# "FLIPPING" EDUCATIONAL TECHNOLOGY PROFESSIONAL DEVELOPMENT FOR K-12 EDUCATORS

By

Daniel Spencer

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE

Geological Sciences

2012

**ABSTRACT**

"FLIPPING" EDUCATIONAL TECHNOLOGY PROFESSIONAL DEVELOPMENT FOR K-12
EDUCATORS

By

Daniel Spencer

As the demand for more effective professional development increases in K-12
schools, trainers must adjust their training methods to meet the needs of their teacher
learners.  Just as lecture-heavy, teacher-centered instruction only meet the learning needs
of a small minority of students, "sit and get" professional development rarely results in the
teachers gaining the skills and confidence necessary to use technology effectively in their
instruction.  To resolve the frustrations of teachers related to ineffective professional
development, a "Flipped PD" training model was developed based on the learning needs of
adult learners, the integration of technological, pedagogical, and content knowledge
(TPACK), learning activities, and the Flipped Classroom concept.  Under this model,
training shifts from a passive, trainer-centered format, to an active, learner-centered
format where teachers learn to use technology in their classrooms by first focusing on
pedagogical issues, then choosing the options that work best for addressing those issues in
their unique situation, and completing "learn-by-doing" projects.  Those who participate in
"Flipped PD" style trainings tend to have more confidence upon completion that they can
use the tools they were trained on in their teaching, as well as believe that the PD was
engaging and a good use of their time.

# TABLE OF CONTENTS

# LIST OF TABLES

# LIST OF FIGURES

**INTRODUCTION**

"Happy families are all alike; [but] every unhappy family is unhappy in its own way" (Tolstoy & Moser, [18-).  In many ways the same can be said for the effectiveness of professional development (PD) in K-12 education.   Simply ask a room full of teachers to share their favorite story of "bad" PD and the room will erupt into conversations.  Yet ask for examples of effective PD that made a positive and lasting impact on their classroom teaching, and one soon realizes that the traits of valuable PD are not so obvious.

As Common Core State Standards for math (Carmichael, Martino, Porter-Magee, & Wilson, 2010), the Next Generation Science Standards (National Research Council, 2012), and the National Educational Technology Standards for students (ISTE, 2007) and teachers (ISTE, 2008) becomes the bar by which students and teachers are judged, the focus on rote teaching and "sit and get" learning is being pushed aside (Donovan & Bransford, 2005; National Research Council, 2000).  Each of these sets of standards carries with them the expectation of teachers ability to use technology effectively to help students communicate, collaborate, and create through differentiating learning and continual assessment (Marzano, Pickering, & Pollock, 2005; Marzano, 2007).  Yet the continuous and timely training necessary for educators to learn and apply these tools into their instruction will be ineffective at best without the proper framework of best PD practices (Garet, Porter, Desimone, Birman, & Yoon, 2001; Joyce & Showers, 2002; Wayne, Yoon, Zhu, Cronen, & Garet, 2008).

**The Problem with PD**

        Despite the need for quality educational technology professional development as it

relates to teaching and learning, the overwhelming feedback from teachers is that PD is

mostly seen as a "waste of time," and many more lack confidence to use those tools in their

classroom after training (Spencer, 2012).  Far too often, attending teachers describe these

sessions in terms such as "sit and get", where the trainer lectures about a technology tool

or concept to a large group of teachers for a time and then expects them to understand how

to effectively apply it in their own unique classroom environment (Schrum, 1999).  While a

few teachers in attendance may be inspired to dig deeper into the topic, or maybe even

incorporate it into their teaching, the vast majority of teachers involved will leave that

training and never think about it again.  However, just as "sit and get" teaching only works

for a select few students in the science classroom, the same can be said for similar models

of PD.  While this is a convenient format for the trainer, there is little benefit for the learner

(Garet, et al, 2001).  If the purpose of PD is to make a positive impact in the classroom, the

focus must be on developing learner-centered trainings that match the needs of the

individual teacher, rather than the convenience of the trainer (Polly & Hannafin, 2010).

        When it comes to teacher discontent over trainer-centered PD, common complaints

can often be grouped into three areas.  These areas include frustrations over 1.) "I can't use

this in my classroom" i.e. a lack of classroom application, 2.) "I couldn't keep up" or "I

already knew everything." i.e. pacing issues for teachers of different ability levels, and 3.)

"We didn't get to try it out" i.e. a lack of "hands on" learning time and the inability to

practice using the technology during the training.   It is easy to see why these concerns,

stemming from a trainer-centered PD model, would translate into a lack of transfer into

teaching.  Yet how can those in charge of training shift their focus from what is convenient for them to what is most effective for the learner?

**Adult Learners and Andragogy**

Moving from a trainer-focused model of PD to learner-focused model must first address the issue of learning "ownership."  Once again, just as "sit and get" teaching is only effective for a select few students, the same applies for adult learners, in this case teachers, mostly because in the trainer-centered model, the learner has little to no investment in the learning process.  Without engagement in the learning process, teachers will never make the steps necessary for implementing the tool into their teaching, let alone using it to make a positive impact on learning outcomes (Shulman, 1986; Watson, 2001).

To address the learning ownership issues, trainers must address the learning preferences of their teachers.  Malcolm Knowles is considered the father of the study of adult learning, also known as "andragogy" (Knowles, 1975; Knowles, 1984; Knowles, 1990).  According to Dr. Knowles, adult learners have specific needs, which must be addressed in order for them to take ownership of the learning process.  For example (1984, Appendix D):

- The need to understand why a specific topic or tool is being taught.
- The need to learn by doing instead of memorizing.
- The need to provide learning activities and materials available for learners of all backgrounds and experience.
- The need for autonomy or allowing learners to discover for themselves while still having help available.

The case can be made that these needs apply to all learners, regardless of age. Therefore learning, whether it be in a K-12 classroom or a teacher training, depends on quality instruction. In the case of a trainer-centered model of PD, needs for learners such as relevance, personalization, and autonomy are often ignored in pursuit of efficiency. But if the focus of training is truly on helping teachers learn and develop skills, efficiency will be replaced by an emphasis on personal relevance. For example, a trainer-centered program on the features of the newest presentation software could be covered efficiently in a faculty-wide demonstration in less than an hour. But based on Knowles needs of learners, many in attendance would struggle to see the relevance of this in their own situation, and would likely walk away having learned little, let alone be able to apply it to their teaching. So the question becomes: how do trainers meet the needs of their adult learners and help them understand how the technology they are being trained on applies to their unique situation?

**TPACK**

While trainers must format their training to meet the expectations of adult learners, they must do so within the context of teaching and learning. The TPACK framework (Technological Pedagogical and Content Knowledge) was developed by Dr. Punya Mishra and addresses the interdependence between the areas of technology, pedagogy, and content in terms of teaching and learning (Koehler & Mishra, 2005; Mishra & Koehler, 2006). Rather than viewing these three areas as silos which function independently of one another, TPACK attempts to address how teachers must consider all three areas when it comes to effective teaching and learning (Koehler, n.d.).

The first area under TPACK, Technological Knowledge (TK) involves an understanding about educational technology tools and concepts, but also includes the skills a teacher would need to execute them effectively.  For example, technological knowledge of a software program such as Microsoft PowerPoint® would involve understanding all the "in's and out's" of this program and how it can be used to create presentations.  Many trainer-centered professional development courses focus specifically on the tool, with the intention that if a teacher understands how to use a particular piece of software or hardware they will automatically know how to use it in their teaching.

Koehler also explains how just as technological knowledge hinges on understanding how to use different tech tools, Content Knowledge (CK) revolves around an understanding of the subject being taught, including "central facts, concepts, theories and procedures within a given field."  At its most basic level, a teacher's content knowledge is their understanding of the subject area they teach.  While understanding the content area being taught, simply knowing the subject does not automatically translate into student learning.

The third and final area of TPACK is Pedagogical Knowledge (PK), moves beyond just content knowledge.  Rather, it is an understanding of the methods and practices needed to teach a particular subject effectively.  Once again, Koehler explains that "as such, pedagogical knowledge requires and understanding of cognitive, social and developmental theories of learning and how they apply to students in their classroom."  Those who understand how to teach content will understand the processes and structure needed for students to build understanding and skills.

With these three knowledge areas of TPACK in mind, any overlap between them represents the interaction between these areas in teaching and learning (Figure 1).  For
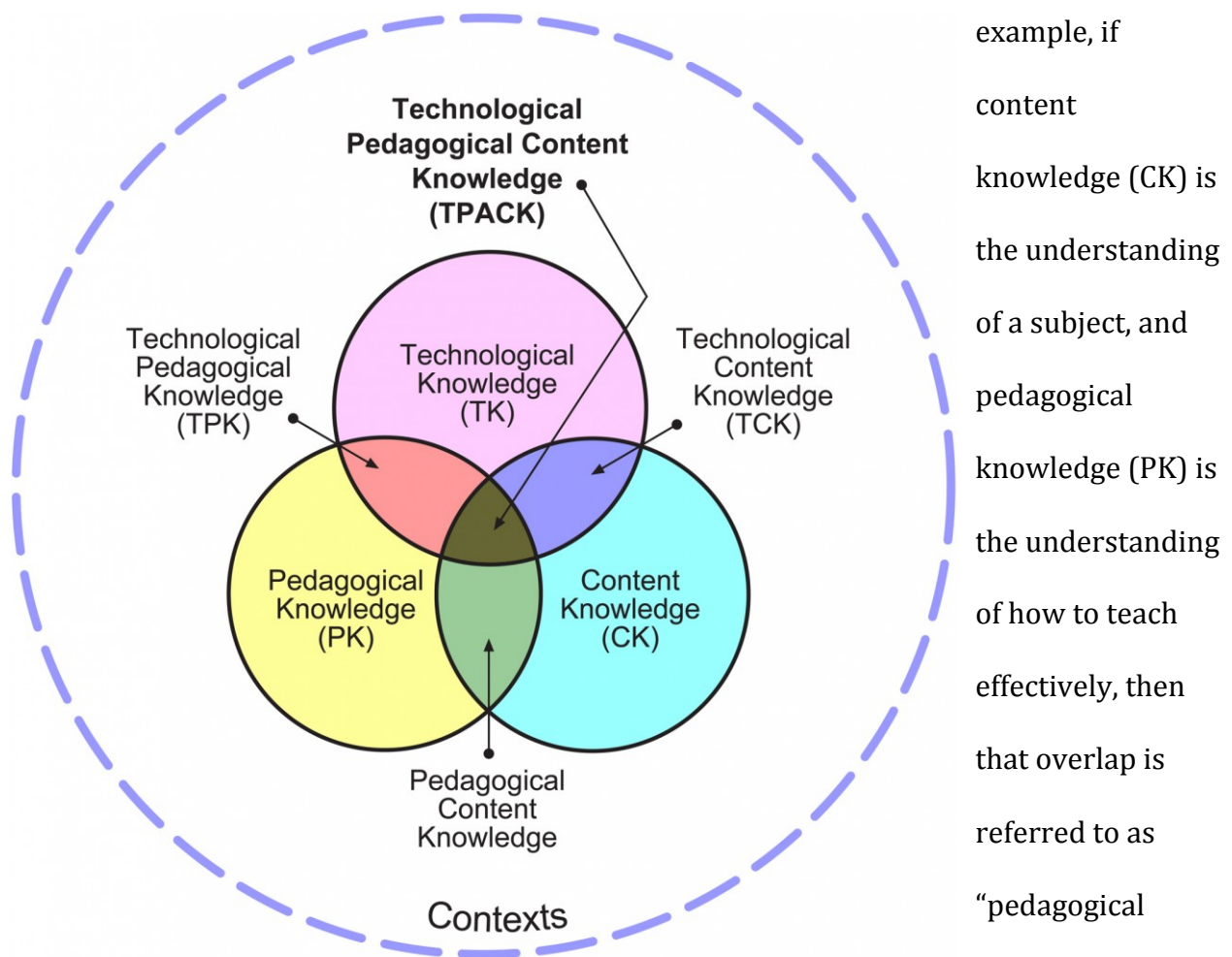
**Figure 1 – TPACK image (rights free)**

*For interpretation of the references to color in this and all other figures, the reader is referred to the electronic version of this thesis.*

example, if content knowledge (CK) is the understanding of a subject, and pedagogical knowledge (PK) is the understanding of how to teach effectively, then that overlap is referred to as "pedagogical content knowledge" (PCK), or how to teach a specific subject area effectively.  The intersection between technological knowledge (TK) and pedagogical knowledge (PK) is referred to as "technological pedagogical knowledge" (TPK), or how technology can be used effectively in teaching situations.  Ultimately, the goal of teaching and learning focuses on the intersection of all three areas or TPACK, and how to use technology to teach content effectively.

