

The SAMR Model: Can It Transform Teacher Practice?

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## **Descriptive Analysis and Critique**

### **Introduction**

We are at a point in the history of education when radical change is possible, and the possibility for that change is directly tied to the impact of the computer. (Papert 1980)

For almost 35 years the promise of the transformational powers of technology has eluded us. There are pockets of innovation but largely teachers continue to teach the same way they did in previous generations. (Harwell 2003, Ertmer & Ottenbreit-Leftwich 2012, Fullan & Langworthy 2014) Technology should be a catalyst to help teachers transform the design and delivery of learning, however more often than not its use is resisted with reasons such as lack of time, lack of support and lack of access to technology sites. (Martellacci 2013) There is a tsunami of change coming. Schools can no longer control the wave of mobile devices sweeping into the classroom. (Wainwright 2013) Traditional ways of teaching and learning fail to address the changing needs of “digital natives” (Prensky 2001) or the skills required to live and learn in the 21st century. If teachers are to use the power of these devices in truly transformative ways, then the focus and intent of teacher professional development needs to change to support this process.

Unfortunately, even with disruptive devices (Christensen 2008) entering the classrooms, the focus remains steadfastly on the device (iPad, BYOD) rather than the learning. In this environment PD continues to be treated as an “event” rather than a process and an opportunity. (Harwell 2003, Fullan 2007) Technology-focused “point and click” training ignores the deep pedagogical dive required to change practice. (Ertmer & Ottenbreit-Leftwich 2012) This results

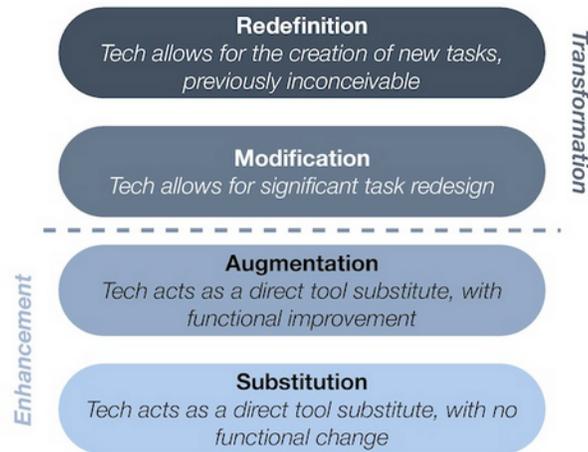
in teachers abandoning the technology or simply using it to amplify their existing instructional practice.

Research consistently recommends PD focus on the integration of pedagogy, content and technology (Harris, Mishra & Koehler 2009, Ertmer & Ottenbreit-Leftwich 2012).

Unfortunately, whether by design or mistaken application, PD sessions continue to emphasize “...layering technology on top of traditional teaching”. (Fullan & Langworthy 2014) This is a step beyond technology specific training but maintains technology application at the substitution and replication level. Transforming teaching and learning is a complicated process (NEA 2008) that requires a shift in thinking as teachers analyze and discard old beliefs. (Owston, 2004, Hew and Brush 2007, Ertmer & Ottenbreit-Leftwich 2012)

Jonassen (1998), called for technology to be considered a “mindtool” supporting the development of learners as designers, focused on knowledge construction not reproduction. More recently, Fullan (2012, 2013, 2014) echoed Jonassen, emphasizing teachers as “activators” with the goal of deep learning and knowledge creation.-To achieve Jonassen and Fullan’s vision will require a different approach to PD. It will require teachers to reconsider, rethink and redesign their teaching with “new pedagogies” embedded in “learning partnerships” with students (Fullan & Langworthy 2014), all fueled by mobile technologies.

With this in mind, the SAMR model provides a simple but effective tool to frame the move from a technology-first approach and/or substitution model to a transformational change approach. The SAMR model (Puentedura 2013a) is both a continuum intended to help teachers recognize the limitations of an “enhancement” model, and a lens to closely examine existing pedagogy and practice to promote the adoption of transformational practices activated by technology.



### Problem Statement

This research will examine whether the use of a guiding framework can scaffold learning, encourage change and move teachers beyond substitution in their use of technology.

Question: If the SAMR model is used within PD as a guide to support teachers' understanding of the transformational purpose of technology will they be more likely to use technology with intent beyond substitution and augmentation, than those given technology training and no planned exposure to the model?

### Introduction to the Review

Almost 20 years ago, Jonassen (1996 as cited in Ertmer & Ottenbreit-Leftwich 2014) categorized students' interactions with technology into three areas: learning *about, from and with* technology. Currently the majority of technology related tasks in schools (Van Roekel 2008, Murray & Olcese 2011, Fullan & Langworthy 2014) involve students using technology to access content, complete drill & practice activities and receive instruction. This mirrors the experience of most teacher professional development. Workshops focus on learning about technology with titles such as "Introduction to the iPad" and "101 Tips and Tricks". Or they

focus on learning with technology: teachers explore how technology “fits” with their current practice, and plan ways for it to enhance the activities they are already doing. Teachers consider pedagogy, but do not change pedagogy.

This literature review will use Jonassen’s three categories - learning about, from and with technology - to frame the analysis. Beginning with an examination of the “barriers” to technology integration, it will then focus on the literature that defines effective (and ineffective) professional development. To conclude, the review will explore the research related to the use of a framework to support change, and then briefly explore the SAMR model and its potential to address the changes required.

