

University of Alberta

**Technology and Student Learning
by**

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Abstract

For educators to move into the twenty first century, they need to let go of the past and integrate aspects of technology which support student learning. This allows today's learners an opportunity to explore how to think and learn and not what to think and learn. There needs to be a pedagogical shift into teaching with technology and away from solely traditional practices. Teachers use technology in a variety of ways and to varying degrees. This was demonstrated through referencing the SAMR model. The keys to technological integration lie in incorporating technology into assessments, teaching digital literacy skills and utilizing technology more frequently in teacher education programs.

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Technology and Student Learning

Rational teachers change their minds based on new evidence and a desire to deliver the curriculum in a flexible and adaptable fashion. According to Howard (2013) "the availability of technology has significantly increased in schools, but teachers continue to struggle with, and at times seem resistant to, integrating technology in their practice" (p. 358). While students are offered several ways to display their knowledge of a given topic, challenges remain, such as when teachers are forced to revert to standardized assessments and substitute technology instead of reinventing student learning. Technology's educational potential will not be fully realized unless teachers embrace and understand how to use it effectively to promote deep learning (Fullan & Langworthy, 2014). Fabry and Higgs (1997) conducted a meta-analysis of the research available before the year 2000 relating to the use of technology and its impact on teaching. It was concluded that

positive effects exist throughout education (preschool through higher education), for both regular and special needs students in all major subject areas, 2) technology positively affects student attitudes toward learning and self-concept and 3) technology introduction enhances cooperation and collaboration, increasing teacher-student and student-student interactions. (p. 386)

Although dated, the research would seem to indicate a large number of educators integrate technology effectively into the classroom environment, and yet this does not seem to be the case. Despite Alberta having implemented the "Learning and Technology Policy Framework" (2013), teachers still fall back on traditional summative ways of assessing student learning, such as multiple-choice and true or false questions, which are seen as more valuable means of collecting student data. This is supported by the view of Irez and Han (2011), who state that

“research acknowledges that reform efforts often face resistance, particularly on the part of teaching staff” (p. 252).

This qualitative study aimed to examine technological integration into student learning. There are several ways of viewing the use of technology within the classroom, explained by the Substitution, Augmentation, Modification, and Redefinition (SAMR) model. My findings highlight which aspects of the SAMR model are most prominent in current classrooms, and then outlines themes and recommendations. There are many challenges in using technology in the classroom. As seen in Fabry and Higgs (1997),

Cohen points out that schools and the nature of teaching have remained relatively unchanged for hundreds of years. Therefore, any reform or policy that disrupts the stable nature of schooling represents a threat that will result in immense resistance. The tendency in schools is to assimilate anything new and threatening in a manner that causes the least disturbance. (p. 28)

Educational consultant Hayes Jacobs (2014) discusses three literacy types on which educators need to focus. The first is digital literacy, the second is media literacy, and the last is global literacy. The concept of digital literacy and connectedness to technology is important moving forward.

In traditional print literacy, it is understood that a teacher needs to be a highly competent language maker and user in order to prepare students well. Indeed one can't get hired as a teacher without this skill. Similarly, today, each teacher needs to work to become a connected educator who employs the three literacies in his or her professional practice to be both a model and guide for students (p. 61).

Fullan and Langworthy (2014) go on to say that deep learning is essential for creating engaged and modern thinkers. They state that digital learning is essential for creating learners that are prepared for the 21st century environment.

To assess the current practices of educators in the field I asked: How are excellent teachers using technology to enhance student learning? Subsequent questions to the research question included: (a) How are teachers currently utilizing technology in student learning? (b) How can technology be used to enhance student learning in the classroom? (c) What challenges do teachers face when using technology to enhance student learning? These questions were chosen because a variety of research supports digital integration into student learning. Eyal (2012), posited for “learners to function in the 21st century successfully, they will need skills in locating and acquiring knowledge independently; wise use of knowledge to solve problems; informed choice and critical evaluation, at the same time, while developing communication and collaboration skills” (p. 42).

Findings from the research elicited three themes for discussion. First, digital learning as an excellent way to promote deep learning and differentiation for all students. Second, where are teachers (and students) currently located on the SAMR model and how does this affect digital integration in the learning environment? Third, challenges in digital integration and how to overcome them. From these three themes I have made a number of recommendations for improving practice and digital integration within the classroom environment.

Significance of Research

Technology and the pace of digital change is rapid and ever increasing. Learning methods of the past industrial nation are no longer sufficient to prepare learners for the 21st century and the demands placed upon them. It is a failure of the system to continue to teach students using

outdated methods that neither encourage deep thinking nor engagement of students. One of the main barriers to effective technological integration remains the cycle of traditional teaching practices. This was demonstrated by Serhat and Çiğdem (2011), who stated, "[m]any teachers were educated with the conceptual framework and norms of the previous educational approach" (p. 253). This idea is reinforced according to Bhattacharyya et al. (2013) who state

students are subjected to curriculum using rote memorization and practice drills, the same outdated teaching methods that got them to this point. Then we wonder why so many low-income and minority groups suffer from low self-esteem and, in many cases, fail to graduate from high school. (p. 637)

This qualitative research explored the potential for further large-scale research in the area of technological integration and provided an impetus for teachers to embrace technology in the classroom. Granovetter (1978) discussed the idea of threshold models of collective behaviour and stated, "The individuals in these models are assumed to be rational, that is, given their goals and preferences, and their perception of their situations, they act to maximize their utility" (p. 1422). Many schools are still stuck in the conceptual framework of the factory model of education, yet, "[r]ecent technological transformations have unleashed new disruptive forces and are presenting challenges for educational leaders, especially leaders and teachers in schools" (Duignan, 2020, p. 1).

Teacher attitudes and perspectives related to how to integrate technology are a major concern if we recognize technology as an important driving force rather than an add-on and embrace it as necessary and an opportunity to display knowledge in non-traditional formats.

This qualitative piece of research is significant in understanding the themes and barriers associated with digital integration in the classroom, as well as providing a platform on which to

base further large scale research. As cited in Irez and Han (2011), Fullan (1991) argued “the core values develop[ed] by individuals over time regarding various aspects of education are difficult to change as such values are, often not explicit, discussed, or understood, but rather are buried at the level of unstated assumptions” (p. 263). When looking at the factors which lead to teachers leaving the profession, continually expecting new teachers to teach to a specific test in a specific manner is frustrating and could be a reason teachers leave the profession.