For instance, a high school chemistry teacher who understands TPACK will consider all three areas when planning a unit on the Periodic Table.  In terms of content, the teacher

must understand details relating to the history of the periodic table, the structure of

elements and the resulting characteristics, as well as patterns and how they change

throughout the table.  When it comes to pedagogy, this teacher would understand how to

use effectively use methods such as explanations, analogies, demonstrations, labs, and

other assignments to help students learn.  But embedded into the learning cycle would also

be the use of technology such as websites, simulations, and web 2.0 tools to help students

interact with the topic and demonstrate understanding in ways which were not possible

without the technology.  Used properly, all three areas of knowledge for this teacher would

complement one another, while removing any of them would hinder the learning process.

**Learning Activities**

The idea of learning activities is an extension of TPACK from Dr. Judy Harris (Harris

& Hofer, 2011; Harris, Mishra, & Koehler, 2009).  The emphasis here is that if we teach just

technological knowledge, such as how to use a specific software program, or how to

operate a unique piece of hardware, that knowledge becomes quickly outdated and is

rarely advanced to a level of classroom application (Harris & Hofer, n.d.).  However, if the

focus moves from being tool-specific, to pedagogical issues, then the use of that tool can be

adapted for a wide range of classrooms.

A training which effectively utilizes learning activities first asks teachers "what do

you want your students to do?" before ever discussing specific technology tools (Harris &

Hofer, 2009).  This is a similar mindset to the "backwards design" method (Wiggins &

McTighe, 1998) used by many educators to plan their curriculum.  In the realm of PD,

focusing on specific tools is hampered by the number of teachers who have access to them

and how quickly features become out of date.  However, by focusing on what teachers want

students to do in their classroom, and then offering a variety of choices, the conversation moves from being about the tool in isolation, to a discussion on effective pedagogy first and then about which tools will be best for that teacher.

For example, training for high school chemistry teachers on Vernier® probes may help those who have access to that brand of probes but will be limited by the specific probes demonstrated. However, training focused on "how do we help students effectively collect and analyze data?" which identifies different technological options to address the pedagogical problem will have a much different feel. So rather than just teaching how to use a Vernier temperature or pH probe, a learning activities training would focus on measuring techniques and then offer a variety of measurement tool options from which teachers can choose from and then learn more about.

**The Flipped Classroom**

But while the TPACK and Learning Activity concepts address the "why" behind making technology training applicable to a wide variety of teachers and classrooms, the problem still remains in the area of "how." Just as students exhibit a wide array of interests, learning preferences, and background knowledge in a subject area, the same applies to teachers involved in a training scenario. Not all students learn in the same way and at the same pace. So yet another wrinkle to the PD problem is that of pacing and how to accommodate learners of all levels.

The "Flipped Classroom" concept has received much focus lately in educational circles concerning accommodating the learning needs of the individual. At its most basic level, the flipped classroom shifts direct instruction (i.e. lecture) to a digital format done outside of class, and then using class time for applying what has been learned. Those who

use the flipped classroom effectively focus on first, how to leverage technology to allow teachers to be available when students need their help the most. Secondly, they use technology to allow student ownership of the pace and structure of their learning (Bergmann & Sams, 2012).

When it comes to the logistics of this concept, teachers who flip their classrooms are simply shifting when and where content is delivered and providing opportunities for a more meaningful class experience. Rather than spending valuable face-to-face time on direct instructional activities such as lecture, examples, and other rote activities, these are instead introduced digitally via video "screencasts" outside of the classroom. Students have access to these content screencasts at all times both in and out of class and can learn the basics at their pace and on their schedule. But the true power of this concept comes through when class begins. With content available at any time, class time no longer has to be monopolized by introducing content in a "one size fits all" model. Rather, class time can now center on the individual application of what has been learned through a multitude of higher-order thinking activities such as inquiry, project based learning, modeling, and most importantly, providing authentic demonstrations of their understanding.

While the ability to focus scarce class time on the application of concepts rather than introducing them is extremely valuable, moving from a teacher-centered, "whole class" mindset to one which focuses on the individual student, allows the teacher the flexibility to be available when students need help the most. In a teacher-centered model, teachers often spend a considerable amount of class time lecturing to students and then send them home to work on problems before returning the next day. A flipped, learner-centered model allows students to learn content at their own pace while also having access to the

teacher when they need help the most. In essence, by untethering themselves from whole class lectures, and a confined area in front of their whiteboards, flipped teachers create a learning environment where they are readily available for their students as they work through the application of what they are learning.

Some may feel the learner-centered model made possible by the flipped classroom concept would only result in chaos and frustration when it comes to real world learning situations (especially in PD). However, individualization does not mean a lack of structure. Dr. Ramsey Musallam's "Explore-Flip-Apply" method (Musallam, 2010; Musallam, 2012) provides context for how this can be done effectively in a classroom or training. The focus of "explore-flip-apply", regardless of the subject area, is to first allow learners to "explore" the topic and build background knowledge. After the exploration phase, teachers or trainers then "flip" the instruction and provide rote content digitally, which the learner can access on demand to answer any questions or fill in any knowledge gaps from the explore phase. Finally, learners "apply" what they have learned by creating learning artifacts related to the topic. Fortunately, this model can be modified to work in any learning situation, regardless of the topic.

**"Flipping" PD**

The concept of "flipped" PD addresses the concerns over classroom application, pacing, and hands-on learning opportunities many teachers have related to ineffective PD. By combining the effective attributes of learning goals, TPACK, Learning Activities, and the Flipped Classroom, those who provide educational technology training to K-12 educators can shift from a trainer-centered mentality, to a learner-centered one. As such, the primary focus of flipped PD will be on the classroom application of technology and allowing

teachers to learn at their own pace by doing projects related to the tool regardless of the tool or concept being taught.

## Hypothesis

By shifting from a trainer-centered model of PD to a learner-centered model, participating teachers will have confidence in their ability to use educational technology tools and concepts presented in trainings in their teaching.

## Demographics

Seventy K-12 teachers from schools throughout Michigan participated in this study. Of those teachers, 41% came from the elementary level, 52% from the middle or high school levels, and the remaining 7% being from higher education or administration. Of the teachers who participated, 90% said they chose to attend the training, while only 10% were asked to be there. When asked to describe their level of technology use in their classroom, 70% of attending teachers said they "use technology quite a bit and structure [their] teaching to include it." These data were collected in conjunction with multiple educational technology trainings provided during April through June 2012.

# IMPLEMENTATION

## PreSurvey

In January 2012, a presurvey was sent to K-12 educators throughout Jackson County, Michigan asking them about their experience related to previous educational technology professional developments they had taken through the Jackson County Intermediate School District (Appendix A). Seventy-two teachers responded. The survey was sent through countywide email and included a link to a Google® Form designed to collect information anonymously. The Google® Form consisted first of a series of statements and asked teachers to check those they felt accurately described their PD experiences in the past. Statements included phrases such as "the training was an effective use of time", "I practiced using technology related to the topic", and "I was able to use what I learned in my classroom right away." Responses were collected and tabulated as a percentage of teachers who agreed with the statement. The second question was in free response form, and asked teachers to describe a training experience that was a "waste of time" for them. Free response answers were grouped based on similarities.

## The Flipped PD Model

Trainings were designed after the Explore-Flip-Apply model with the intent to address the main issues raised by teachers in the survey, which included: 1.) The need for an emphasis on classroom application and addressing pedagogical issues, 2.) Allowing participants to learn at their own pace, and 3.) Incorporating hands-on "learn-by-doing" projects into the training. Ideally, learn-by-doing projects create an artifact, which can be

used immediately in the classroom.  Based on these points, the Flipped PD model used in all

trainings, regardless of the tool or concept being taught, consisted of the following format:

Explore Phase:

1. Addressing a pedagogical issue or concern as the focus of the training.

2. Providing classroom examples of tools or concepts used to address the issue.

3. Live demonstrations and discussions during the training of how to use the tool.

Flip Phase:

4. Offering tutorials and other "how-to" resources in a digital format, which attendees could access as needed both during and after the training.

Apply Phase:

5. Embedding "learn-by-doing" project(s) throughout the training.


Over the course of this project, six different trainings were conducted at various K-12 schools around the state of Michigan using the Flipped PD model.  Trainings included:

1. Cell Phones in the Classroom: Columbia Central Middle School, May 2, 2012

2. iPad Training: George Long Elementary School, May 3, 2012

3. Screencasting: Burns Elementary, May 18, 2012

4. Flipped Classroom Training: Pinconning Community Schools, June 6, 2012

5. Flipped Classroom Training: Detroit School of Arts, June 8, 2012

6. Flipped Classroom Training: Jackson County ISD, June 12-13, 2012

**Consent Forms and Training Surveys**

At the beginning of each training session, participating teachers were asked to sign a

consent form (Appendix B) if they would allow their feedback to be included in this

research project.  Teachers who consented completed a two-part survey (see Appendix C) about the training.  The first part of the survey asked for information about the training and background on themselves and their experience using technology in their teaching.  Questions asked them to describe whether their attendance was voluntary or mandatory, their level of technology use in the classroom, and their level of previous experience with the tool they were learning about during that training.  The second part of the survey was completed at the end of the training.  Teachers were asked to circle all the provided statements they felt accurately described the Flipped PD training they had just experienced.  Statements were similar to those provided in the JCISD Educational Technology PD Survey sent out to Jackson County Educators previously and included statements such as:

- The time allotted was appropriate for this topic.

- I learned more than I already knew.

- I practiced using the technology.

- I know where to go if I have questions.

- This was an effective use of my time.

- I will be able to use what I learned in my classroom right away.

The results were collected anonymously and tabulated using Google® Forms.

