a classroom isn’t going to cause higher student
achievement on its own, teachers must prepare themselves in a number of ways to
maximize their interactions with students. Some suggestions for making this happen are
to make sure homework lectures are engaging and not too long for the intended audience
to retain interest. DVD’s can be provided in place of internet hosted homework lectures
to accommodate for students with little or no internet access outside of school. It is also
suggested that after viewing homework lectures students come up with questions to ask
the teacher in class, or possibly summarize them to prove understanding. Upon
reviewing this information, the teacher could theoretically spend time in class on what the
students didn’t learn from the homework lectures (Kachka, 2012b).

Goodwin and Miller (2013), report that even though the world of education is
buzzing about flipping classrooms, there is still no scientific research base that guarantees
its success, and there is still much to be learned. Their article does, however, point out
there is growing evidence to suggest there may be benefits to flipping a classroom. One
way in which this is described is the increased membership to the social networking site
Blended-Learning Best Practices 10

Flipped Learning Network. Its members grew from 2,500 teachers in 2011 to 9,000 in 2012. Some of the most significant possible benefits to flipped classrooms mentioned in the article include: students being able to self-pace their learning as they watch lectures as homework, improved student-teacher interactions within the classroom due to the time being spent on the practice and one-on-one conversation rather than group lecture, and also the idea that most of today’s learners are more accustomed to accessing information online than they are listening to someone give a face-to-face lecture (Goodwin & Miller, 2013).

A real-life success story of flipped classroom is Byron High School in Minnesota. Fulton (2012) provides a description of how Byron High School has implemented flipped classrooms, offering insight to what it might look like or sound like to be a part of one. In these classrooms, students have electronic devices such as iPads, laptop computers, and smart phones that are turned on and utilized to help them work through daily problems related to a homework lecture that was assumedly viewed (digitally) outside the class. Some students review these video lectures during the class, which is acceptable because each student is allowed to learn at their own pace. Students of this school are also allowed to access a library of all videos created by any teacher in their school, not just their own. Additionally, they have 24 hour access seven days a week to learning materials that might have traditionally only been offered once during a class lecture. The staff has admitted that the process requires a lot of preparation, collaboration, and hard work to flip classes during the first year, but much of what is created in an environment like this can be reused in future classes (Fulton, 2012).
Many of today’s youth, despite being labeled as “digital natives,” do not possess the technological skills that are often assumed of them, especially those necessary to implement technology effectively as an educator. In an attempt to provide undergraduate students in the Teacher Education program at Michigan State University with an opportunity to practice working with educational technologies, one class contains a focus of designing artifacts with tech tools, promoting individual experimentation of tech tools, and utilizing social networks to promote community. Each student creates their own website that expresses their vision of their identity as a teacher. The program Weebly is used to create these websites. The term *Techsploration* is used to describe the individual exploration of tech tools these students are required to do. The intention of the class is to introduce educational technology best practices to the students as they prepare to become teachers (Shaltry, Henriksen, Wu, & Dickson, 2013).

An article by McGee and Reis (2012) is a review of many of the best practice literatures that have been produced, and it identifies common themes amongst these literatures. It is cautioned that a successful redesign of a traditional face-to-face class may take anywhere from three to six months. Recommendations for educators include: redesign traditional courses rather than simply “add” technological aspects (to avoid an increased workload), begin by clearly defining objectives, construct a course outline that indicates allocation of time and course activities, develop a syllabus that aligns with each learning objective, and explain the elements of the blended design to the students so they can have clear expectations (McGee & Reis, 2012).

The knowledge of instructional technology best practices is important, but another factor that determines successful implementation is the confidence, or self-efficacy, of
the educator to implement the necessary technologies required for true blended learning environments. An article by Pan and Franklin (2011) reports on a study that was done with the goal of identifying some of the factors that predict the utilization of Web 2.0 tools in the classroom. The results concluded that increases in self-efficacy, professional development, and administrative support are all related to increases in Web 2.0 tool integration by teachers (Pan & Franklin, 2011).