Literature Review

Traditional pedagogical practices are seen as necessary because they have been in place for so long. While researched and valid in the past, they are based on the industrial model of education in which we no longer reside (Fullan and Langworthy, 2014). Teachers are hesitant and sometimes resistant to change and technological integration. This is a cycle of comfortability and control. John Dewey said, "If we teach today as we taught yesterday, we rob our children of tomorrow" (as cited in Turkmen, 2006, p. 71). We are truly setting our students up for failure if we do not allow for technology in our teaching. If we want to meet students where they are, we need to move out of our comfort zone and into a new digital playground. This is best described by the statement suggesting children are considered "digital natives" and we (teachers) are the "digital immigrants" (Prensky, 2001). To engage with students, we need to be guided by the Teaching Quality Standard (TQS) 2(f); which states we need to be engaged in lifelong learning and focus on emerging technologies (Alberta Education, 2020). If teachers are unwilling to take "risks" and use technology to their advantage, they do not provide the best education for their students.

The literature shows one of the largest remaining barriers is teachers' attitudes towards the integration of technology. Teachers possess the time and resources to progress through the

Substitution, Augmentation, Modification and Redefinition (SAMR) model but find it difficult to overcome the barrier of losing control over their classroom during the exploration phase of technology-infused assessments. As cited in McFarlane (2003), “‘The Horseless Carriage Stage: replacing conventional measures’, Raikes and Harding address the difficulties of transition from conventional to computer-based high-stakes assessments. Equity and standards issues suggest that the safest route to progress is to computerize conventional tests” (p. 262). This safe route falls into the substitution category on the SAMR model. It allows teachers the ability to start down the path of digitizing assessments. Hamilton et al. (2016) examined the popularity of the SAMR model and critiqued its lack of theoretical explanation in peer-reviewed literature. The authors disapproved of how it treated technological integration as a ladder model where the further you progress, the better you are at offering technological integration and interaction for the student.

One of Hamilton’s et al. (2016) main concerns was the lack of detail on interpreting and applying the SAMR model. While this is seen as a disadvantage, it offers hesitant teachers the opportunity to adapt the model to suit their own comfortability with technology. The SAMR model is also adapted to fit multiple levels of teacher comfort with technology while not prescribing what has to be done at each level. This is reflected in and cited by Laffey (2004). Teachers’ adoption of technology has been frequently treated as a linear movement from an entry-level of developing awareness through appropriation and innovation, in which teaching roles and practices are transformed. The idea of linear progression again offers a narrow view and understanding of the use of technology and the idea of differentiation. Technology is meant to offer easy access to information for teachers to modify or adapt lessons to fit student needs. The use of Kolb’s model (1984) for experiential learning and the SAMR model together allows

teachers and students to work towards a common goal of assessment literate teachers and students who are developing skills and knowledge for the future. The definition used by software company PowerSchool (2021) appears to be the most appropriate, as they view SAMR as a model that ebbs and flows to meet the needs of students.

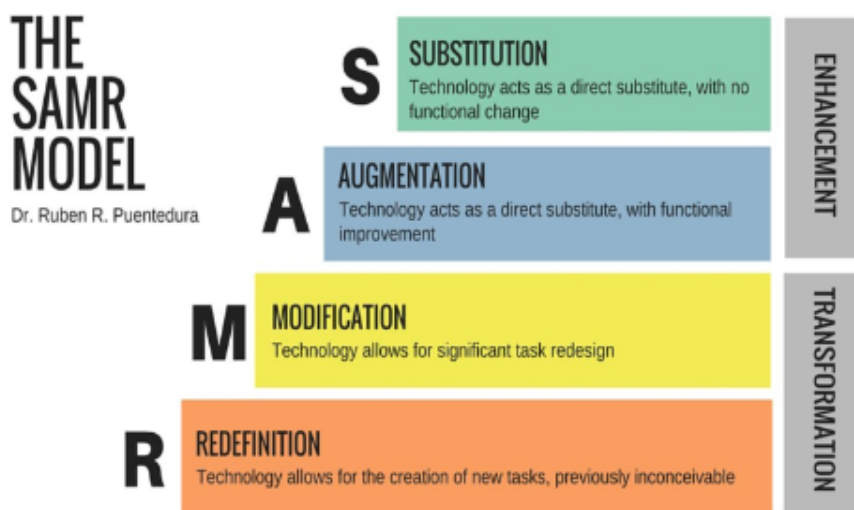
While we often visualize the SAMR model as a ladder or staircase as above, this can be misleading because Substitution (the bottom rung or step) is sometimes the best choice for a particular lesson. This is why it's better to think of the SAMR model more as a spectrum. On one end, technology is used as a one-to-one replacement for traditional tools, and on the other end, technology enables experiences that were previously impossible without it.

Similar to the PowerSchool definition, according to Edutopia (2020):

The SAMR model lays out four tiers of online learning, presented roughly in order of their sophistication and transformative power: substitution, augmentation, modification, and redefinition. When switching to an online format, teachers often focus on the first two levels, which involve replacing traditional materials with digital ones: converting lessons and worksheets into PDFs and posting them online, or recording lectures on video and making them available for asynchronous learning.

Figure 1

Substitution, Augmentation, Modification and Redefinition model



The SAMR model can help educators think about the role of technology in supporting learning.

Source: <https://www.edutopia.org/article/powerful-model-understanding-good-tech-integration>

Regardless of whether it is viewed as a set of tiers or ladders or simply four interconnected concepts available for digital learning, the flexibility of this model means teachers are able to determine which tier is most appropriate for teaching a particular concept.

Students are expected to integrate into an economy that is continually changing from technological disruptions and adapting to a new environment. Alberta Education (2013) notes that “due to the complexity and rapid rate of change in contemporary society, students will need to be flexible, creative and innovative as they adapt to the changes around them. Preparing students to become independent, lifelong learners with such a repertoire of competencies requires that education systems shift to student-centred learning” (p. 19). Students need to constantly learn new skills and decide which skills apply to their future. Fullan and Langworthy echo this further in *A Rich Seam: How New Pedagogies Find Deep Learning* when they state,

[d]igital access makes it possible for students to apply their solutions to real-world problems with authentic audiences well beyond the boundaries of their schools. This is the real potential of technology to affect learning- not to facilitate the delivery and consumption of knowledge, but to enable students to use their knowledge in the world (p 4).

Current research in the area of technological integration highlights the current state of digital resources in the classroom.

Only a few of the faculty used technology in any substantial way in their own teaching, and most faculty were reluctant to make students use technology in advanced ways.