**Cell Phones in the Classroom Training – Columbia Middle School**

 "Cell Phones in the Classroom" training was offered May 2, 2012 at Columbia Middle School for one hour after the end of school.  The principal had recently allowed students to bring their own cell phones to school and to use them for educational purposes during class.  The district curriculum director requested training on the effective use of cell phones in the classroom and offered it as an optional training for any interested teachers.

*Explore Phase:*

 The emphasis of this training was on helping educators teach students how to use mobile devices as educational tools, and not just as toys or entertainment.

 For classroom examples, teachers throughout the district were sent Tom Barrett's Google® Presentation – Interesting Ways to Use Mobile Phones in the Classroom to review five days before the training.  Web address: http://edte.ch/blog/interesting-ways

 Live demonstrations and discussions were divided into two areas: 1.) Classroom Management, and 2.) Classroom Applications.  Classroom Management topics included Acceptable Use Policies (AUP), teaching and modeling digital citizenship, and classroom procedures. Classroom applications included topics such as using cell phones for internet access (i.e. The Google® Rule), texting (i.e. Shakespeare summaries, 6 word poems, formative assessment, etc.), capturing audio (i.e. record foreign language conversations, record interviews, etc.), camera (i.e. Scavenger hunts, demonstrate understanding with pictures, etc.), video camera (i.e. create a one minute video demonstrating understanding about HSCE X.), video content (access to Khan Academy and Bright Storm), and Apps.

*Flip Phase:*

 No digital tutorials or resources were provided for this training.

*Apply Phase:*

Attendees choose one of the following projects:

- Create a QR code for a website you would have your students use in class.

- Watch a video related to the content you are currently teaching on khanacademy.org or brightstorm.com.

- Create a wiffiti.com account and make a wall.  Have someone else post to your wall.

- Summarize your favorite book or poem in a text. Send your text to 517-262-9785 or as a Twitter tweet to @runfardvs

- Create a polleverywhere.com account.  Create a question.  Have someone text in their answer.

- Record a conversation on your phone with another teacher about worries you have about students using their own devices in class.

- Go on a scavenger hunt.  Take 10 pictures with your device related to something you are teaching right now.

- Use the video camera on your phone to record yourself doing a whiteboard tutorial.

- Share your favorite iPhone, iPad, or Android app with someone else and explain how your students could use it in class.

**iPad Training – George Long Elementary**

The iPad training was offered to teachers at George Long Elementary School for three hours after school on May 3, 2012. The entire faculty throughout the district was invited but attendance was optional. Many teachers had used money from a school grant to purchase iPads for their classrooms but were unfamiliar with how to use them properly. Thirty-three teachers and administrators attended.

*Explore Phase*

The emphasis of this training was on helping educators avoid the trap of turning the iPad into a $500 "pencil" and helping them understand how can they could use the iPad to teach in ways they were previously unable to do without it.

Attending teachers were sent an email one week before the training with links to examples of innovative uses of iPads in elementary classrooms. Examples included Tom Barrett's Google® Presentation – Interesting Ways to Use iPads in the Classroom. (Web address: http://bit.ly/interestingways_ipad) as well as the following REMC Connected Educator Videos. (Web address: http://www.remc.org/projects/connectededucator

- o Wikis in the Classroom (Amber Kowatch): How a second grade teacher uses iPads and a class wiki to help students connect and reflect as they write.
- o Using iPads for Writing (Ashley McDonald): How a kindergarten teacher uses iPads to help her students improve their writing.

Live demonstrations were divided into three sections: 1.) Out of the Box Basics, 2.) Native Apps, and 3.) There's an App for That. "Out of the Box Basics" included demos of hardware such as buttons, ports, basic functions, and maneuvering around the device. "Native Apps" demonstrations included settings and apps such as Safari, Camera, Notes,

iTunes, and Photos, which are preinstalled on the iPad. "There's an App for That" focused

on websites such as Appitic, MindLeap, and iEAR which review educational apps, and

options such as the Apple® TV and Reflection App for projecting the iPad screen. A few

basic apps such as Dropbox, Zite, Sock Puppets, and the Fantastic Flying Books of Morris

Lessmore were shown as examples.

*Flip Phase:*

Teachers were provided a link to the iPad Academy website

http://ipadacademy.com which gives tricks, tips, and tutorials to help iPad owners from all

backgrounds learn to use their device.

*Apply Phase:*

Three projects, one for each demonstration section, were embedded into the

training. Project #1 asked attendees to play "iPad Bingo" (Appendix D). For this project,

teachers were given a piece of paper with a 5x5 grid on it. Each box contained a basic task

on the iPad such as changing the wallpaper picture, finding the multitasking bar to switch

apps, and connecting to WiFi. As teachers were able to demonstrate their understanding to

fellow teachers, those teachers initialed the appropriate box.

For Project #2, teachers had the option of choosing from a variety of tasks related to

the native apps on the iPad. Options included:

- Download the free iBooks app and then download a free book from the iBooks store.
- Download the free Screenchomp app. Create a short tutorial about a topic you will
  teach your students next week.
- Write a paragraph in the "Notes" app and email it to someone else
- Create a 30-second video introducing yourself to your students.

- Use the camera app to take 5 pictures of examples in this room of triangles.

- Use Facetime to do a video call with someone else in this training.

The final project invited teachers to search through educational app review websites such as Appitic (http://www.appitic.com), MindLeap (http://www.mindleaptech.com), or iEAR (http://www.iear.org) and find a free app that they could use in their classroom.  Participants were then asked to share their favorite app with someone else.

**Screencasting Training – Burns Elementary**

Instructional technology coaches from Burns Elementary in Detroit, Michigan requested training on the concepts of screencasting and how to use Camtasia® software. Faculty members were recently given laptops and administrators wanted them to learn about different ways they could be used in their teaching.  The training was conducted for two hours after school on May 18, 2012.  The entire faculty was invited but the attendance was optional.  Eight teachers attended but due to other meetings there was considerable movement by the attendees in and out of the training.

*Explore Phase*

Due to issues of not teachers not having enough time in class to teach all of the content required by the state of Michigan, the emphasis of this training was on how they could make content available for their students anytime outside of class.

A link to an online Google® Presentation titled "Screencasting in the Classroom" (website: http://bit.ly/OW7bEO) was sent to teachers three days before the training.  The

presentation included examples of how teachers are using screencasts in their classroom to do such things as provide instructions to substitute teachers, develop tutorials for student questions, as well as student-generated content, and other examples.

Teachers were first shown how to build a basic screencast using free tools Jing® and Screencast-o-matic®. Basic Camtasia® software features were also demonstrated.

*Flip Phase:*

Techsmith, makers of Jing® and Camtasia®, have a Learning Center full of tutorials about how to use their software which can be found at their company website http://www.techsmith.com/tutorial.html. Teachers were shown the website and how to navigate the Learning Center if they ever ran into issues or had questions about how to use certain features on the software.

Tutorials for the use and application of Screencast-o-matic® are found on the website http://screencast-o-matic.com.

*Learn-By-Doing Projects*

This training had two projects as well as "Going Farther" options (see Appendix E). Project #1 asked attendees to design a one minute screencast showing their students how to navigate a website which could be used in class using either Jing® or Screencast-o-matic®. Those who already had experience using Jing or Screencast-o-matic® were invited to do a similar project with Camtasia®.

Screencasting Project #2 asked them to use a screencasting program other than the one used in Project #2 to create one of the following:

- A whiteboard tutorial with your phone or camera.
- An example problem for your students.

- Instructions for a substitute teacher.

- A "point of pain" tutorial for another teacher.

- Record a PowerPoint® presentation

Those who had experience with screencasting had the option to do one of the "Going

Farther" projects, which included:

- Post a link of your video to your classroom website.

- Create a pen.io page and embed your video into it along with a Google® Form.

- Create a TED-Ed video and lesson.

- Try out some of the iPad whiteboard apps like Screenchomp, ShowMe, or
  Educations.


**Flipped Classroom Training – Pinconning Schools**

As part of their Summer Tech Academy on June 6, 2012, Pinconning Schools

requested training on the Flipped Classroom.  During the Tech Academy, attending

teachers from all grade levels could choose from several two-hour sessions.  Arrangements

were made prior to the training for us to use the computer lab so teachers could make a

TED-Ed or pen.io lesson.  Unfortunately, TED-Ed and pen.io were both blocked by the

school filters so the training consisted of strictly demonstrations and discussions rather

than hands-on activities and projects.  Sixteen teachers attended.

*Explore Phase:*

The emphasis of this training was on determining the most effective use of class

time and then using technology to create time for the hands-on, minds-on activities design

to help students truly build understanding.

Tech Academy attendees were sent an email describing the training session which contained a link to the Flipped Classroom pretraining website http://danielvspencer.org/flipclass/page7/index.html.  The website included a survey, examples of materials to bring to the training, helpful resources related to the Flipped Classroom concept, along with several articles and videos describing how teachers are applying the flipped concept in a variety of ways.  Teachers were invited to review the content before attending.

Because teachers did not have access to YouTube or pen.io, the entire two hours were spent in a trainer-centered model of discussion about the concept of the Flipped Classroom and demonstrations of tools which could be used.  The discussion centered on how technology can be leveraged to enable more effective use of class time and allowing students to learn content at their own pace.  Along with a demonstration on how to make a screencast using Jing®, it evolved into a detailed explanation of the  "Flipped Classroom Spectrum", or a range of different applications of the Flipped Classroom concept.  The Flipped Classroom spectrum includes:

- Points of Pain: Creating screencasts as needed to address questions and misconceptions that arise during the learning process.
- Content Libraries: Curating a bank of content screencasts that students can access at any time both in and out of class.
- Flipped Classroom: Switching when and where content is delivered.
- Flipped-Mastery: When content is universally available and students have ownership of their learning, a classroom learning environment can be arranged where students progress through content at their own pace.

- Student Created Content:  Students learn more deeply when they have opportunities create content and demonstrate understanding.

After the Flipped Spectrum discussion, two options for using screencasts as formative assessment on student understanding and progress were presented.  The first tool was from the website TED-Ed (http://ed.ted.com) where teachers can develop "flipped lessons" using any YouTube® video and attaching follow up questions.  The example used (http://bit.ly/tededyt) was created by math teacher Stacey Roshan, using a YouTube® video by Vi Hart about the legitimacy of SpongeBob Squarepant's pineapple home and Fibonacci Numbers.  Attending teachers observed how students watch the video and respond to the questions, and responses are forwarded to the teacher.

The second tool demonstrated was the free webpage developer pen.io (http://pen.io).  Teachers using pen.io in their classrooms can create unique webpages with text, graphics, as well as embed content from a variety of web sources.  The example used (http://whiteboardtutorial.pen.io) contained text, an embedded YouTube video, along with an embedded Google® Form with questions about the video.  Attending teachers saw how students can watch the video and submit their responses to the questions.  Responses are forwarded instantly to the teacher.

*Flip Phase:*

Since there were no "learn-by-doing" projects, no tutorials were given but several resources were shared.  Resources shared include the following:

- The Flipped Classroom Network (http://flippedclassroom.org) is a social network of more than 7,000 educators from around the world who are using the Flipped

Classroom concept in their classrooms.  Members share resources and ideas freely with others.

- Flipped Classroom Resources Google® Doc (http://bit.ly/fcresources) contains information about the flipped classroom concept, equipment needs, answers to common concerns, and addressing misconceptions.