Holden and Rada (2011) analyzed the original Technology Acceptance Model (TAM) proposed by Davis in 1989. The original TAM model is a framework that is supposed to help predict how users (teachers) eventually accept and ultimately use different technologies in the classroom. They defined this as perceived usability. The researchers redefine some of the constructs of the TAM in order to account for what they believe to be causes of some of the variances in technology acceptance levels. In the end, the findings support the idea that teachers’ overall technological self-efficacy can affect their perceived usability and usefulness of a technology. Each of these factors then impacts the teachers’ attitudes toward using a technology and ultimately the possibility of them accepting and using the technology in the classroom. A suggestion to provide staff trainings that focus on building the technological self-efficacy of teachers is given in the article (Holden & Rada, 2011).

It appears that when educators are confident in their own abilities to deploy instructional and learning technologies in a blended learning environment, students benefit and report more valuable learning experiences. The results of a study by Gecer and Dag (2012) showed mostly positive reactions from the students regarding their blended learning experience. Many students commented that, “assignments and project
studies in blended learning environments increased their learning responsibilities,” or “raised their consciousness in taking more responsibility in their learning.” Other positive results from the study included data that revealed the students liked the ease of access to class materials on the Learning Management System (LMS), and that they could control the pace of their learning (Gecer & Dag, 2012).
RESEARCH METHODOLOGY

Research Design

A survey sent via email to LPS middle level teachers was used as the research design. The independent variables were teachers’ level of education (Master’s degree, working towards a Master’s degree, Bachelor’s degree with no further education). The dependent variables were level of familiarity with blended-learning environments, technological self-efficacy, and current utilization of blended-learning best practice components.

Study Group Description

The study group consisted of teachers from a single middle school within a suburban Missouri school district. The demographics of this school district includes averages of 84.8% white enrollment, 19.8% free and reduced lunch, and 18:1 student-to-teacher ratio from the years 2010-2013.

Data Collection and Instrumentation

Archived data from DESE was collected to identify district demographics. A survey was created in Google docs and used to collect variable data. All survey questions were required for all respondents.

Statistical Analysis Methods

A Statistical Package (ASP) software was used to complete all calculations following data collection. An analysis of respondents was completed to determine the
two independent variables for data collection purposes. Six separate Chi-Square crosstab/contingency analyses were calculated to examine the three research questions.
FINDINGS

To determine the independent variables of the research, the survey began with a question asking teachers about their level of education. Three responses were possible; indicating the respondent currently possesses a Master’s degree or higher, has taken classes beyond bachelor’s level, or has received a bachelor’s degree with no further education. The responses were separated into two categories, teachers who have Master’s degrees and those who don’t. Results were recoded for analysis purposes. The Analysis of Respondents frequency plot below describes the results.

**Figure 1:** Analysis of Respondents / Status

**Question:** Which of the following best describes your level of education?

<table>
<thead>
<tr>
<th>VARIABLE: Education</th>
<th>FRQ.</th>
<th>CUM. %</th>
<th>CUM.</th>
<th>FREQUENCY PLOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>x &lt; 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>x = 1</td>
<td>17</td>
<td>17</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>x = 2</td>
<td>3</td>
<td>20</td>
<td>15</td>
<td>100</td>
</tr>
<tr>
<td>x &gt; 2</td>
<td>0</td>
<td>20</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>TOTAL</td>
<td>20</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key for plot**

#1=Teachers with Master’s

#2=Teachers without Master’s

Figure 2

**Teacher Education**

- w/ Master’s (N=17) 85%
- w/o Master’s (N=3) 15%
As illustrated in Figure 1 and Figure 2, 20 LPS teachers responded to the survey. 17 teachers, 85% of all respondents, reported that they currently have a Master’s degree. 3 teachers, 15% of all respondents, reported that they do not have a Master’s degree.

Level of teacher education was used as the independent variable with which six separate dependent variables were compared using Chi-Square crosstab/contingency calculations.