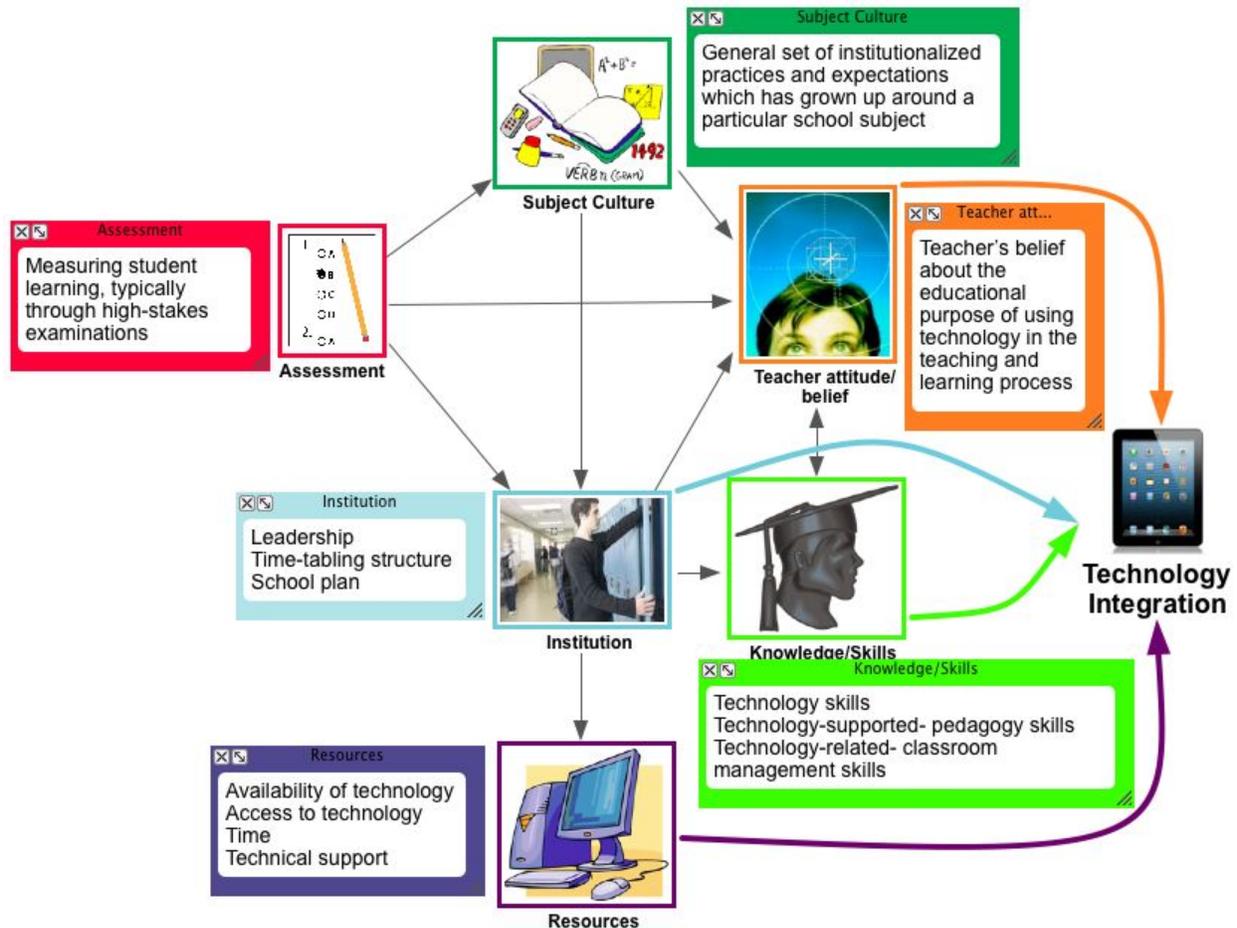
### **Barriers to Technology Integration**

As Hew & Brush (2007) note, there is no consensus on what the term “technology integration” means. As such successful integration might mean anything from lower order replication of traditional classroom activities to higher order changes related to constructivist pedagogy. In this paper the term “technology integration” represents the transformational changes to teacher practice, as they use technology to redefine instruction, roles, learning and assessment.

In 1999, Ertmer wrote a paper based on her involvement in a series of school-based studies related to teacher use, (or non-use) of technology. Her research served to both illustrate and define the problems associated with barriers to technology integration. Even today, when asked about barriers teachers cite time, support (PD) and funding (Martellacci 2013). Ertmer identified these as first-order barriers: external to the teacher and related to the technology. When first order barriers are addressed equipment works, Wi-Fi is available and consistent, and

teachers have access to equipment, tools, resources and support. Second-order barriers are internal, based on teachers' pedagogical beliefs and their willingness to change. When second order barriers are addressed, it was believed teaching and learning would fundamentally change. Ertmer notes many districts focus on first-order barriers (providing computers, training teachers) under the assumption that removing these barriers eliminates many second order barriers. This has proven to be incorrect. In fact, Palak and Walls (2009) discovered even in technology-rich schools, the majority of teachers continue to use technology in ways that support their existing teacher-centered practices. As Ertmer noted second-order barriers often "hide" behind first-order barriers. Once these initial barriers are reduced or removed, deeper issues and beliefs become evident rather than disappear.

Hew & Brush (2007) in their oft cited research, analyzed 48 empirical research studies from 1995-2006 to determine the common barriers to technology integration. They used the constant comparative method, a systematic approach to data collection and analysis in quantitative research, to categorize the barriers. Using this process Hew & Brush approached the research without predefined categories, breaking down the data into units and then coding them into categories. (QDATraining 2012) They concluded that a) resources, b) subject culture, c) attitudes and beliefs, d) knowledge and skills and e) assessment were the main barriers. These were ranked according to the frequency of their mention in the studies reviewed. Hew & Brush then broke down and defined a variety of barriers within each category. For example, lack of resources included lack of: technology, access, time and technical support. They then further summarized their findings by identifying the connections between the various barriers, attributing attitude and beliefs, knowledge and skills, institution and resources as directly influencing the success of technology integration.



Adapted from: Integrating technology into K-12 teaching and learning: current knowledge gaps and recommendations for future research (Hew & Brush 2007)

After reading Ertmer's and Hew & Brush's work questions remain as to why technology integration remains at such a surface level. There are some limitations to the research that does not diminish the findings but does inform further research. Ertmer does not address the methodology used in the various studies she cites, but merely mentions they are based on her work in the field. As such this paper is more descriptive in nature but given the plethora of Ertmer's research in the field of technology integration, her conclusions are supported. Hew & Brush outlined their methodology but acknowledge that most of the research they cited was limited by: incomplete methodology, self-reported data, short-duration and teacher/classroom focus. This highlights the need to ensure future research is not based just on teacher perception

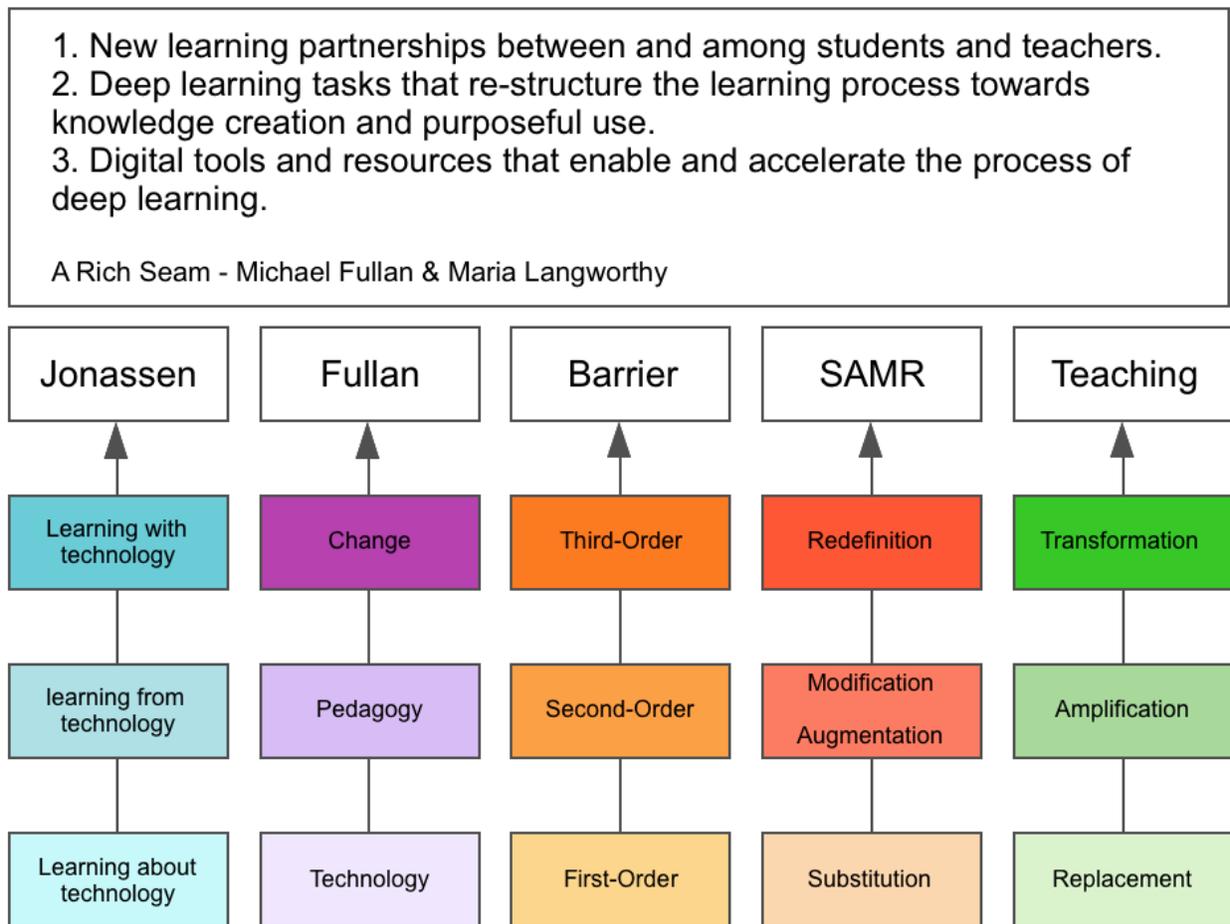
of knowledge and skills, but on observed behaviour.