- Dr. Ramsey Musallam's website http://cyclesoflearning.com contains many examples of researched pedagogy on the effective use of the flipped classroom concept.

- Brian Bennett (http://www.brianbennett.org) is a classroom science teacher actively using the flipped classroom concept.  His blog provides continual and honest reflections on what is going well (and not so well) in his classroom.

*Apply Phase:*

Due to TED-Ed and pen.io being blocked there were no projects.

**Flipped Classroom Training – Detroit School of Arts**

In an effort to address student achievement concerns in math, the math department from the Detroit School of Arts requested training on the Flipped Classroom, June 8, 2012. The training was held for two hours after school and six teachers from the faculty, as well as three student teachers, participated.  Much of this agenda mirrored that of the Pinconning Schools training.  However, because attending teachers had working computers and appropriate access to the internet, more time was spent on application of "learn-by-doing" projects rather than just discussion.

*Explore Phase:*

Just as in the Pinconning training, he emphasis of this training was on determining the most effective use of class time and then using technology to create time for the hands-on, minds-on activities design to help students truly build understanding.

Attendees were sent an email describing the training session which contained a link to the Flipped Classroom pretraining website http://danielvspencer.org/flipclass/page7/index.html. Teachers were encouraged to review the content before attending.

Similar to the Pinconning training, there was discussion about the Flipped Classroom concept and Spectrum but with less detail due to time constraints. Demonstrations included how to create screencasts using Jing, TED-Ed, and pen.io.

*Flip Phase:*

Resources shared were the same as at Pinconning with website links to the Flipped Classroom Network, the Flipped Classroom Resources Google® Doc, http://www.cyclesoflearning.com, and http://www.BrianBennett.org. Tutorials provided included:

- Techsmith's Learning Center for Jing® http://www.techsmith.com/tutorial-jing.html

- Techsmith's Learning Center for Camtasia Studio® (PC version) http://www.techsmith.com/tutorial-camtasia.html and Camtasia for Mac® http://www.techsmith.com/tutorial-camtasia-mac.html

- TED-Ed lesson tour video http://ed.ted.com/tour

- pen.io tutorial page http://tutorial.pen.io.

*Apply Phase:*

Attending teachers had two "learn-by-doing" projects embedded into the training. Project #1 asked teachers to create a one-minute screencast using Jing® or Camtasia® showing students how to navigate a classroom relevant website.  Project #2 asked teachers to design a whiteboard tutorial using the screencasting program of their choice and a Wacom® Bamboo tablet.  For those who felt proficient with creating screencasts, they were challenged to either create a TED-Ed lesson or pen.io page.

**Flipped Classroom Training – Jackson County ISD**

On June 12 and 13, 2012, the Jackson County ISD hosted an in-depth, 12-hour training on the Flipped Classroom.  Teachers throughout the state were invited to attend. While similar in philosophy to both the Pinconning and Detroit School of Arts trainings, teachers had much more time to discuss, collaborate, and work on projects.  Nineteen teachers including elementary, middle school, high school, and higher ed backgrounds attended.

*Explore Phase*

Once again, he emphasis of this training was on determining the most effective use of class time and then using technology to develop time for the hands-on, minds-on activities design to help students truly build understanding.

Just as with the Pinconning and Detroit School of Arts trainings, attendees were sent an email describing the training session which contained a link to the Flipped Classroom pretraining website http://danielvspencer.org/flipclass/page7/index.html. Teachers were invited to review the content before attending.

Day #1 – The Big Picture and Creating Screencasts

The first day included several conversations about the Flipped Classroom concept and the Flipped Classroom Spectrum. In addition, several teachers with experience flipping their classrooms from around the country participated in a video conference via Google® Hangout. The teacher panel included Nancy Schutke (TX-Chemistry), Troy Cockrum (IN-English), Deb Wolfe (SD-Teacher Trainer), and Jen Gray (CO-Chemistry). Attending teachers had the opportunity to hear their stories as well as ask questions.

Demonstrations included creating screencasts using Jing® and Screencast-o-matic®, as well as Educreation ®. As usual, there were also demonstrations of TED-Ed and pen.io. In addition, teachers saw options for hosting their videos (YouTube®, Vimeo®, screencast.com, and TeacherTube®), along with ways to post content for their students (Moodle, class websites, class wikis, class blogs, and Edmodo ®).

Day #2 – Planning the Flip

Conversations and demonstrations for day 2 of the training focused on planning and preparing to flip the classroom. Teachers saw examples of Layered Curriculum Units, student tracking systems, rubrics, and examples of Explore-Flip-Apply planning using the Michigan High School Content Expecations (HSCE).

*Flip Phase:*

Resources and tutorials provided were identical to those shared in the Detroit School of Arts training.

*Apply Phase:*

Projects in the Jackson County ISD Flipped Classroom training were designed to build upon one another. Project topics included: 1.) Creating Content, 2.) Hosting Content, 3.) Making Content Accessible, 4.) Assessing Student Work, and 5.) Planning.

During Project #1 attendees were asked to make a one-minute screencast using Jing®, Screencast-o-matic®, and Educreations®. The purpose of developing three screencasts was to allow teachers to get experience with a wide range of tools and then decide upon the one that worked best for their situation.

Project #2 required participants to create a one-minute video that they would use with their students where they had to annotate a PowerPoint® slide using a Wacom® Bamboo tablet. When finished they were to embed their video into a pen.io page and share the link with class members.

Project #3 required them to post their pen.io link from Project #2 to the classroom "hub" of their choice – Moodle, Edmodo®, webpage, wiki, or blog.

In Project #4, teachers organized an Explore-Flip-Apply learning cycle for a HSCE or GLCE, which they would be teaching the following year.

For the final project, attendees were allowed to go back and work on improving and developing any of the previous projects.

**RESULTS**

**Presurvey**

Seventy-two (72) teachers responded to the JCISD EdTech PD Survey. Results from questions #1 and #2 of the survey were pertinent to this research project. Question #1 asked teachers to identify statements they felt correctly described educational technology professional development trainings they had attended through the Jackson County Intermediate School District in the past. Figure 2 shows most statement areas hover around or below the 50% agreement range. The focus of the feedback however, will center on the two statements: "This was an effective use of my time" and "I am able to use this in my classroom right away." This is due to their relevance related to attendee perception of training quality and confidence.
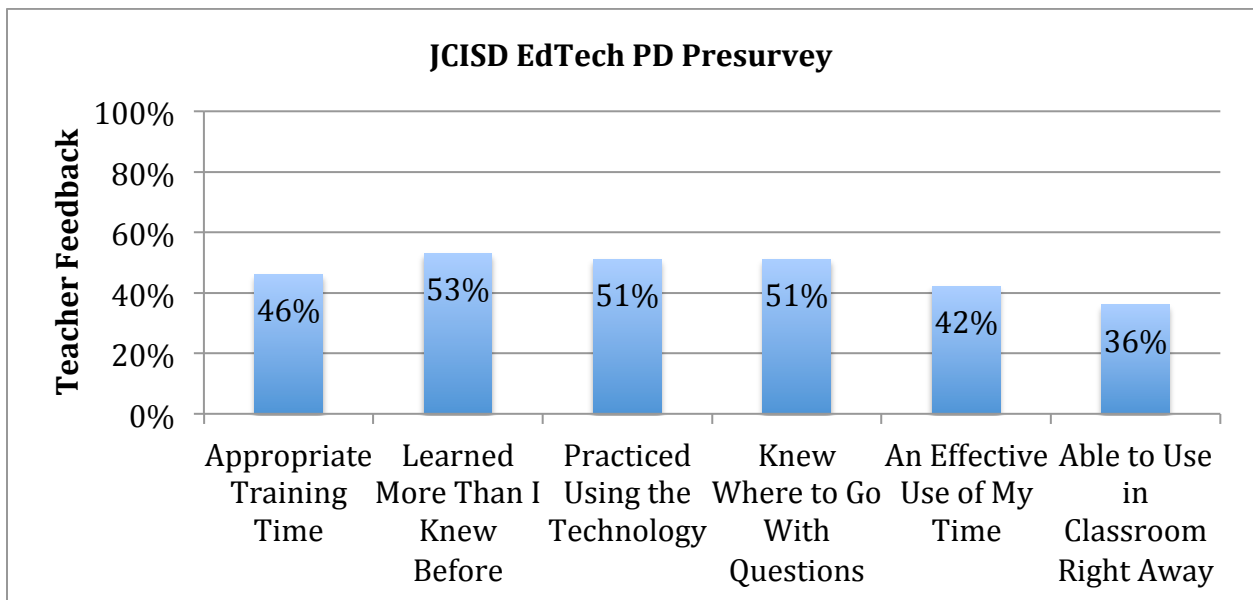


Figure 2 - Teacher (n=72) Feedback from the JCISD PD Presurvey

Question #2 was an open response format where teachers were asked to think of training they had previously participated in through the JCISD and felt was "a waste of time" and identify the reason(s) why.  Responses were grouped based on similarities. Table 1 below shows the most common responses, which emphasized a lack of classroom application (36%), followed by frustration with not being able to practice using the technology (24%).

| Why Training was a "Waste of Time" | % Mentioned |
|---|---|
| The training didn't apply to my classroom. | 36% |
| No time to practice using the technology | 24% |
| No examples of how to use it in my teaching | 11% |
| Pacing issues: i.e. too fast or too slow | 11% |

**Table 1 – Reasons for ineffective professional development.**


**Individual Training Demographics and Feedback**

Information collected from each training session can be divided into two areas: demographic information and post-training feedback.  Since 90% of attending teachers said they chose to attend trainings, demographic areas will focus on grade level assignments, the perceived level of technology expertise, and familiarity with the training tool.  Post-training feedback will focus on how many attendees agree with each statement provided.


*1.) Cell Phones in the Classroom Training Feedback*

*Demographic Information*

Two elementary teachers attended the Cell Phones in the Classroom training.  Both voluntarily attended.  One described himself as using technology as required in the

classroom, and the other as using technology quite a bit.  Both reported to have used cell

phones on a limited basis in the past.

*Post-Training Feedback*

Both attendees agreed with all the post-training statements.


*2.) iPad Training Feedback*

*Demographic Information*

Thirty-three (33) teachers attended the iPad Training.  As seen in Table 2, 48% of

attending teachers were from the elementary level, with 15% from the middle school, 24%

from the high school, 3% from high education, and 6% being administrators (see Table 2).