When assignments promoting the use of technology are made, the instructors often provided options for how the work could be done without using technology. (Laffey, 2004, p. 368)

As cited in Fabry and Higgs (1997) “Marcinkiewicz believes that people avoid using computers because they fear a loss of status and hard-earned skills and do not have adequate knowledge” (p. 389). More recently, Johnson (2016) wrote “if teachers feel they do not have the necessary competencies when using technology, they may feel less in control of the class, use less technology, and be unlikely to explore new possibilities that utilize technology when designing their classes” (p. 11). Teachers and instructors are not transforming the way technology is used, but instead are using it to appease its placement in a curriculum written before the convergence of the internet, computers, and applications for educational purposes. This is why there is "a consistent tendency of the educational system to preserve itself and its practices by the assimilation of new technologies into existing instructional practices" in education (Demetriadis et al., 2003, p. 33).

In 2015, in *Exploring the Digital Divide*, Chen sent out surveys to principals of Ontario's K-12 public schools, which included a section on digital learning and technologies in schools. This survey helped provide some context for the geographic and curricular challenges created by the structure of the Canadian education system. Technological implementation is more difficult in areas where adaptation is not seen as a focus. For instance, each province is in charge of its own curriculum, resulting in a wide variety of approaches (Affairs, 2021). Each district is also responsible for implementing its own technology budget and professional development. Another issue can be found in network access, specifically in rural areas; this is also impacted by socioeconomic status as students bring this method of learning home. Although the information is dated back to 1997, the analysis showed access was a significant barrier to effective technology integration (Fabry & Higgs, 1997).

In "An exploration of teacher's use of iPads for students with learning support needs," Chambers et al. (2018) conducted online surveys of teachers from Australia, the United States, Canada and the UK (p. 75). In Canada, they had a response rate of 7.25%. The survey asked how iPads were used, in-class supports offered, demographics, and teachers' perspectives. Respondents in this survey indicated "that the iPad is supportive in engaging and motivating students who have a range of diverse learning support needs" (Chambers et al., 2018, p. 79). However, they also found the iPad was being used mainly in "the area of academic support (70%)," but less so "to teach communication (55%), social skills (42.5%), and particularly functional skills (21%)" (Chambers et al., 2018, p. 79).

According to Howard (2013), "the availability of technology has significantly increased in schools, but teachers continue to struggle with, and at times seem resistant to,

integrating technology in their practice” (p. 358). For teachers to feel more competent at integrating technology, one of the most efficient ways is to learn alongside their students. Demonstrating the skill of lifelong learning and being vulnerable helps establish rapport with students. Howard (2013) referenced Fox and Irwin’s (1998) research stating

exposure to the biases of others in judgement of risks may influence bias in individuals. As a result, certain technologies may be outright devalued in a subject area and determined by individual teachers to be not worth the risk of integration in their practice, or a technology may be over-valued in practice and inappropriately integrated in teaching. (p. 361)

The research indicated issues with technology in the classroom which might not be immediately apparent. One of these issues related to how a teacher’s familiarity or lack thereof can cause problems, as noted in “Young Canadians in a Wired World” (2012). Despite most students using devices almost constantly, they tend to use it all in the same way, “in spite of the fact that young people demonstrate a facility with online tools, many students lack the skills they need to use those tools effectively” (Steeves, 2012, p. 9). Another teacher noted students tended to believe misinformation they found on the internet and had to be educated about finding legitimate sources (Steeves, 2012). Some schools identified filters as one of their issues when trying to use the technology and being unable to access sites they were hoping to use (Steeves, 2012, p. 15). The above research reinforces pedagogical ideas surrounding digital literacy and the reinforcement of technology which serves a different purpose needing to be embraced by teachers who are comfortable using emerging technologies.

Steeves (2012) examined how students can use the internet to feel more connected to the world via Skype projects, but they also note a feeling of comfort has to be established in a

classroom to create an effective learning environment “when technological devices are used to dissolve the boundary between the classroom and the outside world, it is more difficult to create the trust that is central to this sense of community” (p. 20).

In a case study in a British Columbia school district, Derban and O’Neill (2018) examined technology disruptions in an elementary school. Disruptions in this case study were defined as issues teachers were forced to overcome in order to incorporate technology in their classrooms. This study focused on teachers who had previous teaching experience and were identified as “known to be enthusiastic technology-using teachers” to eliminate the idea where technology disruptions were not caused solely by “inexperience with lesson planning . . . , lack of technology access, or a lack of technical competence.” (Derban & O’Neill, 2018, p. 370). The participants took part in interviews relating to their use of technology in the classroom. In this sample of seven, all participants recalled at least one time when access to technology was an issue, such as sharing resources or a burnt-out lightbulb in a smart board projector, limited knowledge of how to use software or hardware or a device not connecting to a resource properly. Another category of disruptions was students not being able to use the technology properly or not being able to be trusted with it, as they were misusing the resource during class time. Parent concerns about the use of technology in the classroom oscillated between those parents who wanted to use the technology as much as possible to keep up communication between the school and parents who had concerns about their child’s screen time (Derban & O’Neill, 2018, p. 374). Lastly, teachers had concerns about time using devices and teaching their students how to use them versus time spent teaching correctly. In this particular case study, it found “personal problem-solving strategies were used to address smaller challenges of access such as too few cables or suitable apps” (Derban & O’Neill, 2018, p. 381). Less frequently, the teacher may

abandon the technology, which would lead to them seeking outside support for their issues afterwards. Examining these articles showed there appear to be varying degrees of success in technological integration in Canadian school districts.

Given the pervasive nature of technology in our classrooms, current day literature was more difficult to find than anticipated. Much of the literature was from the 1990s, and specificity was required to access newer studies.

Methodology

The data collection for this qualitative pilot study came from two semi-structured interviews with female respondents who both had five years or more of teaching experience. The interviews were conducted over Google Meet as it was the best available method to accommodate the facilitator and respondent schedules. The first interview was confirmed by verbal permission and then recorded and transcribed with the permission of the respondent. The interview lasted 40 minutes. During the second interview, rich conversation and insight into my topic of technology and assessment naturally flowed. Reflection and debriefing, which occurred after the first interview, helped to adjust the interview questions for the second interview. Feedback was sought from the first respondent on the nature of the interview questions and how they could be improved. Subsequently, the pauses in the first interview were examined with a mind to encourage further discussion. Instead of following the direction of Dewey (1910) relating to reflection, where he stated (a) a state of perplexity, hesitation, doubt and (b) an act of search or investigation directed toward bringing to light further facts which serve to corroborate or nullify the suggested belief reflection occurred by analyzing how the next interview could be more engaging and expand on the research questions and sub-questions. The impetus was to tackle the topic of technological integration and its use in teaching and learning because too

often, during Covid -19, it was observed that teachers simply digitized worksheets to send to students. They simply could not progress past the substitution phase of the SAMR model. To address my second research question, I focused on the perception of technology and its use as a tool to support learning as opposed to an integral part of daily exploration and discovery.