Both papers attempted to identify and categorize barriers and offered ways to address them. Each paper noted the importance of first order barriers but emphasized second-order barriers as key. "...Technology adds value to the curriculum not by affecting quantitative changes (doing more of the same in less time) but by facilitating qualitative ones (accomplishing more authentic and complex goals). (Ertmer 1999) The importance of their recommended deep pedagogical change appears to have been ignored or misunderstood given the type of professional development most teachers continue to experience.

Despite compelling evidence, technology continues to be treated as the icing on the cake: merely decorative, rather than part of the mix: an essential ingredient. However, for any mix to transform requires heat. The "heat" in this case is change: embracing it as a teacher in a continuous cycle of professional learning. To this end I would propose a third-order barrier. As Hew & Brush 2007, (citing Hughes 2005) noted "technology-supported-pedagogy may be classified into three categories in which technology functions as: (a) replacement, (b) amplification, or (c) transformation." Noted earlier, Jonassen categorized student learning with technology into three levels: about, from and with, mirroring a teachers' stage of technology understanding and use. This leads to the concept of three categories where, to address real change, transformation is its own category, related but separate from first- and second-order barriers. As yet little research has occurred in this area. In Chai & Tsia's (2012) short position paper they argue that even when 1st and 2nd order barriers are addressed teachers may still fail to integrate technology into instruction. They refer to "[design-thinking](#)", an "[agile](#)", iterative approach to problem solving, as the third-order barrier. In "A Rich Seam - How New Pedagogies Find Deep Learning, Fullan and Langworthy (2014) add "change" to the familiar "pedagogy and

technology”. Indeed, Ertmer (2012) echoes the authors’ sentiments, “If we are going to prepare students for the 21st century, we need teachers to adopt new pedagogies (e.g., problem-based, case-based, inquiry-based, etc.) as well new curricula in which technology plays an integral but supporting role.”

The model below outlines how the various “3-Part” concepts outlined above interconnect in our quest to overcome the barriers that have block the way for 30 years.



### What Does (and Doesn't) Work in PD

#### The Challenge

With this call for “new pedagogies”, a review of the research that explores what does and

doesn't work in PD is required. This is a daunting task as research in this area is complex and often lacks validity. According to Guskey & Yoon (2009) in their research synthesis report "What Works in Professional Development?" only 9 of 1,343 studies they reviewed, conducted from 1986 until 2006, were well-designed investigations, making it difficult to quantify or qualify what works. In early work Guskey (2003) notes much of what we believe and implement is based on poor research with an over-reliance on self-reported teacher change and unproven strategies. He calls this "Yes, but..." cautioning us to question what we think "works".

## **Technology Professional Development**

### **First-Order PD**

Continuing with the 3-tiered model, this section will explore 3 aspects of professional development, first, second and third order PD.

Intuitively, showing teachers how to use technology makes sense. The thought is "They can't use the technology if they don't know how to use it." In spite of a quarter century of research to the contrary, the majority of technology training still focuses on "where to click" or "where to tap".

"There are few courses and professional development training opportunities to help teachers...learn how to use technology to meet curriculum outcomes. Training tends to focus on how to use a particular piece of software or hardware so teachers are largely on their own when it comes to figuring out how to use technology to support and enhance learning." (Steeves, 2012)

In a recent poll in which I (Grant 2013) answered in the negative to the question “Are drill-and-practice apps an appropriate use of educational technology?” approximately 50 percent of the teachers who responded to the poll, a group defined by their interest in and use of educational technology, voted yes. It seems once again, device-focused implementation reinforces replication of practice. (Murray & Olcese 2011)

### **Second-Order PD**

Research tells us if teachers are to successfully implement technology into instruction, they need to change their pedagogy. (DiBenedetto 2005) When asked to describe what makes for effective PD educators often include the enhancement of teachers’ content and pedagogical knowledge (Gursky 2003); however, research and “general knowledge” about what works has not translated into action, or results. As Timperley et al 2007 note: “What is known to be effective...is not always what is practiced.”

DiBenedetto’s (2005) study is a classic example of both the difficulties associated with changing teacher practice and the limits of much of the educational research. This study examined training designed to introduce teachers to a variety of appropriate technologies and encourage constructivist pedagogy. The author studied two groups of teachers from the Louisiana public school system using a stratified random sample. Half of the teachers had taken the technology training and half had not. DiBenedetto used a Summative Evaluation specifically designed for the training, with extremely high internal consistency, however she did not confirm validity. In summarizing her findings, the author notes the study was limited by sample size, length of study and the limits of the questionnaire. Her research showed that trained teachers

demonstrated positive attitudes toward using technology, and used more technology than teachers who had no training. However, the training was not enough to redefine teachers' instructional practice, defined by student-centric instruction and technology rich learning.

In another study, Peeraer & Van Petegem (2012) introduced a newly designed PD program based on TPACK (Koehler, Mishra and Yahya, 2007) to a total of 505 participants. To address TPACK the authors designed two training modules to explore the interaction among and between technological, pedagogical and content knowledge. In the second step teachers designed a technology infused lesson plan and reflected on TPACK. The authors explored participants' reactions to the program with a self-reporting questionnaire related to: a) participation levels, b) learning, c) behaviour change, and d) access to computers. To complement the quantitative data they completed focus group interviews with a core group of 67 participants who completed all aspects of the program.