In terms of technology use, Table 3 shows 61% of teachers felt they use technology often

and structured their teaching to include it.  Of those teachers who attended, the majority

described themselves as having used iPads briefly but never in the classroom (33%) or

having used it a little in their classroom (42%) as shown in Table 4.

| Describe your level of technology expertise | |
|---|---|
| I use technology very little. | 3% |
| I use technology as required, but don't seek out opportunities to use it. | 33% |
| I use technology quite a bit and structure my teaching to include it. | 61% |

**Table 2 - iPad: Perceived Levels of Technology Expertise**


| What is your level of experience with the tool you are learning about today? | |
|---|---|
| I have never heard of it. | 0% |
| I have heard of it, but never used it before. | 9% |
| I have used it briefly, but never in my classroom. | 33% |
| I have used it a little in my classroom. | 42% |
| I have used it extensively in my classroom. | 12% |

**Table 3 - iPad: Tool Familiarity**

Teacher feedback from the iPad Training (Figure 3) shows 97% of teachers involved felt the training was an effective use of their time while 63% feel they could use the iPads right away in their classrooms.
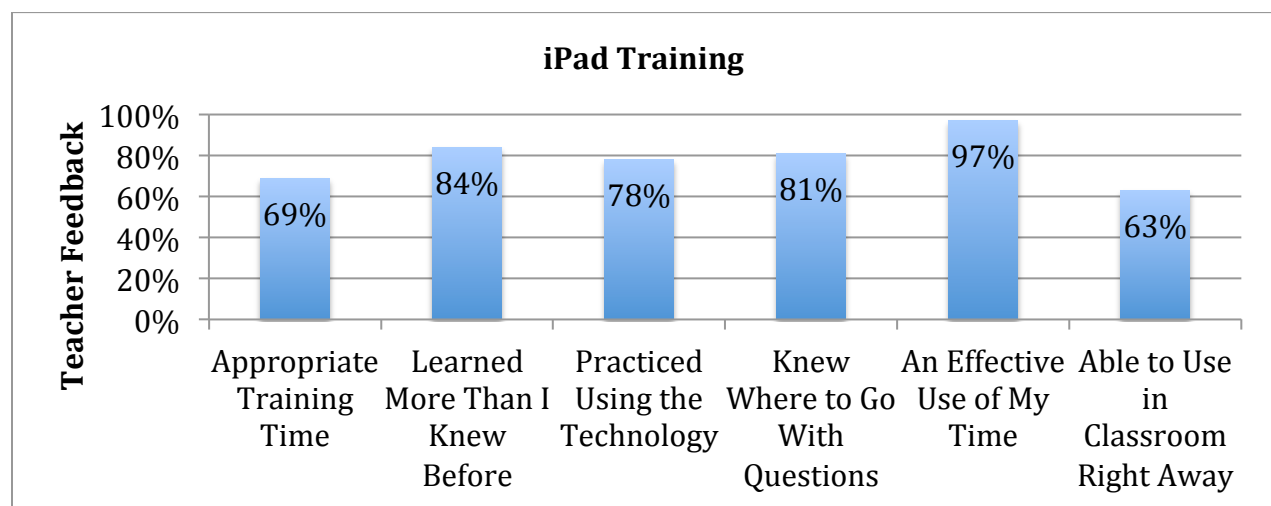


**Figure 3 - iPad Training Feedback**

*3.) Screencasting Training – Burns Elementary*

*Demographic Information*

Eight (8) teachers attended the Burns Elementary training on screencasting. Of those eight teachers, six (6) were from the elementary level, while the other two (2) were from the middle school level.

In terms of technology use, 75% felt they incorporate technology extensively into their teaching (Table 4).

| Describe your level of technology expertise | |
|---|---|
| I use technology very little. | 0% |
| I use technology as required, but don't seek out opportunities to use it. | 25% |
| I use technology quite a bit and structure my teaching to include it. | 75% |

**Table 4 - Screencasting: Perceived Levels of Technology Expertise**

Yet, when it came to experience using screencasting tools, half of those teachers had heard of it but never used it. (Table 5)

| What is your level of experience with the tool you are learning about today? | |
|---|---|
| I have never heard of it. | 13% |
| I have heard of it, but never used it before. | 50% |
| I have used it briefly, but never in my classroom. | 13% |
| I have used it a little in my classroom. | 25% |
| I have used it extensively in my classroom. | 0% |

**Table 5 - Screencasting: Tool Familiarity**

*Post-Training Feedback*

Teacher feedback from the Screencasting Training (Figure 4) shows 63% of teachers involved felt the training was an effective use of their time while only 38% felt they could use screencasting right away in their classrooms.
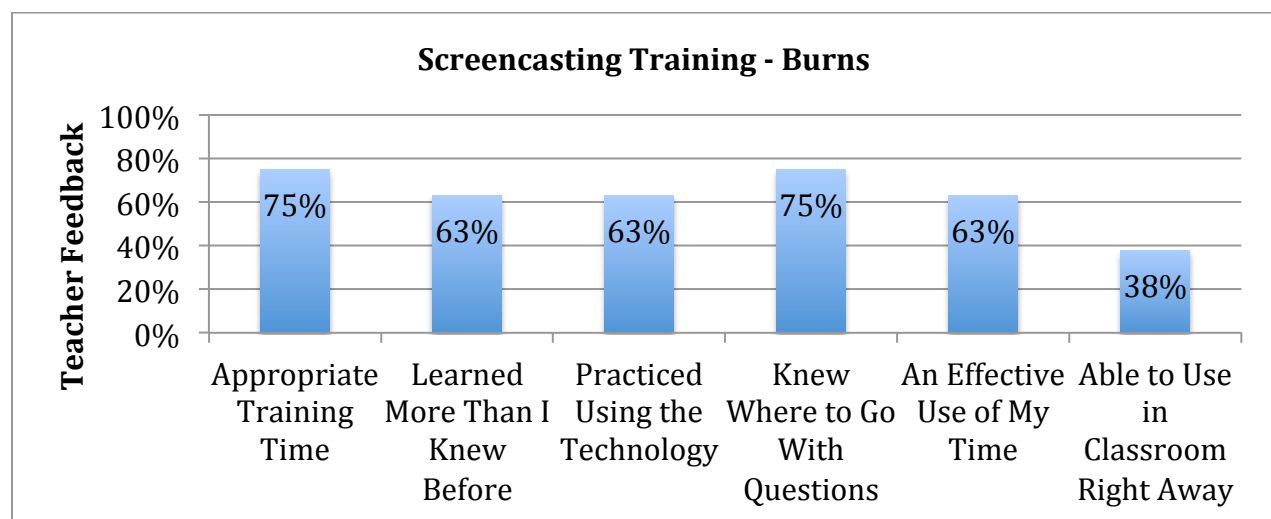


**Figure 4 - Screencasting Training Feedback**

*4.) Flipped Classroom Training Feedback – Pinconning*

*Demographic Information*

In the two-hour Pinconning training on the Flipped Classroom, sixteen (16) teachers attended. Those who attended were spread relatively evenly throughout grade levels with 31% from the elementary level, while 25% from middle school, and the remaining 44% from high school. The majority of teachers described themselves as using technology as required (44%) and using technology quite a bit (44%) (Table 6). The bulk of attendees were inexperienced with the concept of the Flipped Classroom with 31% having never heard of it and an additional 50% having heard of the concept but never used it (Table 7).

| Describe your level of technology expertise | |
|---|---|
| I use technology very little. | 13% |
| I use technology as required, but don't seek out opportunities to use it. | 44% |
| I use technology quite a bit and structure my teaching to include it. | 44% |

**Table 6 - Flipped Classroom (Pinconning): Perceived Levels of Technology Expertise**

| What is your level of experience with the tool you are learning about today? | |
|---|---|
| I have never heard of it. | 31% |
| I have heard of it, but never used it before. | 50% |
| I have used it briefly, but never in my classroom. | 0% |
| I have used it a little in my classroom. | 19% |
| I have used it extensively in my classroom. | 0% |

**Table 7 - Flipped Classroom (Pinconning): Tool Familiarity**

*Post-Training Feedback*

It is important to note once again that due to issues with Internet access, this training consisted of discussion but no hands-on learning opportunities. Because of this, no one practiced using the technology as in other Flipped PD trainings. 81% of the teachers

who attended this trainer-based inservice felt it was an effective use of their time, however only 31% felt confident they could use it in their teaching right away (Figure 5).
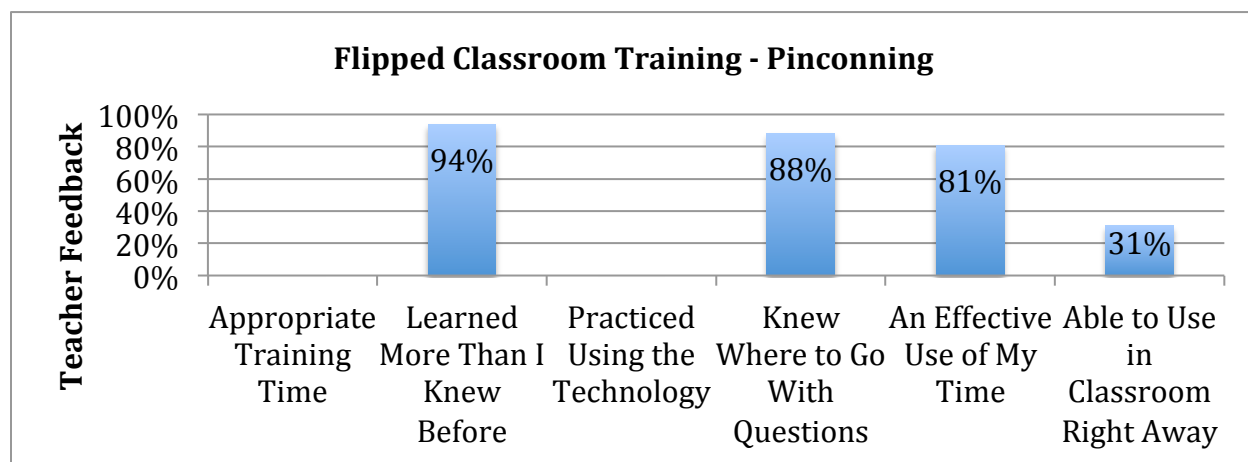
**Flipped Classroom Training - Pinconning**



**Figure 5 - Flipped Classroom (Pinconning): Training Feedback**

*5.) Screencasting and the Flipped Classroom Training Feedback – Detroit School of Arts*

*Demographic Information*

The nine (9) teachers who attended the flipped classroom training held at the Detroit School of Arts were all members of the high school math faculty.  Many of them (67%) felt confident in their use of technology in the classroom (Table 8) but few had any significant experience in using the Flipped Classroom concept in their teaching (Table 9).

| Describe your level of technology expertise | |
|---|---|
| I use technology very little. | 0% |
| I use technology as required, but don't seek out opportunities to use it. | 33% |
| I use technology quite a bit and structure my teaching to include it. | 67% |

**Table 8 - Flipped Classroom (DSA): Perceived Levels of Technology Expertise**

| What is your level of experience with the tool you are learning about today? | |
|---|---|
| I have never heard of it. | 22% |
| I have heard of it, but never used it before. | 33% |
| I have used it briefly, but never in my classroom. | 33% |
| I have used it a little in my classroom. | 11% |
| I have used it extensively in my classroom. | 0% |