Respondent Group

Two respondents were included in the qualitative study. The respondents who participated taught different grade levels, one grade 5 in Peace River School Division (PRSD), referred to throughout as Michelle, and the other grade 9 math and science in Lakeland Catholic School District, referred to throughout as Tonia. Both of my interviewees were female and familiar with the use of technology in classrooms. My participant from PRSD had been a teacher for five years. She taught in Grande Prairie for a year and then moved to the Peace River area. She was transitioning from grade 5 to junior high school humanities. My other participant was from a school division North East of Edmonton. She had been a teacher for six years. She stayed within her division but did change schools. She went from an Apple distinguished school to a one-to-one Chromebook or I-pad school.

Findings

Throughout the semi-structured interviews, the purpose of qualitative research repeatedly was salient. According to Ellis (2006), “In qualitative research, the researcher's purpose is to learn the thinking and feeling behind people’s actions and in so doing to come to see how their thoughts are reasonable and coherent.” According to Merriam and Tisdell (2017), “collection and analysis should be a simultaneous process in qualitative research” (p.195). During the interviews, opportunities for organic questioning and discussion presented themselves and I was able to take

advantage of those opportunities to elucidate further understanding. The transcripts of the two interviews presented the opportunity for thematic analysis.

The findings from the two interviews can be broadly grouped into three categories or themes. The first of these is teachers are at various places on the SAMR model. The second theme is how the teachers in question used technology to differentiate for students effectively. The third is the significant challenges and barriers that remain with regard to effective technological integration.

SAMR

Understanding that the SAMR model was not specifically referenced in the questions asked of respondents, it nonetheless is salient in the analysis of responses. The SAMR model, or Substitution, Augmentation, Modification, and Redefinition model can be used to pinpoint the approximate stage of technological integration that a teacher is currently at, as well as to provide recommendations and performance indicators.

Substitution

My respondents frequently referred to instances where both they and other teachers used the substitution phase with technology, such as where Michelle stated “I don't think teachers are fundamentally changing how they do assessment by uploading worksheets to Google classroom to have students fill them in” (line 201). Tonia further echoes this when she stated “Sometimes for math, I'll give textbook questions and I'll just screenshot the questions, post it to classroom and they can put their answers” (line 341). They also referred to a lack of responsiveness on the part of teachers driving stagnation at the substitution phase, Michelle stated “I think that teachers aren't always super great at being responsive, The teachers that are just uploading those worksheets are often also the teachers that have like, September 18th file, folders with the

worksheets for September 18th on them” (line 207). This discussion further stated that the respondent felt some teachers simply prepared for the whole year ahead of time regardless of student bodies in front of them, without differentiating for student needs, and for those teachers, technological integration was simply a matter of digitizing what they already had created.

Augmentation

Augmentation was also referred to during the two interviews. This concept was not referred to as frequently due to its availability and how easily it is to overlook the conversion of a traditional assessment into a digital one. The improvements could have been overlooked as they occurred frequently between the two respondents. Michelle referenced the fact she uses digital click and drag assignments, “I do use digital click and drag assessments and assignments all the time for math. I use them kind of across the board like the Google slides where you would share a copy, each kid would get a copy, and I find it especially at my grade level, it's awesome” (line 170). Both Tonia and Michelle referred to the use of digital augmentation for differentiation. Tonia stated “I have one boy, who's on an IPP, and he uses Google Read and write. So, he uses a lot of speech to text and a lot of bookcreator where he can do that speech to text for the questions because his writing he has a very difficult time writing. and then I can get that same assessment and get asking those same questions and get worthy responses that I can assess at the same level as everybody else” (line 286). This is an example of augmenting a traditional assignment to allow for digital response.

Modification

While modification was not referenced in depth, the concept was discussed by Tonia “We have given tests through Google forms before. Um, especially for modified tests where they

need recordings” (line 114). She also referenced how offering choice in response increased student engagement,

[b]ecause I know myself, I was more hands-on, more visual, and if I had to just sit and listen the whole time, nothing ever went through my mind. And so being allowed the opportunity to like, even some of my students, take notes via their computer, If that's what works best for them” (line 282).

Redefinition

While the respondents were not explicitly aware of the redefinition stage of the SAMR model some of their usage fit within the framework. Referring to increasing student understanding and engagement Michelle stated,

So instead of being like, Oh look, I have this Google slide and you can plunk in your answers on here. We're going to work on volume in this totally intuitive way. What is that going to look like? I think that's, you know, where things need to go with it is I think we need to say, hey what is working, what our kids doing out in this world and now how can we use that (line 277).

Although it was not explicitly stated, Michelle was operating in the Redefinition phase of the SAMR model. She goes on to say,

where you get the buy-in from the kids is, they know all this stuff is going on. They have twitch streams that they follow, all of this different stuff. So if we want to meet them where we're at, they're at. Hey, these skills will prepare you for this thing that you think you're going to do or that you want to do with your life, you want to be a youtuber. These are the skills you're gonna need (line 385).

With this quote Michelle tied together the ideas of redefinition and twenty first century learning. Tonia also discussed the idea of redefinition and student engagement, when she said,

The ecosystems unit. I had them do a sustainable dog house. Or sustainable house. And so they got to use a variety of different methods to do this and one of the options was Minecraft. And so a lot of the students that chose it. They had to build a house with certain measurements and then they use like the, the signposts and they put like, the windows are here to be able to get the sun in at this level and they were able to put all those like graphics throughout it and various things. And then they took a screen recording walking through it and explaining what each thing was and what each thing meant (line 363).

Redefinition was also identified as a risk taking pedagogy. Tonia referenced a learning opportunity which occurred when she redefined technology in her classroom. She stated,

the students were using this app that I wasn't called Thing Link that I wasn't a hundred percent familiar with. And one day I was like, you know what, we're gonna try this. And I put it up there and I was like, but I don't and I tied it into the assignment that I was giving them and the lesson and I'm like I don't really know how to use this app yet. Can somebody show me? And they were super engaged wanting to teach me something. And show me how to use this app and it's really cool because it's a app that you can put pictures and videos and they can click and it can send you to websites and like kind of all these things (line 325).

Redefinition was used as a learning opportunity for both teacher and students.

Differentiation

The concept of using technology to support differentiation and student engagement was a major theme throughout both interviews. Technology was frequently touted as an excellent way to remove barriers to learning and assessment. Technology also frequently increased student engagement by raising student interest in both subject matter and demonstration of learning. Tonia referenced becoming a Minecraft Education certified teacher and how it helped in her classroom.

Minecraft Teacher Edition. Whatever it is, Academy, whatever it's called. And I think allowing the kids to utilize those skills. Especially for games like that, like it helps build like coding and it helps build a lot of those creativity skills that sometimes they might not get and then it allows those students that might not be athletic or might not be the ones that are doing all of the extracurricular, stuff, still a chance to have that development in terms of skill and interest as well (line 290).