Research question 1 asks: **Is there a significant difference in the degree of familiarity with the concept of blended-learning between middle level teachers who have a Master’s degree and those who don’t?** First, in order to gain an overall understanding of the teachers’ familiarity with blended-learning, respondents were asked to rate their own level of familiarity on a five point scale. Figure 3 below is the frequency plot associated with the responses for this survey question. Figure 4 displays a graphic representation of the same data.

**Figure 3: Degree of Familiarity with Blended-learning**

**Question:** On a scale of 1-5 (one being lowest, five being highest) what is your degree of familiarity with the term "Blended-learning"?
As illustrated in Figure 3 and Figure 4, 2 teachers (10% of respondents) reported Not Familiar, 3 teachers (15% of respondents) reported Mild Familiarity, 5 teachers (25% of respondents) reported Conceptual Familiarity, 7 teachers (35% of respondents) reported Some Implementation, and 3 teachers (15% of respondents) reported Very Familiar-Class is Blended.

<table>
<thead>
<tr>
<th>Level of Familiarity</th>
<th># of Teachers</th>
<th>Total Blended-Learning Familiarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>&gt; 5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

Key for plot
1=Not Familiar, 2=Mild Familiarity, 3=Conceptual Familiarity, 4=Some Implementation, 5=Very Familiar-Class is Blended
Next, this data was cross-referenced using Chi-Square analysis in order to determine whether the level of education of the teachers impacts their familiarity with the concept of blended-learning. Table 1 below illustrates the findings.

<table>
<thead>
<tr>
<th>Source</th>
<th>M.A./M.S.</th>
<th>B.A./B.S.</th>
<th>Chi Sq</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blended1</td>
<td>11.8% (2)</td>
<td>0% (0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blended2</td>
<td>17.6% (3)</td>
<td>0% (0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blended3</td>
<td>23.5% (4)</td>
<td>33.3% (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blended4</td>
<td>29.4% (5)</td>
<td>66.7% (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blended5</td>
<td>17.6% (3)</td>
<td>0% (0)</td>
<td>2.52</td>
<td>4</td>
<td>0.64</td>
</tr>
</tbody>
</table>

Sign = or < 0.25

The independent variable was the level of teacher education. The dependent variable was level of familiarity with the concept of Blended-learning. 20 teachers who responded to a survey were divided into 2 groups. 17 teachers made up the group of teachers that have Master’s degrees. 3 teachers made up the group of teachers that do not have Master’s degrees. The null hypothesis was: There is no significant difference in degree of familiarity with the concept of blended-learning environments between middle level teachers who have a Master’s degree and those who don’t. The null is not rejected because, as shown in Table 1, no significant difference was found (Chi-Square (4) = 2.52, p-value = 0.64) in the level of familiarity of blended-learning between teachers who have
Master’s degrees and those who do not have Master’s degrees. The $p$-value is 0.64, which is more than the alpha level of 0.25. The level of teacher education does not determine their level of familiarity with blended-learning. However, the small sample size used as the independent variable (Teachers w/ Master’s = 17; Teachers w/out Master’s = 3) may limit the significance of the results of the study. Additional research should be considered to investigate this finding.

Research question 2 asks: *Is there a significant difference in the level of technological self-efficacy between middle level teachers who have a Master’s degree and those who don’t?* In order to gain an overall understanding of the teachers’ self-efficacy levels, respondents were asked to rate their own levels of confidence in utilizing instructional and learning technologies in the classroom. Figure 5 below is the frequency plot associated with the responses for this survey question. Figure 6 displays a graphic representation of the same data.

**Figure 5:** Confidence/Self-Efficacy

**Question:** On a scale of 1-5 (one being lowest, five being highest) describe your personal level of confidence in utilizing instructional and learning technologies in your classes.
As illustrated in Figure 5 and Figure 6, 1 teacher (5%) rated their technological self-efficacy as 1, 3 teachers (15%) reported a rating of 2, 3 teachers (15%) reported a rating of 3, 6 teachers (30%) reported a rating of 4, and 7 teachers (35%) reported a rating of 5.
Next, this data was cross-referenced using Chi-Square analysis in order to
determine whether the level of education of the teachers creates a significant difference
between their self-efficacy (confidence) levels. Table 2 below illustrates the findings.