Two points are of particular interest to this review. Both studies talk about transformational teaching but do not mention how this is addressed in the teacher training. It is unclear whether additional time, a particular strategy or some other variable caused the results. The second is the reliance on self-reporting as evidence. This seems to be a limitation of many studies as highlighted by Hew & Brush (2007). There is no direct observation or confirmation of teacher-perceived changes in either research, and yet Peeraer & Van Petegem claim "...all trainees who took part in the input training on TPACK felt very confident and knowledgeable about the interplay between technology and pedagogy." It is unclear whether teachers transformed their practice with technology or merely enhanced it. Upon closer examination of the survey questions it appears technology most likely was an enhancement, layered on to

existing practice.

Table 3: Learning: Descriptive statistics TPK  
(N = 392; 77.6% of trained teacher educators)

	M	SD	Strongly disagree (%)	Disagree (%)	Neither disagree nor agree (%)	Agree (%)	Strongly agree (%)
I can choose technologies that enhance the teaching approaches for a lesson.	4.13	.467	0.0	0.3	4.3	77.3	18.1
I can choose technologies that enhance students' learning for a lesson.	4.06	.489	0.0	0.5	7.4	77.3	14.8
The training program has caused me to think more deeply about how technology could influence the teaching approaches I use in my classroom.	4.05	.485	0.0	0.5	7.9	77.8	13.8
I am thinking critically about how to use technology in my classroom.	4.06	.470	0.0	0.0	8.2	77.6	14.3
I can adapt the use of technologies that I am learning about to different teaching activities.	4.06	.473	0.0	0.3	7.4	78.1	14.3

TPACK was designed to conceptualize the interconnectivity of technology, pedagogy and content, but it does not explicitly call for transformation. This represents a significant problem when teachers *think* they are using technology in innovative ways but are merely replicating or enhancing practice. As Brantley-Dias & Ertmer (2013) state, “Ultimately, even if teachers have TPACK, they may not be able or willing to use this knowledge to affect meaningful student outcomes.” Indeed, in their article “Goldilocks and TPACK: Is the Construct ‘Just Right?’” Brantley-Dias & Ertmer discourage the use of TPACK in its present model, noting the 7 aspects are confusing, separating technology out when it should be considered one of the instructional materials originally proposed by Pierson (2001). The authors suggest returning technology to its rightful place while still highlighting the shift from technology integration to “technology-enabled learning”.

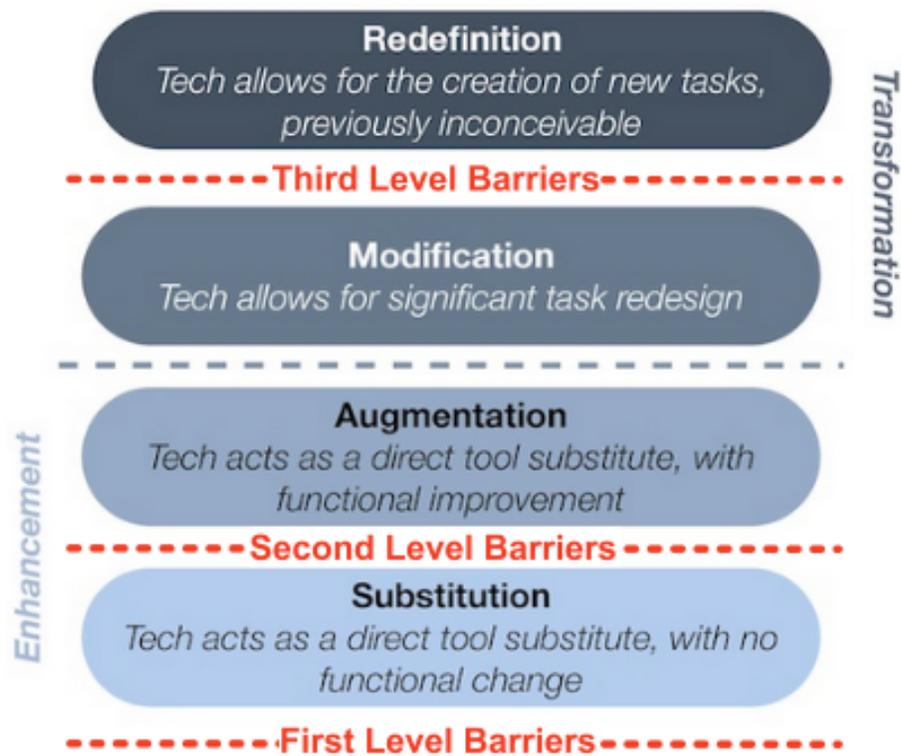
In “Technology as a Catalyst for Change” Matzen & Edmunds (2007) used a mixed methods approach. They used a single group, quasi-experimental design with a pre, post and

follow-up survey. Qualitative data was gathered from two case studies and journal entries from teachers who participated in a 50-hour professional development program that modeled the connection between instructional practices, the curriculum and the use of computers.

Their findings determined that when constructivist approaches are modeled, then teachers often use technology in constructivist ways even if their instructional practice is traditional. The authors suggest that technology can be presented to teachers as a reason to try a new approach or strategy. At the time of publication Ertmer (2005) suggested introducing technology to teachers in simple practical ways rather than transformative ways but the authors argue “...our data suggest that, in the short term, teachers can use technology in ways that may be inconsistent with their instructional beliefs.” This “fake it until you make it approach” counters the problem describe earlier where teachers know about a model (TPACK) but fail to use the model in their instruction or think they are transforming their practice when in fact they are only enhancing it. Given the “sit and git” approach to a great deal of PD, their immersive experience, along with the mixed method approach could better inform what works in PD.

### **Third-Order PD**

Teaching and learning with technology remains at the substitution and augmentation levels despite decades of professional development (Timperley et al, 2007). With the explosion of mobile devices not only has the locus of control shifted from teacher to student, but we’ve moved from “...traditional learning places to a continuum of learning spaces...” (Puentedura 2013b) heightening the problems with the current technology-focused, substitution model of PD. It is fundamental teachers have a framework to support and focus on the changes to practice needed.



The SAMR model, like a ladder, provides teachers with a “bird’s eye” view and defines what is possible. It builds awareness that there are additional levels beyond “using” technology. It encourages movement away from how does this technology “fit” with/enhance what we are already doing, to how can this technology change what we are doing (and what does this mean for our students?) Just like a ladder, the model is a device or frame. Other tools, skills and knowledge are required as one moves up and down the rungs. Indeed, on Dr. Puentedura’s blog (2014) he embeds his model within a rich exploration of models and content including TPACK, 21st century skills and his five categories of learning - social, mobility, visualization, storytelling and gaming.

When teachers understand the purpose of the SAMR model they can use it to explore concrete examples of the different levels, discuss the impact of each level on student engagement and learning, and then design instruction as they move up and down the ladder to address the

needs, abilities and interests of all students. Without it, technology implementation often focuses on the device where success is measured by “use” rather than by impact and learning.