Michelle also referenced the use of Minecraft for education as a way to increase student interest.

And so they and because I play Minecraft, I knew how it worked. So I said look you got to have so many houses. You got to have fences. So the villagers don't get eaten. You have like you have to have this many structures you have to have this many crafting blocks. And so when they went in there to do that I got a beautiful project out of this kid. It was amazing” (line 413).

Michelle discussed differentiation further, also noting where it was successful digitally and how that was an improvement over analog assignments. She stated,

I think that a lot of times teachers still view differentiation as like you get Worksheet A and you get worksheet B and you're a low toad and you're a high flyer. And so we still

put kids in these ability groups that are really awkward and then kid, A looks over at Kid B and goes, Oh, why do they have the blue sheet? And I have the red sheet or whatever it might be, whereas digitally, I could give whole units of study or whole projects and I could just go in and modify the amount of content for certain kids or I could just embed all of that universal design So everything could have a video or everything could have all of these different pieces and then the kids could choose the way that they wanted to access that information. So for the kids that wanted to read it, it was there for the kids that wanted to watch the video. It was there for the kids that needed to do something a bit more hands-on. That was there but it wasn't it wasn't obtrusive or awkward, it was just Oh yeah. Hey, there's six questions here. If you do two, we'll call it good. Or I could just remove two questions from their slide altogether or, you know, and the livetime feedback (line 427 & 428).

Both respondents discussed how technological integration allowed them to differentiate for process, product and content accessibility. They discussed how access to technology in the classroom allowed them to meet the needs of all learners simultaneously.

Challenges and Barriers

I think that the learning curve is really and I think that teachers are always afraid that they're not doing a good enough job. And I think that they're afraid to take a risk because what if it fails, especially if they're not familiar with the technology to start, like if you're not the kind of person who picks up Minecraft on the weekend and plays. It could seem really intimidating to develop a whole unit around it (Michelle, line 286).

This quote highlighted some of the challenges and barriers identified by the respondents. The pace of technological change has accelerated drastically in the last thirty years. When asked

what aspects of your education degree prepared you for the use of technology in the classroom?

Michelle responded,

I think the fact that we use so much Google, Like, I think going into it comfortable with Google, especially between my first and second degrees, like the landscape shifted so dramatically between and I'm sure you found this as well, right between your first and second degree. The first degree, you did all your papers online, maybe but it was still like you did them on a word document and then had to go locate a printer (line 329).

She further responded that the degree did not prepare her for transitioning technology when she stated,

I think that tech was still viewed as an add-on like, Oh look, you can get a textbook online in PDF form. As opposed to, hey, we could do this fully integrated thing that allows kids to do you know, Hyperdoc style assessment (line 336).

Another challenge identified by the respondents was ensuring the students were on task and could be trusted to use the technology responsibly. Tonia referenced this when she said,

I think one of the biggest hurdles is trust that the students to be on task. Um, because it does take a lot of work to get those students to get to that level where it's like, okay, we're gonna actually do our work and not play games (line 337).

Even if students use technology appropriately Michelle identified technological competency as a challenge to full digital integration. She went on to say,

They need to have the ability to access the tech independently. So if they can't log on to

their Chromebook consistently or whatever it might be, if they can never seem to find the assignment or you have to walk them through, then they're probably more of a candidate to hang out with you and do their digital assignment with you (line 444).

The identified challenges and barriers were discussed by respondents as a possible reason for educators not freely moving among the different levels of the SAMR model.

Discussion

As will be discussed in detail below, the respondents answers largely followed the themes of the use of the SAMR model, differentiation and challenges and barriers to using technology in the classroom. These themes were present in the literature review and coincided with the respondents own use of technology in the classroom.

SAMR

The responses supported the idea that teachers' perceptions of technological integration is reflected in their perceived teaching style and how they think about technology use. When referencing the SAMR framework, it became apparent the respondents felt that most educators were stuck in the substitution or augmentation level of the model. Students are still working in the initial level of Bloom's taxonomy at the substitution level within the SAMR model, where they are required to remember or recall information. When looking at technological integration among educators within our division, there was varying comfortability with technology. Much of this aligns with Hu, Clark and Ma's study (2003) that "from a management perspective,... computer literacy matters and teachers must overcome some baseline learning curve beyond which their technology acceptance can be facilitated by training on more sophisticated technologies" (p. 235).

If we apply the concept of the SAMR model and base it on a continuum as opposed to a ladder model, the ability of students and teachers to integrate and utilize technology increases. If we stick to traditional practices and ensure our professionals are not given the opportunity and autonomy to incorporate technology into their practice, we may risk losing teachers to other fields which are not continually fighting disruptions and trying to force new methods into industrial practices. According to Clark (2012), as cited in Bhattacharyya et al. (2013) we may thus be depriving ourselves of genuinely gifted high-quality teachers, those who are not happy about teaching to the test. The concept of a teacher interacting in a digital environment was demonstrated by Eyal (2012), who stated:

a) The role of teachers who appreciates a digital learning environment is primary and significant; b) wise use of technological tools to assess learners is essential for the students, teachers, and for other students participating in educational processes; c) teachers in the 21st century prefer to use technologies that advance the assessment methods that emphasize the learning process, enable peer assessment and develop reflective abilities. (p. 44)

Reinforcing these skills will allow students to learn how to become self-paced and self-guided learners. They have the opportunity to explore and investigate questions in a flexible learning environment while offering students a choice in how to display their understanding.

Differentiation

If we define an assessment, according to Popham (2017), as “a formal attempt to determine students’ status with respect to educational variables of interest,” (p. 10) then in addition to increasing differentiation, technology-based teaching and assessment allow for more authentic learning experiences and assessments. When designing learning opportunities which

incorporate technology, teachers need to ensure they are comfortable with students taking control of the exploration and retrieval of information. The teacher is then responsible for ongoing learning evaluation, deciding if the experience achieved the desired goal and demonstration of learning. This should then lead them to adjust their teaching practice to ensure all students are benefiting from deep learning opportunities (Fullan & Langworthy, 2014). Data and evidence should be used by school leaders and all members of the system to inform educators of their impact on student learning and where to go next in their teaching (Hattie, 2015). It has been shown that differentiated math programs, relying on technology has a positive effect on scores as Arroyo, Park Woolf, Royer, Tai and English (2010) “show that a math-oriented, IT-based tutoring systems leads to improved student performance for middle school students” Burns, Kanive and Degrande (2012) showed similar results using computer delivery (Haelermans et al., 2015, p. 1163).