<table>
<thead>
<tr>
<th>Source</th>
<th>M.A./M.S.</th>
<th>B.A./B.S.</th>
<th>Chi Sq</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confidence 1</td>
<td>5.9% (1)</td>
<td>0% (0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confidence 2</td>
<td>17.6% (3)</td>
<td>0% (0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confidence 3</td>
<td>5.9% (1)</td>
<td>33.3% (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confidence 4</td>
<td>35.3% (6)</td>
<td>0% (0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confidence 5</td>
<td>35.3% (6)</td>
<td>33.3% (1)</td>
<td>8.0486</td>
<td>4</td>
<td>0.0898</td>
</tr>
</tbody>
</table>

Sign = or < 0.25

The independent variable was the level of teacher education. The same two
groups of teachers (17 with Master’s degrees, and 3 without Master’s degrees) made up
the total list of respondents. The dependent variable was teachers’ personal level of
confidence in using instructional and learning technologies in the classroom; or their
*technological self-efficacy*. The null hypothesis was: There is no significant difference
in the level of technological self-efficacy between teachers who have a Master’s degree
and those who don’t. The null is rejected because, as shown in Table 2, a significant
difference was found (Chi-Square (4) = 8.0486, *p*-value = 0.0868) in the level of
 technological self-efficacy between teachers who have Master’s degrees and those who
do not have Master’s degrees. The $p$-value is 0.0898, which is less than the alpha level of 0.25. The level of a teacher’s education does appear to determine their technological self-efficacy in the classroom. However, the small sample size used as the independent variable (Teachers w/ Master’s = 17; Teachers w/out Master’s = 3) may limit the significance of the results of the study. Additional research should be considered to investigate this finding.

Research question 3 asks: Is there a significant difference in the amount of best-practice blended-learning components being utilized by middle level teachers who have a Master’s degree and those who don’t? In order to gain an overall understanding of the amount of best-practice blended-learning components being utilized by LPS teachers, four specific questions were asked on the survey. Each survey question was intended to find out the level of implementation of a specific blended-learning component that is supposed to be considered best-practice according to experts in the field. Each component is analyzed separately, but they are all considered to be aspects of research question 3. The results of each of these questions were documented in frequency plots that were then cross-referenced with the independent variable (teacher education level) using Chi-Square analysis in order to determine whether the level of education influences the implementation of blended-learning best-practice components.

The first survey question relating to blended-learning components was intended to find out how many teachers were currently utilizing a Learning Management System (LMS) or a class website to supplement their class. Figure 7 below is the frequency plot associated with the responses for this survey question. Figure 8 displays a graphic representation of the same data.
**Figure 7:** Learning Management System (LMS)

**Question:** (Yes or No) Do you utilize a Learning Management System or a website to supplement your class?

<table>
<thead>
<tr>
<th>VARIABLE: LMS</th>
<th>FRQ.</th>
<th>CUM.</th>
<th>%</th>
<th>CUM.</th>
<th>FREQUENCY PLOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>x &lt; 1</td>
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</tr>
<tr>
<td>x = 1</td>
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<td>16</td>
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<td>80</td>
<td>***************</td>
</tr>
<tr>
<td>x = 2</td>
<td>4</td>
<td>20</td>
<td>20</td>
<td>100</td>
<td>*</td>
</tr>
<tr>
<td>x &gt; 2</td>
<td>0</td>
<td>20</td>
<td>0</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>20</td>
<td></td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key for plot**
1=Yes, 2=No

As illustrated in Figure 7 and Figure 8, 16 teachers (80%) reported utilizing a LMS or website to supplement their classroom, and 4 teachers (20%) reported they did not use a LMS or class website.
Next, this data was cross-referenced using Chi-Square analysis in order to determine whether the level of education of the teachers creates a significant difference between their utilization levels of LMS’s or websites to supplement their classes. Table 3 below illustrates the findings.