**Table 9 - Flipped Classroom (DSA): Tool Familiarity**

*Post-Training Feedback*

Those who attended the Flipped Classroom training at the Detroit School of Arts had the opportunity to not only discuss the concept but also gain experience creating their own screencasts.  Of those teachers, 89% felt the training was an effective use of their time while 56% left confident they could begin using the flip in their classroom right away (Figure 6).
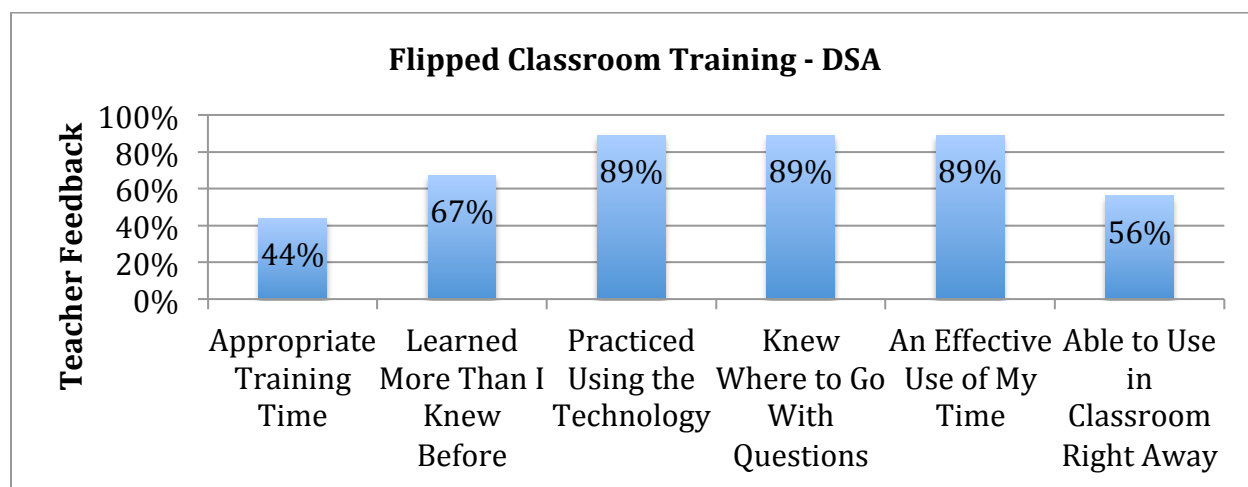


**Figure 6 - Flipped Classroom (DSA): Training Feedback**

*6.) Screencasting and the Flipped Classroom Training Feedback – Jackson County ISD*

*Demographic Information*

As in previous Flipped Classroom trainings done in Pinconning and the Detroit School of Arts, the inservice hosted at the Jackson County Intermediate School District was

designed to help teacher begin using the Flipped Classroom concept in their own classrooms. However, due to the length of training (2 full days, 12 hours) participants were able to delve much deeper into the topic and also spend more time on "Learn-By-Doing" projects. Nineteen (19) teachers attended with the majority (63%) being from the high school level. The majority of these teachers also felt quite confident in their level of technology use, with 84% saying they structure their teaching to include it (Table 10). But while many of them use technology, most teachers had limited experience using the Flipped Classroom concept in their teaching (Table 11).

| Describe your level of technology expertise | |
|---|---|
| I use technology very little. | 0% |
| I use technology as required, but don't seek out opportunities to use it. | 16% |
| I use technology quite a bit and structure my teaching to include it. | 84% |

**Table 10 - Flipped Classroom (JCISD): Perceived Level of Technology Expertise**

| What is your level of experience with the tool you are learning about today? | |
|---|---|
| I have never heard of it. | 5% |
| I have heard of it, but never used it before. | 47% |
| I have used it briefly, but never in my classroom. | 21% |
| I have used it a little in my classroom. | 26% |
| I have used it extensively in my classroom. | 0% |

**Table 11 - Flipped Classroom (JCISD): Tool Familiarity**

*Post-Training Feedback*

After two days of in-depth training on the Flipped Classroom, 95% of attendees felt the training was an effective use of their time and 89% felt they could use it in their classroom right away (Figure 7).
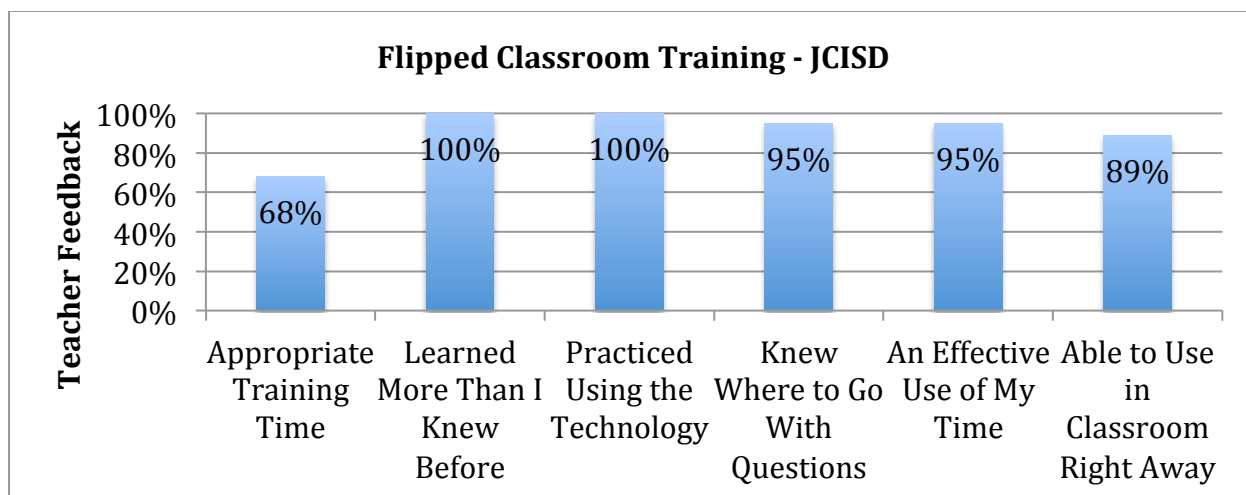
37

**Flipped Classroom Training - JCISD**



**Figure 7 - Flipped Classroom (JCISD): Training Feedback**

## Overall Flipped PD Model Feedback

The feedback from all the trainings using the Flipped PD model can be found in Figure 8. Of the 72 attendees who participated in this project, 93% felt this training model was an effective use of their time and 67% could use it in their teaching right away.
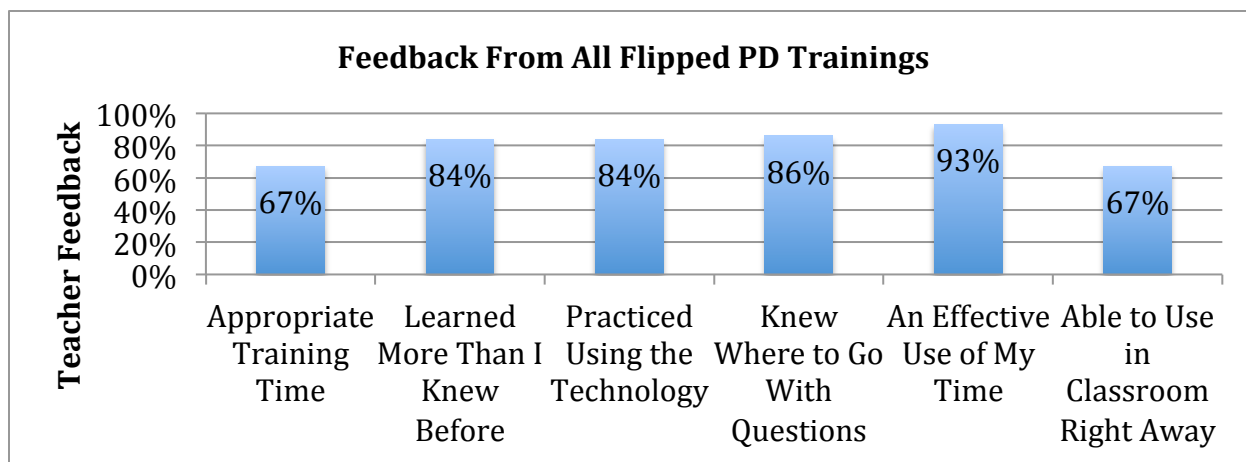
**Feedback From All Flipped PD Trainings**



**Figure 8 - Feedback From All Flipped PD trainings**

When overall feedback results (n=70) were compared to those of the presurvey (n=72), there was a increase in every area (Figure 9). The statement "this was an effective

use of my time" increased the most, being affirmed by 42% of respondents in the Presurvey, while jumping to 93% in the post training feedback – an increase of 51 percentage points. The other area of interest was related to those who felt confident they could use what they had learned in their classrooms right away. In the Presurvey, just 36% of respondents felt confident they could use what they learned in their classrooms, while 67% of those who completed the learner-centered flipped PD trainings felt they could do likewise.
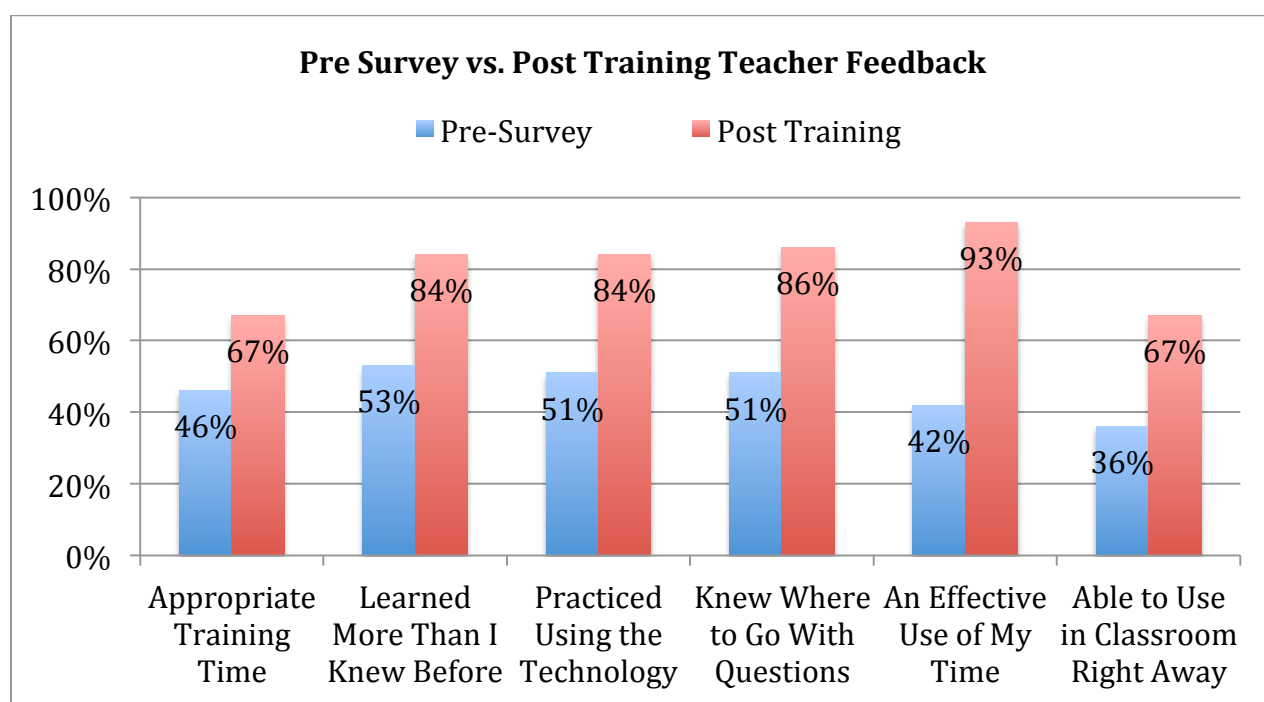


**Figure 9 - Comparison Between Presurvey and Post Training Feedback**

The three Flipped Classroom trainings at Pinconning, the Detroit School of Arts, and the Jackson County ISD provided a unique comparison between different training formats. As mentioned previously, of all the trainings done as part of this project, the Pinconning training most closely resembled a trainer-centered PD due to an unforeseen failure in technology. The Detroit School of Arts training was done in a similar time frame as

Pinconning while also covering the same pedagogical topics, but managed to incorporate "learn-by-doing" activities into the training.  Finally, the JCISD training applied the same pedagogical discussions and "learn-by-doing" activities as mentioned previously but due to longer training time allowed attendees to delve more deeply into both areas.