### **Conclusion**

The greatest challenge facing schools in the 21<sup>st</sup> century is relevance. Teachers must learn, and soon, to not only embrace technology but also transform their instructional practice. There are many barriers and relying on new technology (mobile devices) to create this change will only repeat the past. New devices will be used to replicate old practices. Without an understanding of how to overcome the biggest barrier of all - change - the latest devices will only give the illusion of 21<sup>st</sup> century learning.

## **Part Two: Research Method**

### **Description of the Research Methods**

Given the literature suggests the limitations of much of the research, and the need for more generalizable research, this study will make sure of a convergent mixed method design to answer my original question posed earlier: If the SAMR model is used within PD as a guide to support teachers’ understanding of the transformational purpose of technology will they be more likely to use technology with intent beyond substitution and augmentation, than those given traditional technology training and no planned exposure to the model?

In addition, I hope to answer the following related questions:

- Will teachers consistently choose “redefinition” activities over lower order questions when explicitly taught to apply look for them?
- Will teachers “layer on” redefinition activities or will their entire instructional practice change?

- Is there a continuum of transformational skills from technology-enriched teacher-centric instruction to technology-enabled, student-centric instruction?
- How accurate are teachers in their self-assessment of their professional skills, attitudes, pedagogical beliefs and instructional support

The goal of the research is to provide a model for professional development to support districts as they, yet again, attempt to implement the use of technology, this time using mobile devices, as well as make suggestions for further research in this challenging area. Blending the qualitative and quantitative methods will allow for verification of self-reporting which was a criticism within the research, and help increase the generalizability of the findings.

This study will involve two groups of approximately 50 teachers from 2 different districts (2 groups of 25 in each district). The study will begin with a survey given to all of the district's teachers to benchmark current skills, attitudes, beliefs and needs related to technology integration. Each group of teachers will experience the same technology integration course on the use of the iPad. Constructivist activities as describes by Matzen & Edmunds (as well as their mixed method approach) will be modeled. In one district the SAMR model will be introduced as both a means of understanding technology use, and as a reflective tool through which to view instructional practice. A small subset of teachers, selected based on the survey profile, will be observed and interviewed at the conclusion of the workshop. Finally the survey will be repeated to explore whether there was a change in teachers' perceived and/or actual growth towards transforming their instruction and using technology within a more student-centric classroom.

In my current role I am often involved in the design and delivery of district-wide technology implementation initiatives across North America. This proposal is based on my access to school

districts through CEU workshops (Continuing Education Units) I present to US schools. These relationships would allow me to deliver 30-hour courses to 2 districts and ensure consistency of design and delivery to the teachers.

### **Participants**

This research will involve two groups of educators in two different districts to avoid treatment diffusion. Participants will self-select to attend the 30-hour course for CEUs that will take place over a 4-6 month time span. Using a survey to determine each teacher's level of technology integration, I would apply a quota sampling to select a smaller group of participants to interview and observe in their classrooms. A total of 16 people would be selected, 8 from each district representing 4 levels of technology integration. (Limited, Moderate, Extensive, Transformative) No one would be excluded from the study. Although interviewing and following up with 16 teachers would be time consuming, this number would be optimal to avoid problems with mortality.

Ethical considerations include recording, reading, observing and interviewing teachers related to their professional skills with technology. A declaration of intended research and a waiver would be imbedded into the course sign up process. It would outline the research being conducted, the observation, recording and analysis of reflections as well as a possible request for inclusion in further interviews/observations. All participants would be informed their information, responses and lessons would remain anonymous and given the small size of the groupings, identifying references excluded in the final paper.

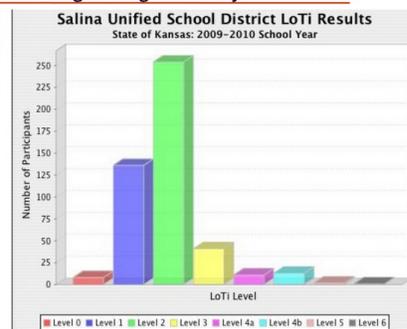
### **Instruments and Materials**

The following instruments and observations tools would be used: (1) a district survey (2) ethnographic field notes made from the video recording of the workshop sessions including the final presentation session of participants, (3) self-reflection journals at the end of each session (exit ticket) for all participants, (4) observation notes from classroom lesson observation, (5) post-lesson interviews with teachers reviewing their lesson and outcomes, (6) post-session survey of all participants (7) possible technology “walk-through” related to teacher/student use of technology.

### Surveys

Based on my literature review, surveys are problematic. They are often too short for detailed analysis, too long and left incomplete, or not returned. To counter this, the survey will use the “Goldilock’s rule” and contain enough detail for analysis but only require 10-15 minutes to complete. In addition, requirements for participating in the workshops would include completion of the survey. The survey would be tested for reliability, internal consistency and validity, which would, in all likelihood require purchase. LoTi is one such survey.

LoTi Digital-Age Survey



Level 0	Level 1	Level 2	Level 3	Level 4a	Level 4b	Level 5	Level 6
Non-Use	Awareness	Exploration	Infusion	Integration (Mechanical)	Integration (Routine)	Expansion	Refinement

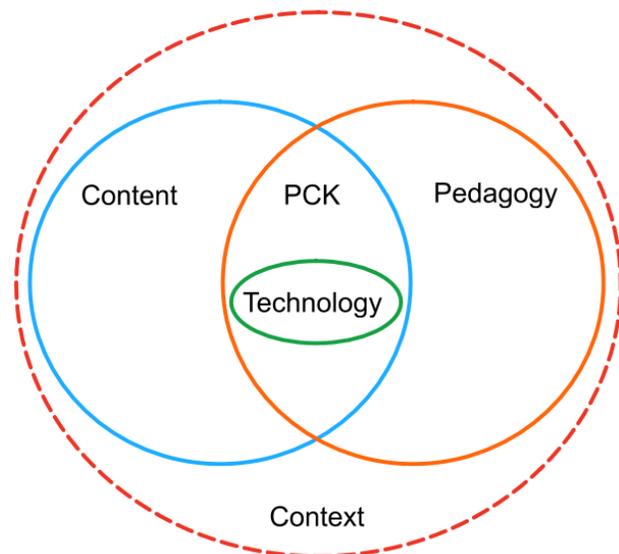
If a survey could not be purchased, one would be created using the ISTE NETS for Teachers (see Appendix – Survey Examples)

### Procedure

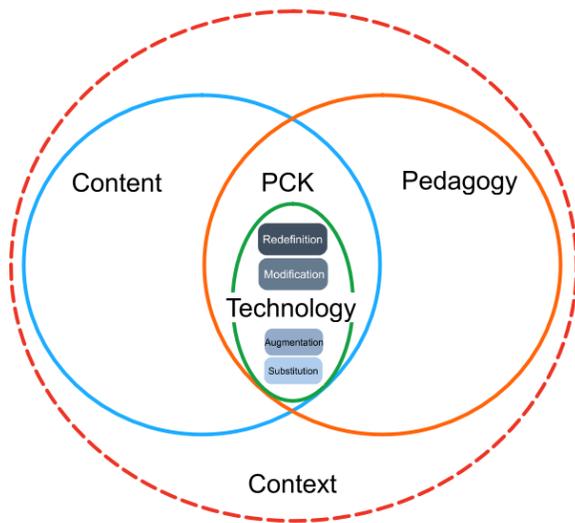
The study will take place over the course of approximately 4 to 6 months time. Surveys would be sent out at the beginning of the school year where possible and 2 weeks before the first session if the survey was not part of a district initiative and/or occurred mid-year. There would be two 15-hour workshop sessions making up the 30-hour course. These would occur after school for 3 days and one full Saturday. To receive credit for the course teachers are required to submit a lesson plan to the Principal and the Principal must observe the lesson and complete a report for the district.