<table>
<thead>
<tr>
<th>Table 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summary of Chi-Square Analysis</strong></td>
</tr>
<tr>
<td><strong>Source</strong></td>
</tr>
<tr>
<td>yes</td>
</tr>
<tr>
<td>no</td>
</tr>
</tbody>
</table>

Sign = or < 0.25

The independent variable was the level of teacher education. The same two groups of teachers (17 with Master’s degrees, and 3 without Master’s degrees) made up the total list of respondents. The dependent variable was the number of teachers using a LMS or class website to supplement their class. The null hypothesis was: There is no significant difference in the amount of best practice blended-learning components currently being utilized (specifically, LMS utilization) by middle level teachers who have a Master’s degree and those who don’t. The null is not rejected because, as shown in Table 3, no significant difference was found (Chi-Square (1) = 0.392, p-value = 0.531) in the level of LMS or class website utilization between teachers who have Master’s degrees and those who do not have Master’s degrees. The p-value is 0.531, which is more than the alpha level of 0.25. The level of teacher education does not determine their LMS or class website implementation. However, the small sample size used as the independent
variable (Teachers w/ Master’s = 17; Teachers w/out Master’s = 3) may limit the significance of the results of the study. Additional research should be considered to investigate this finding.

The second survey question relating to blended-learning components was intended to find out how many teachers were posting a syllabus on their LMS or class website. Figure 9 below is the frequency plot associated with the responses for this survey question. Figure 10 displays a graphic representation of the same data.

**Figure 9:** Syllabus

**Question:** (Yes or No) Do you have a class syllabus posted on your class website?

<table>
<thead>
<tr>
<th>VARIABLE: Syllabus</th>
<th>FRQ.</th>
<th>CUM. %</th>
<th>CUM.</th>
<th>FREQUENCY PLOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>x &lt; 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>x = 1</td>
<td>12</td>
<td>12</td>
<td>60</td>
<td>******************</td>
</tr>
<tr>
<td>x = 2</td>
<td>8</td>
<td>20</td>
<td>40</td>
<td>***************</td>
</tr>
<tr>
<td>x &gt; 2</td>
<td>0</td>
<td>20</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>20</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key for Plot**
1=Yes, 2=No

**Figure 10**
As illustrated in Figure 9 and Figure 10, 12 teachers (60%) reported that they do have a class syllabus posted on their LMS or class website, and 8 teachers (40%) reported that they do not have a syllabus posted.

Next, this data was cross-referenced using Chi-Square analysis in order to determine whether the level of education of the teachers creates a significant difference between their tendencies to post a syllabus to their LMS or class website. Table 4 below illustrates the findings.

<table>
<thead>
<tr>
<th>Source</th>
<th>M.A./M.S.</th>
<th>B.A./B.S.</th>
<th>Chi Sq</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>64.7% (11)</td>
<td>33.3% (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>35.3% (6)</td>
<td>66.7% (2)</td>
<td>1.046</td>
<td>1</td>
<td>0.306</td>
</tr>
</tbody>
</table>

Sign = or < 0.25
The independent variable was the level of teacher education. The same two groups of teachers (17 with Master’s degrees, and 3 without Master’s degrees) made up the total list of respondents. The dependent variable was the number of teachers that post a syllabus on their LMS or class website. The null hypothesis was: There is no significant difference in the amount of best practice blended-learning components currently being utilized (specifically, posting a syllabus on their LMS) by middle level teachers who have a Master’s degree and those who don’t. The null is not rejected because, as shown in Table 4, no significant difference was found (Chi-Square (1) = 1.046, \(p\)-value = 0.306) in the number of teachers posting a syllabus to their LMS or class website between teachers who have Master’s degrees and those who do not have Master’s degrees. The \(p\)-value is 0.306, which is more than the alpha level of 0.25. The level of a teacher’s education does not determine whether they post a syllabus on their LMS or class website. However, the small sample size used as the independent variable (Teachers w/ Master’s = 17; Teachers w/out Master’s = 3) may limit the significance of the results of the study. Additional research should be considered to investigate this finding.