As identified above in the findings, the respondents indicated technological integration led to deep learning opportunities and successful differentiation (Fullan and Langworthy, 2014). By providing students with redefined digital learning opportunities we are truly preparing them to be twenty first century learners.

Challenges and Barriers

The respondents identified a lack of preparedness in their teacher education programs as a challenge in integrating technology. This means integrating technology has been largely a matter of professional development on the part of individual teachers. This lead to teacher hesitancy. Teacher hesitancy relates to the willingness of teachers to step out of their comfort zone and grow as professionals. Access to technology has increased and has largely been removed as a significant barrier. The next progression comes in changing teachers' mindsets and

helping them see technology as an essential part of teaching and learning instead of an add-on or gimmick. Comfortability stagnates growth, as is seen in Johnson et al., (2016) “Perhaps the most common reason mentioned by teachers for not actively integrating new technologies is that many teachers are satisfied with their current lesson plans” (p. 14). Shifting a mindset is difficult when you have not been exposed to the benefits of technology and continue to see it as another addition to your regular workload. According to Hermans, Tondeur, van Braak, and Valcke (2008, as cited in Johnson et al., 2016) “more traditional educational beliefs have been related to less integration of computer-based technology in classrooms” (p. 12). Teacher hesitancy and reluctance can be related to where teachers place on the SAMR spectrum. If teachers are confident in their ability to practice professional autonomy and create technological assessments, this will allow them to make mistakes and engage in lifelong learning. Serhat and Çiğdem (2011) supported the concept, “[a]s in paradigm shifts, large-scale educational reforms bring new conceptual frameworks, introduce new educational aims and views on how people learn, require to adopt new teaching and assessment approaches and materials, etc” (p. 253).

To see significant disruption in teachers' pedagogical practices, we need to have a distributed leadership model where the traditional teaching and learning roles are redefined. This concept was discussed by Duignan (2020) where he expressed the notion in

Educational leaders and their colleagues may need to suspend, even discard, many of their hard-fought-for assumptions about the way things have been in the past, even if successful, in favour of seeing people and change cycles as having potential for new creative energies. (p. 60)

Lifelong learning is a goal which most teachers ascribe to, but generally, we build upon the knowledge that we already have. This can make it difficult to create better practices from

disruptions. This is also referenced in Duignan (2020) “Emerging disruptions and technology-inspired changes and advances require educational leaders and reformers to see old educational landscapes with new eyes – Millennials already possess such visionary views and have growth mindsets to match” (p. 5). Traditional assessment still works, of course, but has limitations that technology can help manage, such as better and more efficient differentiation methods, which will be explored in more detail below.

It is also important to consider, screens are where students are most comfortable in these times and providing assessments in this format helps us to engage them with what they already know. When students are engaged with the material and have the freedom to interact with it in the format they are most accustomed to, they feel empowered to explore and learn. "There is clear evidence that using classroom assessment for learning and involving students in their own assessment improves learning" (Hill, 2011, p. 347). The use of digital assessments allows for a rich and fulfilling experience; however, it is not standard practice yet. Teachers need to be risk-takers, and administrators need to be supportive of those who take risks. Without administrator support, efforts will be idiosyncratic to particular teachers and classrooms. It seems like the time for institutionalized practices needs to be replaced by evidence-based best practices for students in education. If our goal is to create learners for the future, which is uncertain at best, we need to stop looking to the past for answers.

With educational leaders using evidence-based practices, a school which properly integrates technology has the opportunity to engrain an academic culture that endures and evolves with future disruptions instead of pushing them to the fringe and staying with an outdated method of standardization and industrial education.

Research Conclusions

My original questions were to understand: (a) How are teachers currently utilizing technology in student learning? (b) How can technology be used to enhance student learning in the classroom? (c) What challenges do teachers face when using technology to enhance student learning? The SAMR model helps to gauge the first question. Teachers, especially since COVID-19, have learned to digitize resources, and start to use technology such as Google Forms to give assessments and teach students. The second part of SAMR, augmentation, was evident with the respondents as they used technology to differentiate the assessment for each student and to provide alternative methods of response such as Read Write Google or videos to learn information. Each respondent was moving into the modification and redefinition part of the SAMR model by using Minecraft for education to transform their teaching and providing deep learning opportunities for students. It is evident from both research and respondents, technology is being used in the classroom, but each teacher is employing it differently and to different degrees; as written by Howard (2013), “each teacher uses and integrates technology differently. This relates to the basic understanding of what the word proficiency means to each individual teacher” (p. 361). Keeping in mind we call technology a *disruption* for a reason, as it is a large change in what we have traditionally done. As such, we should not expect it to be an overnight switch, but the switch is occurring regardless of our individual practices. Leaders are not meeting LQS 6 of providing instructional leadership if they are not “facilitating the use of a variety of technologies to support learning for all students” (Alberta Education, 2020, p. 4).

This moves us into part b of our question. Teachers are using technology to enhance student learning by making learning more engaging and meaningful, such as using Kahoots, Gimkit or gamifying the classroom. The respondents were well versed in technological use and

were willing to try new ideas in the classroom. Research showed consistently teachers were willing to employ technology but were hesitant if they were uncomfortable with the technology and did not want to invest extra time into augmenting lessons. It would seem this takes a mind shift on the part of teachers to be willing to learn alongside the students, which brings us to the third part of our question.

Alberta has instituted the “Learning and Technology Policy Framework” (Alberta Education, 2013), but this policy is not the same as a new curriculum designed to incorporate technology to enhance student learning. The onus has fallen to teachers to decide when, how and where to incorporate technology into their lessons. Some teachers are hesitant to do this for a variety of reasons, such as time constraints, worry about loss of control, unfamiliarity and loss of lesson time if technology does not work, among other reasons. Using technology to create new experiences can be engaging for students who are *digital natives*, but teachers are left to weigh the pros and cons of use. The curriculum does allow for teachers to implement technology, as seen from the respondents remarks, but requires teachers to figure out how. Some teachers will work well with this freedom, others, as shown, will revert back to what they know. The issue of how competently teachers can mitigate the challenges of technological integration continues to be a difficulty and almost acts as a gateway into incorporating technology into the classroom. The respondents demonstrate that it is possible to integrate new technologies into the classroom to provide learners with the tools and education they need for the twenty-first century even if at first the teacher is unfamiliar with the digital opportunities being utilized.

Recommendations

During my relatively short educational career, I have seen technology be used as a tool for change. When evaluating our role in the educational landscape, building off of what has come before is essential.