The workshops will explore how to use the iPad for English Language Arts (reading & writing) to meet Common Core State Standards.

The focus of the workshops beyond curriculum will be to increase engagement and include more student-centred learning. All workshops will include the original TPACK model and then introduce the revised model (Brantley-Dias, & Ertmer 2013) as a means of discussing pedagogy and content supported by technology.



TPACK is well known with over 300 articles, research and presentations published or presented. (Brantley-Dias, & Ertmer 2013) Although this is a slightly different interpretation of TPACK (from the original) it is a subtle shift to help teachers consider technology within pedagogy and content, rather than think of it as a separate skill or component of instruction.



One district will also explore the SAMR model embedded within the TPACK model. The goal of this model is to help teachers understand how technology changes the teaching and learning. SAMR will also be used as part of the teachers' self-assessment when they complete their daily exit ticket and within their lesson plan design. (See Appendix – Exit Ticket Questions)

I will design and deliver the workshops and observe the lessons and interview the teachers. If it was required that only the Principals observe the lesson I will train Principals in the use of the observation record. This form will need to be approved by the district as an addendum to the district's current CEU report. In this way, if I can't have access to the complete report (teacher evaluation), I will still have access to the level of SAMR application in the lesson. I will meet with the Principals involved to review the SAMR model with them and explain the report. This workshop would be provided to the district free of charge to increase the likelihood I will meet personally with the Principals. If this is not possible I would create a short instructional video to share with the Principals. Once the Principal viewed the teacher's lesson I would meet with them to review their comments.

**Research Design and Analysis**

Measurement Instrument	Type of Data Collected	Analysis
History	<p>As part of any initiative I research the districts to review:</p> <ul style="list-style-type: none"> <li>• Demographics</li> <li>• State testing results (from PARCC or Smarter Balance)</li> <li>• Current initiatives,</li> <li>• Available technology</li> <li>• Professional Development - external, internal</li> </ul>	
Survey of all participants (Quantitative)	<p>This survey will identify the self-perceived knowledge, skills and attitudes of teachers in the district. It will provide a baseline level of competency upon which to compare the teachers’ growth. This will provide quantitative data; however as noted in the research, teacher self-reporting has limited applicability unless additional information is gathered. This survey will be analyzed before the sessions start, allowing me to locate a variety of participants to represent the 4 different competency levels. The survey will include data collected related to:</p> <p><b>ISTE NETS-T</b>  <a href="http://www.iste.org/docs/pdfs/20-14_ISTE_Standards-T_PDF.pdf">http://www.iste.org/docs/pdfs/20-14_ISTE_Standards-T_PDF.pdf</a></p> <ol style="list-style-type: none"> <li>1. Facilitate and inspire student learning and creativity</li> <li>2. Design and develop digital age learning experiences and assessments</li> <li>3. Model digital age work and learning</li> <li>4. Promote and model digital citizenship and responsibility</li> <li>5. Engage in professional growth and leadership</li> </ol>	<p>To analyze the data I will keep a consistent interval numbering system – 1-10 for beliefs and 1-4 for skills. This will allow me to give a rating to each answer to support analysis of the responses. The collected data will allow me to compare the two districts to see if the SAMR model had an impact on transformational practices. It is highly unlikely, given the research, and my experience, that one district will be extremely high on the SAMR model.</p> <p>In order to be valuable this data must be aligned with the additional quantitative (classroom observation) and qualitative (notes, interviews) data. This was mentioned throughout the research.</p>

	<p><b>Barriers</b></p> <ol style="list-style-type: none"> <li>1. First-Order Barriers</li> <li>2. Second-Order Barriers</li> <li>3. Third-Order Barriers</li> </ol> <p><b>Attitudes and Perceptions</b></p> <ol style="list-style-type: none"> <li>1. General Competency with Technology</li> <li>2. Technology Used in the Classroom (Teacher Instruction)</li> <li>3. Technology Used in the Classroom (Student Learning)</li> <li>4. Opinions, Attitudes and Beliefs</li> <li>5. Technology Needs (Equipment)</li> <li>6. Technology Needs (Professional)</li> </ol>	
<p>Ethnographic field notes (Qualitative)</p>	<p>I will record these notes via the use of sticky notes throughout the workshop and review the video created of the session.</p> <p>This will allow me to make basic notes as I work, and then use the video to create accurate notes as well as look for bias in my instruction.</p>	<p>I will observe and analyze the various teachers’ participation to the workshop, their attitude to both “learning new and letting go of the old” in the session. In addition, I will analyze the SAMR level of their activities in each day’s session to assess growth in ability or change in attitude.</p>
<p>Self-reflection journals (Qualitative)</p>	<p>Participants will be given time within the session to complete their reflections. They will be asked to explore what they learned and how they will apply it to their instruction. Those in the SAMR model will be expected to relate the activities to the 4 stages in the model. The reflection will be created using Google forms</p>	<p>The reflections will be analyzed for key words related to the SAMR model and each participant’s perceived growth will be recorded in a spreadsheet using the rating of 1 (substitution) to 4 (transformation).</p>