The third survey question relating to blended-learning components was intended to find out how many teachers were posting their learning objectives on their LMS or class website. Figure 11 below is the frequency plot associated with the responses for this survey question. Figure 12 displays a graphic representation of the same data.

**Figure 11:** Objectives
**Question:** (Yes or No) Are learning objectives clearly stated on your class website?

As illustrated in Figure 11 and Figure 12, 6 teachers (30%) reported that they do post their learning objectives on their LMS or class website, and 14 (70%) of teachers reported that they do not post their learning objectives on their LMS or class website.

Next, this data was cross-referenced using Chi-Square analysis in order to determine whether the level of education of the teachers creates a significant difference.
between their tendencies to post learning objectives on their LMS or class website. Table 5 below illustrates the findings.

<table>
<thead>
<tr>
<th>Source</th>
<th>M.A./M.S.</th>
<th>B.A./B.S.</th>
<th>Chi Sq</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>29.4% (5)</td>
<td>33.3% (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>70.6% (12)</td>
<td>66.7% (2)</td>
<td>0.019</td>
<td>1</td>
<td>0.891</td>
</tr>
</tbody>
</table>

Sign = = or < 0.25

The independent variable was the level of teacher education. The same two groups of teachers (17 with Master’s degrees, and 3 without Master’s degrees) made up the total list of respondents. The dependent variable was the number of teachers posting their learning objectives on their LMS or class website. The null hypothesis was: There is no significant difference in the amount of best-practice blended-learning components currently being utilized (specifically, posting objectives on their LMS) by middle level teachers who have a Master’s degree and those who don’t. The null is not rejected because, as shown in Table 5, no significant difference was found (Chi-Square (1) = 0.019, p-value = 0.891) in the number of teachers posting their learning objectives on their LMS or class website between teachers who have Master’s degrees and those who do not have Master’s degrees. The p-value is 0.891, which is more than the alpha level of 0.25. The level of a teacher’s education does not determine whether they post learning objectives on their LMS or class website. However, the small sample size used as the independent variable (Teachers w/ Master’s = 17; Teachers w/out Master’s = 3) may
limit the significance of the results of the study. Additional research should be considered to investigate this finding.

The fourth survey question relating to blended-learning components was intended to find out how many teachers were posting class outlines or timelines on their LMS or class website. Figure 13 below is the frequency plot associated with the responses for this survey question. Figure 14 displays a graphic representation of the same data.

**Figure 13: Outline/Timeline**

**Question:** (Yes or No) Do you have a class outline and/or timeline posted on your class website?

```
<table>
<thead>
<tr>
<th>VARIABLE: Outline/Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRQ.</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>x &lt; 1</td>
</tr>
<tr>
<td>x = 1</td>
</tr>
<tr>
<td>x = 2</td>
</tr>
<tr>
<td>x &gt; 2</td>
</tr>
<tr>
<td>TOTAL</td>
</tr>
</tbody>
</table>
```

**Key for Plot**
1=Yes, 2=No

**Figure 14**
As illustrated in Figure 13 and Figure 14, 10 teachers (50%) reported that they did post class outlines or timelines on their LMS or class website, and 10 teachers (50%) reported that they did not post class outlines or timelines on their LMS or class website.

Next, this data was cross-referenced using Chi-Square analysis in order to determine whether the level of education of the teachers creates a significant difference between their tendencies to post class outlines or timelines on their LMS or class website. Table 6 below illustrates the findings.