Comparing the results (Figure 10) of each flipped classroom training to the Presurvey also showed an increase in teachers feeling this was an of effective time use of time and as well as confidence to use the technology in the classroom setting.  At the same time there was an increase in both areas when comparing the trainer-centered model (Pinconning) to learner-centered model (DSA and JCISD).
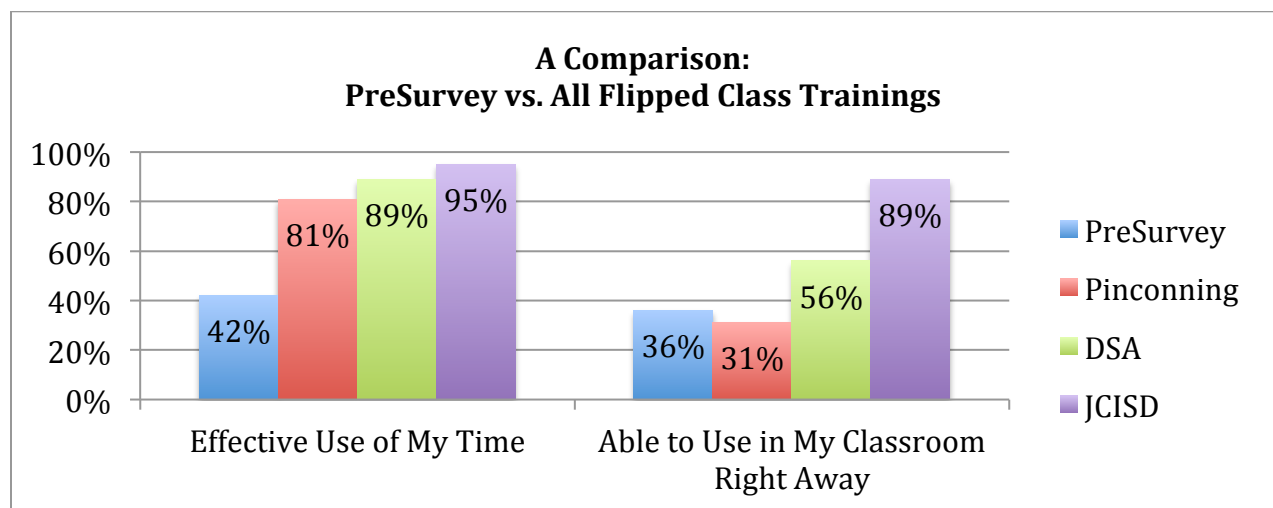


**Figure 10 - A Comparison Between Flipped PDs**

40

**DISCUSSION**

**A Comparison: Presurvey vs. Post Training**

      Overall, a comparison between the JCISD Educational Technology Feedback

Presurvey and Post Training surveys suggests a drastic rise in all areas being measured

(Figure 9). Most notably, there was an increase by 51 percentage points by those who

participated in the learner-center model of PD compared to the previous trainer-centered

model when it came to determining whether or not the training was an effective use of

time. At the same time, those who participated in the learner-centered model trainings

indicated they had more confidence in their ability to use what they had learned in their

trainings by a margin of 31 percentage points compared to those who participated in

trainer-centered PD. The comparison between Presurvey and Post training data seems to

suggest that those who are trained in a learned-centered PD model not only feel their time

was used more effectively, but are also more confident in their ability to use what they have

learned in a classroom setting.

**A Comparison: Flipped Classroom Trainings**

      When the feedback from the Pinconning, Detroit School of Arts, and Jackson County

ISD Flipped Classroom trainings are compared (Figure 10), an interesting pattern appears

in teacher's perception of effective time use and their confidence to use the technology in

their classrooms. In those three trainings there was an increase in teacher perception of

effective time use between the trainer-centered model in Pinconning (81%), to the 2-hour

learner-centered training at the Detroit School of Arts (89%), to the 2-day learner-centered

training at the Jackson County ISD (95%). In terms of teacher confidence, only 31% of

41

Pinconning participants responded affirmatively, while that number grew to 56% at the Detroit School of Arts, and again to 89% at the Jackson County ISD. Just as the comparison between the overall Pre and Post training surveys, the results from the three flipped classroom trainings seems to suggest that as training shifts from trainer-centered focus, to that of a learner-centered focus, there is an increase in teacher perception of effective time use and confidence to use technology in the classroom.

**Conclusions**

Based on the comparisons between the feedback from the Presurvey and the overall Post training survey, as well as the three Flipped Classroom trainings, the data seems to suggest that teachers who participate in learner-centered models of professional development not only feel their time has been used effectively, but are also more confident in their ability to use the tools they learned about in their own classrooms compared to those who participate in trainer-centered models of PD.

The purpose of TPACK is to help educators understand the symbiotic relationship between technology and teaching. At the same time, the purpose of the Flipped Classroom is to leverage technology so that learners have the flexibility to master content at an individual pace. The combination of these principles, as seen in this study, provides teachers who are learning how to use technology in their classrooms ownership of their learning in ways that were not possible in trainer-centered models of PD.

Interestingly, the flipped training model in educational technology PD for K-12 educators has the potential to positively impact both the teacher and trainer. It can be argued that while participating teachers benefit from an increased level of confidence, trainers are also empowered. While the emphasis on classroom relevance and hands-on

experience are important pieces to the effectiveness of this model, the opportunities for developing positive mentor relationships should not be overlooked.  In general, trainer-based models of PD may be an efficient form for disseminating information, but at the same time can be criticized for being impersonal and indifferent when it comes to the needs of teachers.  However, while learner-centered trainings can give teachers the autonomy to learn in a personal way, it also gives the trainer the flexibility to move from a role of lecturer to one of mentor.  With that added flexibility, trainers have the opportunity to work more one-on-one with teachers, give them individual insights and assistance, as well as encouragement in ways that were rarely possible previously.

**Next Steps**

While the research seems to suggest that those who participate in learner-centered trainings following the Flipped PD model are more confident in their ability to use what they have learned in the classroom, there are still other aspects to consider.  For example, teacher confidence is important when it comes to taking the first steps to implement technology tools into teaching and learning, but one should be cautious to not mistake teacher confidence for student achievement.  If the true purpose of teacher training is ultimately improving student achievement, then building teacher confidence in their ability to use what they have learned is an important first step toward student achievement, but is only part of a much larger picture.  Thus the question becomes, how do we convert teacher confidence into student achievement?

One of the weaknesses of this study was that most training was done on a one-time basis where the trainer and teacher part ways at the end of their work together. Regardless of teacher confidence upon leaving the training, there will come a time when

they must experiment with what they have learned in their own classroom setting. Their

ability to maneuver through the problems and questions that will most definitely arise will

ultimately determine whether or not what they have learned will make an impact on their

classroom. But long after the formal training sessions finish, how do we help even the most

confident teacher continue to work through the difficulties, and continually work towards

using the technology to improve student learning?

One way to improve the likelihood of training making a positive impact on student

achievement is to not only move from trainer-centered to learner-centered PD, but to also

move from an environment of one-time training to one of continual coaching (Joyce &

Showers, 2002). In other words, when done correctly, one-time training can inspire

teachers to try new tools and concepts in their classrooms, but continual coaching helps

guide them towards effective implementation long after introducing the initial idea.

Ideally, this support takes place in individual or small group settings where a technology

integration coach and teachers meet together on a regular basis to set goals, plan, discus,

and improve upon classroom projects related to the effective use of technology in teaching

and learning.

One example of where this continual coaching model is being used effectively in

conjunction with the Flipped PD training model, is in Stillwater Area Public Schools in

Stillwater, Minnesota. Kristin Daniels and Wayne Feller are Technology Integration

Specialists who work with elementary school teachers in their district to effectively

incorporate technology into the learning cycle (Daniels & Feller, 2012). In an effort to

improve student achievement through professional development, Daniels and Feller focus

their efforts on working with teachers to develop technology-based projects tied to the district's pedagogical goals (Daniels & Feller, 2012).

Under their model of continual coaching, interested teachers choose a technology project related to 1.) Collaboration, 2.) Communication, 3.) Creative Media, or 4.) Presentation.  Daniels and Feller then work with individual teachers to plan and define what the teacher wants to do and learn from the project.  After planning, they provide teachers with the tools and skills needed to incorporate this project into their teaching.  As teachers work on their project throughout the school year, Daniels and Feller meet with them monthly to provide additional training and ongoing support in developing the project. When finished, teachers have learned to use technology more effectively in their classroom by creating something directly for their classroom.  Projects are then shared with future teachers as they begin their own continual coaching cycle.

The Daniels and Feller model of PD coincides with the Explore-Flip-Apply method and could be easily adapted to work with the "Flipped PD" model proposed in this study. Just as in the Flipped PD model proposed in this study, the Daniels and Feller model of PD focuses first on classroom application of technology use in teaching and learning, provides teachers with resources to be successful at their own pace, and then allows them to learn through hands-on projects.  The major difference between the two is that the Daniels and Feller model recognizes the importance of continual trainer contact with learners over an extended period of time.  As seen in the comparison between the flipped classroom trainings conducted at the Detroit School of Arts and the Jackson County ISD, increased contact time with trainers and participants seems to play an important role in teacher

45

confidence, which would most likely be enhanced when done on a consistent schedule over

an extended period of time.

**APPENDICES**

## JCISD Educational Technology PD Survey

Teachers,
I'm trying to improve the way educational technology PD is offered at the ISD.  Please be candid and honest.  If you have any questions or suggestions you can reach me at
dan.spencer@jcisd.org

**Please check all the statements below you feel apply to PD you have taken through the ISD.**
- The time allotted for training was appropriate for the topic
- I learned more than I already knew about the topic.
- I practiced using technology related to the topic.
- I knew where to go if I had questions about the topic.
- The training was an effective use of my time.
- All of the above.
- None of the above.

**Think of a time you went to a PD you thought was a waste of time.  What was it about that training that kept it from being useful to you in your teaching?**

**Which educational technology PD topics could the ISD offer that would be useful to you?**

## Research Participant Information and Consent Form

You are being asked to participate in a research project.  Researchers are required to provide a consent form to inform you about the study, to convey that participation is voluntary, to explain risks and benefits of participation, and to empower you to make an informed decision.  You should feel free to ask the researchers any questions you may have.