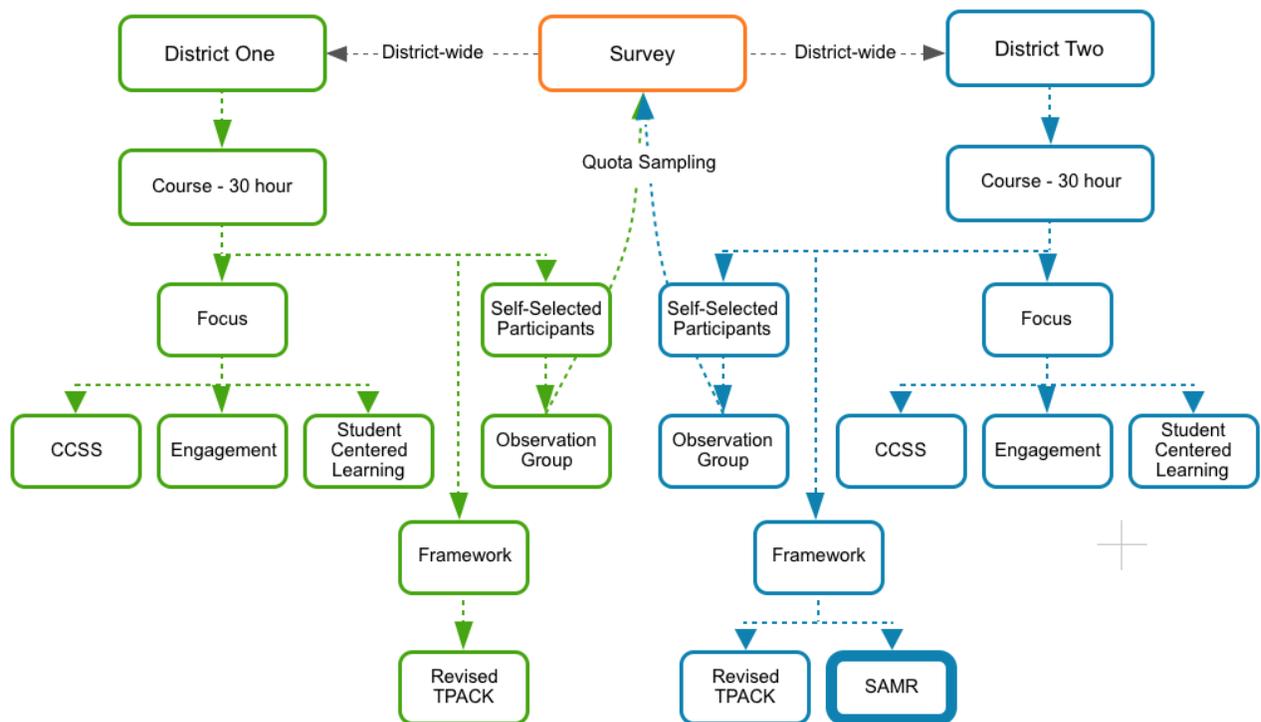
	<p>(or a district survey mechanism if required). This will allow me to capture reflections into one document and avoid the need to record each individual response. Each teacher will receive an identifying number to ensure anonymity.</p>	<p>The data will be further split into understanding/knowledge and action/implementation to further define whether teachers are acting on their knowledge.</p>
<p>Observation report from classroom lesson (Quantitative)</p>	<p>The report will be created using a structured observation checklist based on the technology survey categories. This will be a separate form (as a supplement to the existing district observation list) to ensure consistency of reports between the two districts.</p> <p>Part of the review would be based on the SAMR model (for both districts), focused on the transformational aspects of technology use, but would not refer to the levels. This would allow me to use the same checklist/report for both groups as well as de-emphasize what a teacher “should” be doing with technology and avoiding a hierarchy of skills.</p>	<p>The observation checklist will use the same structure and numbering as the survey to allow for comparison between the observation and the survey. The report will also confirm or deny, when compare with the teacher’s perceived level of technology use in the classroom (as gathered in the interview), how accurate the teacher’s perception are.</p>
<p>Post-lesson interviews with teachers reviewing their lesson and outcomes (Qualitative)</p>	<p>I will meet with teachers and review their lesson and outcomes based on the observation list. The intent of the interviews is to explore if teacher perception of their abilities and results is similar to those observed by others. It will also inform the degree to which teacher perception of their skills and use of tech is accurate as reported in the pre-post survey.</p> <p>I will record these interviews with permission and use the “YouTube” technique to aid in the transcription. This will significantly reduce the time involved in analyzing the interviews.</p>	<p>The interview will allow a direct comparison between the teachers’ perceived use of technology in the classroom and the rating by the unbiased observation. This information will help to confirm the validity of the initial self-assessment survey and support the conclusions of the study.</p> <p>Additional qualitative data will be collected by asking teachers what they learned, what strategies</p>

		<p>in the workshop were most effective and what other support they need.</p>
<p>Post-session survey of all participants (Quantitative)</p>	<p>Teachers will complete the same survey approximately 6 months after the initial survey. The goal is to have enough time between surveys to avoid (whatever it is called). Having survey results from all staff will allow me to determine how much of the change is attributed to the professional development I delivered, or whether other factors such as additional PD or schools initiatives created change.</p>	<p>This survey will be analyzed for growth in the teachers who participated in the workshops. A comparison between the two districts will also be made for the growth in transformational practices both self-reported (and as analyzed in the additional quantitative and qualitative data)</p>
<p>“Walkthrough” teacher/student use report (Quantitative)</p>	<p>If possible the inclusion of random “walkthroughs” would give additional data over time. A walkthrough checklist based on “look fors” related to SAMR would be developed. To increase the likelihood that I would be allowed into the schools no formal observation would happen, merely informal interactions to determine the type of technology being used in the classroom.</p>	<p>Each walkthrough would be plotted on a spreadsheet, representing the number of times technology was used by the students or teachers and what level of the SAMR model the use represented. This would be used as a secondary indication of improvement to complement and support the survey data.</p>