<table>
<thead>
<tr>
<th>Source</th>
<th>M.A./M.S.</th>
<th>B.A./B.S.</th>
<th>Chi Sq</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>52.9% (9)</td>
<td>33.3% (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>47.1% (8)</td>
<td>66.7% (2)</td>
<td>0.392</td>
<td>1</td>
<td>0.531</td>
</tr>
</tbody>
</table>

Sign = or < 0.25
The independent variable was the level of teacher education. The same two groups of teachers (17 with Master’s degrees, and 3 without Master’s degrees) made up the total list of respondents. The dependent variable was the number of teachers that post class outlines or timelines on their LMS or class website. The null hypothesis was:

There is no significant difference in the amount of best practice blended-learning components currently being utilized (specifically, posting timelines/outlines on their LMS) by middle level teachers who have a Master’s degree and those who don’t. The null is not rejected because, as shown in Table 6, no significant difference was found (Chi-Square (1) = 0.392, \( p \)-value = 0.531) in the number of teachers that post a class outline or timeline on their LMS or class website between teachers who have Master’s degrees and those who do not have Master’s degrees. The \( p \)-value is 0.531, which is more than the alpha level of 0.25. The level of a teacher’s education does not determine whether they post a class outline or timeline on their LMS or class website. However, the small sample size used as the independent variable (Teachers w/ Master’s = 17; Teachers w/out Master’s = 3) may limit the significance of the results of the study. Additional research should be considered to investigate this finding.
CONCLUSIONS AND RECOMMENDATIONS

The outcomes reported from this study show that level of teacher education does not have that great of an impact on the research questions at hand. It is important to note again that the sample size of twenty respondents could play a large part in the validity of the findings. As stated in the findings, seventeen of the twenty respondents were teachers with Master’s degrees while only three did not.

It was the assumption of the author of this paper that veteran teachers who already hold Master’s degrees will not possess any significantly higher degree of technological self-efficacy or familiarity with blended-learning environments than those teachers who do not possess Master’s degrees. It is difficult to tell if the research truly supports or negates these suspicions.

Research question number one asked, is there a significant difference in the degree of familiarity with the concept of blended learning between middle level teachers who have a Master’s degree and those who don’t? The conclusion for research question number one is there is no significant difference in degree of familiarity with the concept of blended learning between teachers who have Master’s degrees and those who don’t. The null hypothesis was rejected because no significant difference was found. According to the research, the level of teacher education does not determine their level of familiarity with blended learning. These results support the suspected outcomes outlined in the Conceptual Underpinning section of this paper. It doesn’t appear that level of education plays a part in the overall conceptual understanding of blended learning.

Research question number two asked, is there a significant difference in the level of technological self-efficacy between middle level teachers who have a Master’s degree
and those who don’t? The conclusion for research questions two is that there is a significant difference in the level of technological self-efficacy between teachers who have Master’s degrees and those who don’t. The null hypothesis was rejected because a significant difference was found in the level of technological self-efficacy between teachers who have Master’s degrees and those who do not have Master’s degrees. According to the research, the higher the level of a teacher’s education, the higher their level of technological self-efficacy is in the classroom. These results do not support the suspected outcomes outlined in the Conceptual Underpinning section of this paper. The thinking was that teachers without Master’s degrees might be younger than those with Master’s degrees, and since younger people are often thought to be more tech-savvy, these beginning teachers might have a predisposition of high confidence levels with implementing technology in their classrooms.

Research question number three asked, is there a significant difference in the amount of best practice blended learning components being utilized by middle level teachers who have a Master’s degree and those who don’t? In order to find the answer, teachers were surveyed regarding their implementation of four separate identified best-practice components. The conclusion is that no significant difference was found between teachers without Master’s degrees and teachers with Master’s degrees in their implementation of learning management systems (LMS), posting of a syllabus to their LMS, posting objectives to their LMS, or posting timelines and outlines to their LMS. The null hypothesis was not rejected for all four best-practice component questions because no significant differences were found. According to the research, the level of a teacher’s education does not determine their level of utilization of a LMS, nor their
tendency to post a syllabus, learning objectives, or outlines and timelines on their LMS class page.

Additional research could be done on each hypothesis presented in this paper. A larger sample size of teachers without Master’s degrees seems especially necessary before any valid conclusions can be made.
REFERENCES