**Study Title:**  "Flipping" Educational Technology PD for K-12 Educators
**Researcher:**  Dan Spencer
**Department:** Technology
**Institution:**  Jackson County Intermediate School District
**Address:**      6700 Browns Lake Rd, Jackson, MI 49201
**Contact Info:** Phone: (517) 262-9785
                 Email: dan.spencer@jcisd.org

**Purpose of Research:**
You are being asked to participate in a research study about the effectiveness of technology professional development in K-12 schools.  You have been selected because you are part of a professional development being conducted by Dan Spencer through the Jackson County Intermediate School District.  From this study researchers hope to learn how pedagogically based learning activities affect teacher attitudes towards the effectiveness of the training.  Your participation in this study will only last for the duration of this training.

**What You Will Do:**
As part of this study you will be asked to participate in the technology teacher development training you are attending and then take an anonymous survey concerning your perceived effectiveness of the training.  Surveys will be given as paper forms or via Google Form.

**Potential Benefits:**
While you will not directly benefit from your participation in this study, the results of your feedback will help the researchers improve future professional development trainings.

**Potential Risks:**
There are no foreseeable risks associated with participation in this study.

**Privacy and Confidentiality:**
The data for this project are being collected anonymously.  Neither the researchers, nor anyone else will be able to link data to you.

**Your Rights to Participate, Say No, or Withdraw**
Participation in this research project is completely voluntary. You have the right to say no. You may change your mind at any time and withdraw. There will be no consequences for withdrawal or incomplete participation. You may choose not to answer specific question or to stop participating at any time. Choosing not to participate or withdrawing from this study will not make any difference in the quality of the training you receive or the benefits to which you are otherwise entitled. Whether you choose to participate or not will have no affect on your grade or evaluation.

**Costs and Compensation for Being in the Study**
Procedures are being performed for research purposes only and will be provided free of charge.

**Contact Information for Questions and Concerns**
If you have any concerns or questions about this study, such as scientific issues, or how to do any part or it, please contact Dan Spencer at 6700 Browns Lake Rd, Jackson, MI 49201, or by phone at 517-262-9785, or by email at dan.spencer@jcisd.org.

If you have questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact, anonymously if you wish, the Michigan State University's Human Research Protection Program at 517-355-2180, Fax 517-432-4503, or email irb@msu.edu, or regular mail at 207 Olds Hall, MSU, East Lansing, MI 48824.

**Documentation of Informed Consent**
Your signature below means that you voluntarily agree to participate in this research study.


_____          _____
Signature                                                                                  Date

## Post Training Survey

The purpose of this survey is to evaluate the effectiveness of technology professional development (PD).  Providing your name is optional.  Please be candid and honest.

---

**Basic Information**

| Date | District | Grade Level | Training Topic |
|------|----------|-------------|----------------|
|      |          |             |                |

Time allotted for this training (circle one):
- 1 hour or less
- 1-3 hours
- 3-6 hours
- Multiple days

Setting (circle one):
- Large group (10+)
- Small group (2-9)
- Individual

---

**Pre-Training Survey**

What is your reason for attending this training? (circle one):
- I was asked to be here
- I chose to be here

How would you describe your level of technology expertise? (circle one):
- I use technology very little.
- I use technology as required, but don't seek out opportunities to use it.
- I use technology quite a bit and structure my teaching to include it.

What is your level of experience with the tool you are learning about today? (circle one):
- I have never heard of it.
- I have heard of it but never used it.
- I have used it briefly but never in my classroom.
- I have used it a little in my classroom.
- I have used it extensively in my classroom.

---

**Post-Training Survey – Circle all that apply:**
- The time allotted was appropriate for this topic
- I learned more than I already knew
- I practiced using the technology
- I know where to go if I have questions
- This was an effective use of my time
- I will be able to use what I learned in my classroom right away

**iPad Training (Grass Lake) "Learn-By-Doing" Project #1 – iPad BINGO**

| B | I | N | G | O |
|---|---|---|---|---|
| Where do you plug in ear buds? | Move an app to a different screen | Turn on "Airplane Mode" | Change your email signature | Go to your favorite website on Safari |
| Set side switch to "lock rotation" | Use iCloud to set up "Find my iPad" | Change wallpaper picture | "Split" keyboard then put it back again | Find the multitasking bar & switch apps |
| How do you charge it? | Create & rename a folder w/ 2 or more apps | Where are the cameras? | Take screenshot & find it in Camera Roll | Connect to WiFi |
| Create a free iCloud account | Swipe between screens | "Close" app from the multitasking ba | Listen to musics while using another app | Download free book into iBooks |
| Auto-lock screen to 15 minutes | Turn on multitasking gestures, pinch app to close | Change screen brightness | Download the free app Screenchomp | Find something using "Search iPad" screen |

http://print-bingo.com

**Screencasting Training (Burns Elementary) "Learn By Doing" Projects**

Screencasting Project #1
Using either Jing or Screencast-o-matic.com create a screencast showing your students how to get around our favorite classroom website.

Screencasting Project #2
If possible, use a screencasting program other than the one used in Project #1 to create one of the following:

- A whiteboard tutorial with your cell phone or camera.
- An example problem for your student who has a question.
- Class instructions for a substitute teacher.
- A "Point of Pain" tutorial for another teacher.
- Record a PowerPoint presentation.

Going Farther:
After completing Screencasting Projects #1 and #2 feel free to try one of the following:

- Post a link of your video to your website.
- Create a pen.io page and embed your video into it along with a Google Form.
- Created a TED-Ed video lesson.
- Try out one of the free iPad whiteboard apps like Screenchomp, ShowMe, or Educations.

Follow Up:
What problems did you run into during this training?

What went well for you during this training?

Think about how you could use screencasting in your own classroom. What are the next steps?

**WORKS CITED**

# WORKS CITED

Bergmann, J., & Sams, A. (2012). *Flip Your Classroom: Reach Every Student in Every Class Every Day*. Eugene, OR: International Society for Technology in Education.

Carmichael, S. B., Martino, G., Porter-Magee, K., & Wilson, S. W. (2010). *The State of State Standards - and the Common Core - in 2010* (Rep.). Washington DC: Thomas B. Fordham Foundation and Institute. (ERIC Document Reproduction Service No. ED516607)

Daniels, K., & Feller, W. (2012). FlippedPD. *FlippedPD*. Retrieved June 20, 2012, from http://www.flippedpd.org/

Daniels, K., & Feller, W. (2012, June 24). *Flipped PD*. Lecture presented at ISTE 2012 Conference in San Diego Convention Center, San Diego.

Donovan, S., & Bransford, J. (2005). *How Students Learn: Science in the Classroom*. Washington, D.C.: National Academies Press.

Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., & Yoon, K. S. (2001). What Makes Professional Development Effective? Results From a National Sample of Teachers. *American Educational Research Journal*, *38*(4), 915-945. doi: 10.3102/00028312038004915

Harris, J., & Hofer, M. (n.d.). Activity Types Wiki. *Learning Activity Types Wiki*. Retrieved June 20, 2011, from http://activitytypes.wmwikis.net/

Harris, J., & Hofer, M. (2009). Instructional Planning Activity Types as Vehicles for Curriculum-Based TPACK Development. *C. D. Maddux: Research Highlights in Technology and Teacher Education 2009*, 99-108.

Harris, J., Mishra, P., & Koehler, M. (2009). Teacher's Technological Pedagogical Content Knowledge and Learning Activity Types: Curriculum-based Technology Integration Reframed. *Journal of Research on Technology in Education*, *41*(4), 393-416.

Harris, J. B., & Hofer, M. J. (2011). Technological Pedagogical Content Knowledge (TPACK) in Action: A Descriptive Study of Secondary Teachers' Curriculum-Based, Technology-Related Instructional Planning. *ISTE*, *43*(3), 211-229.

ISTE. (2007). *NETS-S* (Publication). Washington, D.C.: International Society for Technology in Education.

ISTE. (2008). *NETS-T* (Publication). Washington, D.C.: International Society for Technology in Education.

Joyce, B. R., & Showers, B. (2002). *Student Achievement Through Staff Development*. Alexandria, VA: Association for Supervision and Curriculum Development.

Knowles, M. S. (1975). *Self-directed Learning: A Guide for Learners and Teachers*. New York, NY: Association Press.

Knowles, M. S. (1984). *Andragogy in Action. Applying Modern Principles of Adult Education.* San Francisco, CA: Jossey-Bass.

Knowles, M. S. (1990). *The Adult Learner: A Neglected Species*. Houston, TX: Gulf Pub.

Marzano, R. J. (2007). *The Art and Science of Teaching: A Comprehensive Framework for Effective Instruction*. Alexandria, VA: Association for Supervision and Curriculum Development.

Marzano, R. J., Pickering, D., & Pollock, J. E. (2005). *Classroom Instruction that Works: Research-based Strategies for Increasing Student Achievement*. Upper Saddle River, NJ: Pearson/Merrill Prentice Hall.

Koehler, M. J. (n.d.). TPACK.org. *TPACK.org*. Retrieved June 11, 2011, from http://tpack.org

Koehler, M. J., & Mishra, P. (2005). What Happens When Teachers Design Educational Technology? The Development Of Technological Pedagogical Content Knowledge. *Journal of Educational Computing Research*, *32*(2), 131-152. doi: 10.2190/0EW7-01WB-BKHL-QDYV

Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge. *Teachers College Record*, *108*(6), 1017-1054. doi: 10.1111/j.1467-9620.2006.00684.x

Musallam, R. (2012). Explore-Explain-Apply - Google Docs. *Explore-Explain-Apply - Google Docs*. Retrieved June 1, 2012, from https://docs.google.com/drawings/d/1SHTXTAFC5ZZ4qXQU-Y4xFDrRAkqVMQ04jwL-u449QoQ/edit

Musallam, R. (2010). *The Effects of Using Screencasting as a Multimedia Pretraining Tool to Manage the Intrinsic Cognitive Load of Chemical Equilibrium Instruction for Advanced High School Chemistry Students* (Unpublished doctoral dissertation). The University of San Francisco.

National Research Council. (2000). *How People Learn: Brain, Mind, Experience, and School.* Washington, D.C.: National Academy Press.

National Research Council. (2012). *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Washington, D.C.: The National Academies Press.

Polly, D., & Hannafin, M. J. (2010). Reexamining technology's role in learner-centered professional development. *Educational Technology Research and Development*, *58*(5), 557-571. doi: 10.1007/s11423-009-9146-5

Schrum, L. (1999). Technology professional development for teachers. *Educational Technology Research and Development*, *47*(4), 83-90. doi: 10.1007/BF02299599

Shulman, L. S. (1986). Those Who Understand: Knowledge Growth in Teaching. *Educational Researcher*, *15*(2), 4. doi: 10.2307/1175860

Spencer, D. V. (2012, June 20). [JCISD Ed Tech Training Survey]. Unpublished raw data.

Tolstoy, L., & Moser, H. ([18-). *Anna Karenina*. Leipzig, NY: Philipp Reclam.

Watson, G. (2001). Models of information technology teacher professional development that engage with teachers' hearts and minds. *Journal of Information Technology for Teacher Education*, *10*(1-2), 179-190. doi: 10.1080/14759390100200110

Wayne, A. J., Yoon, K. S., Zhu, P., Cronen, S., & Garet, M. S. (2008). Experimenting With Teacher Professional Development: Motives and Methods. *Educational Researcher*, *37*(8), 469-479. doi: 10.3102/0013189X08327154

Wiggins, G. P., & McTighe, J. (1998). *Understanding by Design*. Alexandria, VA: Association for Supervision and Curriculum Development.