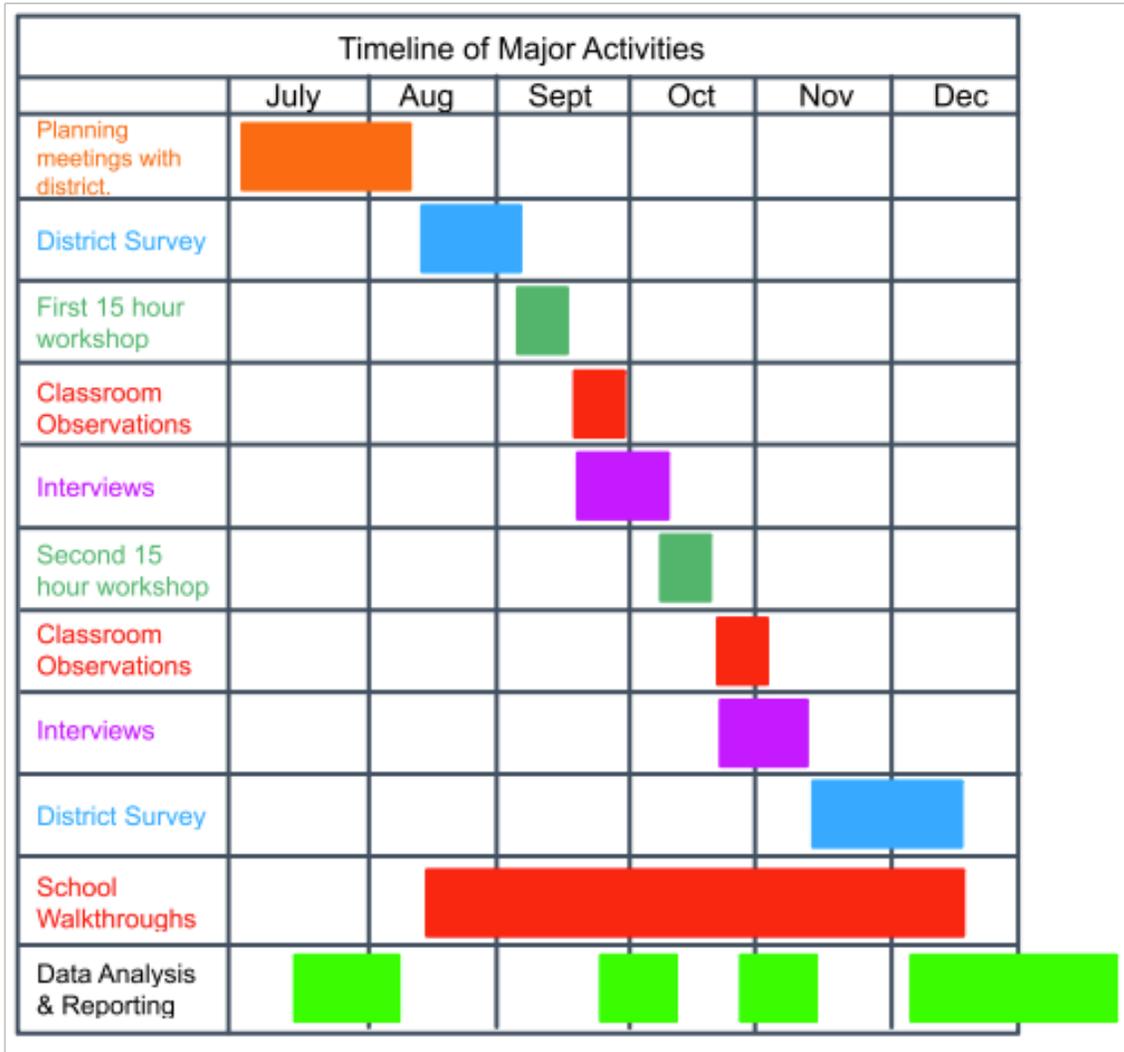
### Threats to Validity

Since I am giving the workshop and observing/interviewing I would need to be highly cognizant of experimenter bias so that I do not make connections, see growth that is not there or support the SAMR group in additional ways to promote success. The survey also has several threats to validity. Testing would be avoided by completing the survey several months after the first survey. As discussed, relying on self-reporting can threaten validity. The blend of quantitative and qualitative methods to balance this information will serve to lessen the threat. History would also be a threat given teachers are continually involved in professional development at a district level and individually. Questions of additional PD could be included in the final survey and interview to determine additional PD that may have occurred.

### Quantitative and Qualitative Interconnections



**Schedule of Activities**



## **Discussion**

### **Relationship to Literature**

This study will attempt to address some of the problems in the literature related to overreliance on self-reporting by including quantitative and qualitative data to balance and check for validity. To date most professional development focuses on integrating technology, which often results in layering technology on top of existing practice. This research will explore whether teachers require an explicit model to clearly defines where they need to be, and then provides the support to get there.

### **Significance and Possible Implications**

Given there are dozens of different barriers to the implementation of technology this study may follow one of several scenarios.

- There is no change between the groups and as such the use of a model does not impact a change in teacher practice
- Teachers are aware of the different levels of change but there is no change in their behaviour
- There is a small change in both teacher awareness and practice
- There is significant change in both teacher awareness and practice

Regardless of the outcome, the information will be valuable in that billions of dollars are spent on professional development each year in the US (US Department of Education) - numbers unavailable for Canada. Helping to define what works is important given that little to date has worked to move teachers into the transformational use of technology. In addition to helping validate a change in teacher practice, the surveys and interviews (self-reporting) balanced with

the observations and walkthroughs, will help determine how accurate teacher self-reporting is.

This is a noted concern in research. This approach would help confirm whether teachers are identifying their strengths and needs accurately or if they are mistaken in their technology related abilities.

As noted in the literature PD has been ineffective. Even strategies that are “researched-based” have failed to create constructivist, student centered learning with “technology-enabled learning.” There is also question as to whether teachers know themselves and can self-assess or whether, due to pressure or a need to be “on top” they assess higher than their current skills.

### **Further Research**

Based on this study recommendations for further research include:

- Replicate the study with a larger population of teachers both including or excluding the SAMR model
- Replicate the study with additional teachers both inside and outside the districts
- Do a follow-up study with the teachers involved either offering an additional course or through survey and observation of current practice
- If sample size for qualitative research was unequal or diminished due to mortality, have a larger group
- Include assistances to participate and observe. These individuals will help with both the volume of data and perhaps better assess bias in the presentations
- Include student data in the research. This adds significantly to the time and scope of the study but if PD is to improve student learning then this needs to be considered within a large-scale study

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## Appendix

### Survey Examples

<https://docs.google.com/spreadsheets/viewform?fromEmail=true&formkey=dEpvbHBFbUJmb0IEd3ltRDFidzF4dWc6MA>

## Teacher Survey

Please rate how often you perform the following National Technology Standards for Teachers.

\* Required

Name

**Promote, support, and model creative and innovative thinking and inventiveness. \***

1 2 3 4 5

Extremely Rare/Never      Always/Most of the Time

**Engage students in exploring real-world issues and solving authentic problems using digital tools and resources. \***

1 2 3 4 5

Extremely Rare/Never      Always/Most of the Time

**Promote student reflection using collaborative tools to reveal and clarify students' conceptual understanding and thinking, planning, and creative processes. \***

1 2 3 4 5

Extremely Rare/Never      Always/Most of the Time

**Model collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments. \***

1 2 3 4 5

Extremely Rare/Never      Always/Most of the Time

### LoTi Digital-Age Survey for Teachers

#### Question

Which category best describes your primary subject/specialty?

Which category best describes your primary grade level?

How many years of experience do you have in education?

What do you perceive as your greatest obstacle to further using technology in your instructional setting?

How often are you (the teacher) using **digital tools and resources** during the **instructional day**?

How often are your students using **digital tools and resources** during the **instructional day**?

- 1 I consider how my students will apply what they have learned in class to the world they live when planning instruction and assessment strategies.
- 2 I prefer using standards-based instructional units and related student learning experiences recommended by colleagues that emphasize **innovative thinking**, student use of **digital tools and resources**, and student relevancy to the real world.
- 3 My students use the available **digital tools and resources** for (1) collaboration with others, (2) publishing, (3) communication, and (4) research to solve issues and problems of personal interest that address specific **content standards**.
- 4 My students use the **digital tools and resources** in my classroom primarily to increase their content understanding (e.g., digital flipcharts, simulations) or to improve their basic math and literacy skills (e.g., online tutorials, content-specific software).
- 5 I use different digital media and formats (e.g. blogs, online newsletters, online lesson plans, podcasting, digital documents) to communicate information effectively to students, parents, and peers.
- 6 I model and facilitate the effective use of current and emerging **digital tools and resources** (e.g., streaming media, wikis, podcasting) to support teaching and learning in my classroom.

**Exit Ticket (Possible Reflection Questions)****Substitution:**

- What will I gain by replacing the older technology with the new technology?

**Substitution to Augmentation:**

- Have I added an improvement to the task process that could not be accomplished with the older technology at a fundamental level?
- How does this feature contribute to my design?

**Augmentation to Modification:**

- How is the original task being modified?
- Does this modification fundamentally depend upon the new technology?
- How does this modification contribute to my design?

**Modification to Redefinition:**

- What is the new task?
- Will any portion of the original task be retained?
- How is the new task uniquely made possible by the new technology?
- How does it contribute to my design?

From: <http://www.hippasus.com/rrpweblog/>