The 1980s and '90s were characterized by roller-coaster economic conditions, dramatic political ideology and leadership swings, and an eroding consensus about societal values in many countries. Public confidence in institutions was eroded, while mistrust of public figures escalated, triggering an irresistible demand for greater accountability in public institutions of all kinds. (Leithwood et al., 1999)

Accountability should be non-negotiable. Educators have a duty to our students and their parents to provide an education which fits into the curricular outcomes outlined by the Government of Alberta and allows students to explore both sides of an argument and confront their confirmation bias. Students whose teachers lack the fortitude to implement further technological integration and be flexible with the SAMR model are prioritizing comfortability over understanding and mastery of outcomes. According to Bhattacharyya et al. (2013), students are subject to a curriculum which encourages rote memorization, practice drills and the same outdated teaching methods which got them to this point of teaching to the test. They also pointed out how the American model of education with increased standardization is failing compared to systems that promote problem-solving and differentiation. They stated the “US educational programs ranked 17th out of 50 other countries. The US was out-ranked by Finland, South Korea, Hong Kong, Japan, Singapore, the UK, Canada, and Germany, to name a few” (p. 637). This clearly shows in order for students to be successful a new way of teaching and learning must be adopted

compared to the industrialization model. Technology is omnipresent in society and students expect and deserve learning opportunities which prepare them for the world that they live in.

Teachers need to continually reference the TQS (Alberta Education, 2020) 2(f); they need to be engaged in lifelong learning, place a higher focus on emerging technologies, and push past the idea of remaining comfortable. Comfortability clearly leads to complacency, which in turn leads to stagnation. When reflection against the TQS, SAMR model and Bloom's Taxonomy is not utilized, one of the problems that occur relates to Vygotsky and his constructivist theory of Zone of Proximal Development "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem-solving . . . in collaboration with more capable peers" (1978, p. 86). When referencing content and curricular knowledge with the survey respondents, this quote by Wahlstrom and Louis (2008) was noteworthy, "pedagogical knowledge and skills provide the basic building blocks for instruction, but workplace factors also affect student learning. Among these are teachers' job satisfaction, a sense of professionalism and influence, collegial trust, and opportunities to collaborate" (p. 460).

According to Lovett (2018), "Recognising that expertise resides amongst multiple players, Coleman (2011) reminds us of the increased research interest in collaboration, specifically how to work in and maximize partnerships around a collective moral purpose, which for schooling, emphasizes that professional decisions are made in the interests of students" (p. 74).

Specific recommendations for school divisions are to develop a culture of collaboration and expectation regarding technology. There are opportunities for less experienced teachers to learn from more experienced educators technologically speaking, but for this to happen an

expectation of collaboration would need to be standard practice. Sharing digital resources and ideas for integration removes some of the risk associated with trying new technologies.

Further, providing time and training on specific technologies and how to integrate them effectively to redefine student learning is essential to increase adoption among educators. Having dedicated resources available to teachers so they can use and interact with them to increase comfortability will lead to increased efficacy with technology.

Moving forward in a digital age where information is readily accessible but not necessarily reliable, educators need to adapt and embrace non-traditional practices of assessment. Digital literacy and critical thinking are two of the most important skills teachers can teach and practice with students. If the traditional assessment model is to be disrupted, there needs to be a focus on the leadership aspects of schools. Principals need to be drivers of change. According to Moss (2013), "administrator leadership is known to be critical for school reforms, including a change to more formative, learning-oriented assessment practices" (p. 205). Teachers tend to be resistant to change that comes from the top-down "perhaps an innate dislike for change (especially change mandated from above) is the most basic and significant barrier to technology integration" (Fabry & Higgs, 1997, p. 388) and see it as another piece of work added to their plate. One of the reasons this concept of disruption is not seen as an opportunity is due to the repeating cycle of education and teacher familiarity with technology from pre-service teaching. Many teacher education programs have no training on the effective integration of technology, and this appears to be a lack of familiarity. This is because "[m]any teachers were educated with the conceptual framework and norms of the previous educational approach" (Serhat & Çiğdem, 2011, p. 253). This makes technological integration and how we interact with information even more critical. With the emergence of digital manipulation of media, creating a group of critical

thinkers that are curious and determined is more important now than ever. The old method of stand and deliver did not offer the same opportunities to explore the material personally or offer the ability to come to the desired conclusion in a way that was not prescribed. Moving forward, students will continue to spend enormous periods of time online and interacting with their peers and information in a digital environment. To better understand and assist students, educators need to meet them where they are, and this means teachers and professors need to start taking risks with technology and how it can be seen as a tool for assessment and not a new form of note-taking. When teachers feel supported by their administration and have the confidence to use their professional judgement, they can use the SAMR to help them gain confidence and competency when using and integrating technology in their pedagogical practices. "I don't use PowerPoints, stuff like that. I can see the relevance, but the risk of impending failure..." (Howard, 2013, p. 367). To move forward, educators need to remove their identity from their educational training and focus on having students construct their understanding in a digital format. The teacher is not the knowledge keeper but is a promoter of curiosity and helps encourage students to become more involved in their education. A lack of risk-taking can be attributed to self-preservation. Without taking technological risks, there is no fear of failing with technology, despite not meeting the requirements of the Teaching Quality Standards (Alberta Government, 2020). Technological integration in assessment practices needs to be embraced and utilized instead of incorporated into basic substitution and augmentation. According to Tony Seba, if "you don't participate in the new opportunities afforded by the disruption, you miss out on the massive potential to transform how products or information is perceived" (Seba, 3:07-3:12).

Technology should be used to offer students differentiated and individualized programs to help them be successful. Teachers are very focused and often excel in their explanation of a topic or concept but lack the willingness to give up control during the exploration stage. Further research is needed both to determine the full extent of challenges facing educators in successful technological integration as well as measures needed to ensure those challenges can be overcome. Only through deep learning and digital opportunities can we fully prepare students for the world we live in.

Personal Reflections

Thus far in my use of technology in the classroom, I have had students create a cooking show to discuss the concepts of globalization, where they named and defined the ingredients and how they interacted with one another. I had a student animate the Rhoynan genocide, and I have also had students use their cellphones and walk around our village to find the influences of globalization. I have received outstanding work in each of these instances, and my students were demonstrating high levels of understanding and engagement. During Covid-19, I also gave a student a single-question take-home exam. She answered the question, “Identify and predict where and why genocide can occur during your lifetime?” This offered her the opportunity to display higher levels of understanding such as analysis, synthesis and application according to Bloom's Taxonomy. By incorporating multiple forms of digital integration, students are given the best opportunity to show mastery of learning outcomes.

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Appendix A

Interview Schedule

Type 1 Questions - Experience and Behaviour

- A) What forms of digital assessment are you currently using in your classroom? If they differ from your analog assessments what do you perceive to be the benefits of these assessments?
- B) Consider the following scenario - Tell me your thoughts on letting students complete a unit that was all online and you only did instruction based on student needs? (Students would colour code areas they felt were challenging. (Red/Yellow/Green)
 - a) For example, in A hyperdoc where students watch videos, reflect on what they learn, fill out quizzes that relate to what they watch, create audio recordings of their answers to questions, they are able to create and post their own videos, they create a project in class and discuss the project through a video of their own.

Type 2 Questions - Opinion and Values

- A) Where do you feel technology is being used to its fullest potential either inside or outside of education?
 - a) In fields where technology has improved that industry, how can education use their method?
 - b) What do you think teachers need to know about how technology is being used well in classrooms?
 - c) In your opinion what are the biggest hurdles teachers face when integrating technology into their classroom and using it for an assessment?

Type 6 Questions - Background/Demographic

- A) What aspects of your Education degree prepared you for the use of technology in the classroom?
- a) If you could have learned something that would have prepared you better, what would it have been?
 - b) When you use technology how is that or is that not supported by the organization you are with?

Concepts covered in Interview #1

- Teachers were able to differentiate instruction based on student assessments.
- Data generated from digital assessments is easily accessible and valuable when using it to back up claims for parents to see.
- Allows students to engage visually
- Allows students to become more independent learners.
- Digital assessment allows students to display knowledge in more than just written formats.
- Changes needed during the pandemic to give teachers administrative privileges over their google meets. (Students could keep google recordings if they were the first one in the meeting)

- Math is hard to translate to digital assessment (click and drag seems to be acceptable for grade 5 teacher)
- Transitioning a bad assessment from analog to digital does not improve the assessment.
- Teachers aren't always comfortable using technology for assessment and it feels more acceptable/traditional to give a worksheet.
- Analog assessment has its place to create a baseline of where students are.
- Online teachers vary in their responsiveness to student work
- Online work tends to suffer if not given direct instruction
- Not having kids in the room and teaching completely online was foreign and hard to keep students on task.
- Major shift even from the original degree.
 - Type out papers in word and find a printer, now it's shared through Google docs for feedback.
 - Allows for flexibility.
- Woefully underprepared for technology use in the classroom from teacher education programs. *Yeah, I think the big problem is that if we keep offering tech courses then we keep adding it in as an other option as opposed to this, this is the way the world is. You need to learn to adapt because your kids can run an iPhone since the time they were two,*
- But in reality, You can often find out what they understand out of a concept. A lot more if it's engaging for them anyways, I got some of the best work that I got all year out of my one kid last year, because we did a Minecraft map for perimeter

and area

Concepts/ Ideas covered in interview #2

- Allows for modified tests and fits what works well for students.
- More discreet than analog assessments.
- Fits in well with Universal Design
- Analog assessments used frequently in Math.
- Accommodations can be made on the spot.
- Guided until they acquired the appropriate skills to be more self directed/motivated.
- Allows for cross curricular integration and exploration.
- Offers more options for students to demonstrate their understanding.
- Letting go of control. Guiding students instead of delivering information to them.

Constructing knowledge. “It is hard to let go of that control in the classroom when it comes to using that technology and allowing them that freedom, because it is different than just standing and delivering.”

- Teacher was hands on visual learner (got interested when these were options as opposed to stand and deliver then make a poster.
- Digital assessments help students build relevant skills like coding and encourages creativity.
- Teachers should be eased into technology.
- Trust your kids and have clear expectations.
- Opportunity for students to teach the teacher how to operate a new app or specific technology.

- Biggest hurdle is trusting your students will be on task.
- Five months of steady use to even feel comfortable with technology
- More experienced teachers were more rigid and sceptical of the technology as they already had their assessments created.
- Did not create a divide between the techy teacher and the worksheet teacher.
- Allows students to problem solve.
- Teacher college painted a doom and gloom cloud over technology as it was being misused by professionals and was leading to lawsuits.

Appendix B Letter of Consent



UNIVERSITY OF ALBERTA

Adult Participant Consent Form

EDPS 509 Research Assignment: <insert your title>

Researcher: <Insert Your Name>

Date Range of Research: <Month Day, 202X - Month Day, 202X

I, _____ (name of participant), hereby consent to participate in the research, <insert your title>.

I understand that my participation includes:

- <data collection method and time commitment> with <insert your name>.
- <insert additional information including the fact the interview will be audio recorded>.

As per the Letter of Information, I understand that:

- My participation in this research is voluntary.
- I may withdraw from the research without penalty until <insert time frame>.
- All information gathered will be treated confidentially.
- No identifying information will appear on written representations of the data: pseudonyms or numerical coding will be used to convey the data.
- The data will be used for the purposes of completion of the Master of Education in Educational Studies (MES) program and may be used in future presentations and publications in the educational context.
- The plan for this research has been reviewed for its adherence to ethical guidelines and approved by Research Ethics Board 1 at the University of Alberta. For questions regarding participant rights and ethical conduct of research, I can contact the Research Ethics Office at (780) 492-2615.

Signature of Participant

Date

University of Alberta Ethics ID# Pro00096710

Educational Policy Studies

Appendix C Letter of Introduction



UNIVERSITY OF ALBERTA

Letter of Introduction - Individual Interview - Adult Participant

Your Name
Your University Department Address
Edmonton, AB T6G 2R3
123.456.7890
no_reply@example.com

Month Day, 20XX

Recipient Name
Recipient City, Province Postal Code

Dear <Recipient Name>,

I am a graduate student in the <Master of Education in Educational Policy Studies (or substitute your program details)> program at the University of Alberta. The purpose of this letter is to you to take part in a research assignment for my EDPS 509 Research Design and Data Analysis course. My assignment is intended to <insert a brief description of the purpose and scope of the research assignment>. Your participation would involve <insert participant's role in the research and the required time commitment>. Your participation is voluntary; there will be no consequence to you should you decline to participate or decide to withdraw from participating.

In order to gather data for my research assignment, I will be <insert a few sentences explaining data collection methodology>. The interview will be audio recorded and transcribed. Please note:

- You may choose not to answer any question.
- You may opt out of this research assignment once responses have been submitted. To do so, please submit your request by email by <insert date> and I will destroy all data.
- I will send you a transcription of the interview as well as a summary of the main points I understood you to make by email; you will have the opportunity to verify the accuracy of the transcription and my interpretation of it.

Should any concerns, complaints, or questions arise from your participation, you may contact me or my instructor, Dr. Jose da Costa (jdacosta@ualberta.ca).

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7-104 Education North • University of Alberta • Edmonton • Canada • T6G 2G5

Telephone: (780) 492-7625 • Fax: (780) 492-2024

All data will be handled in compliance with the University of Alberta Standards for the Protection of Human Research Participants:

- Participant names will not be revealed. To protect confidentiality, pseudonyms or numerical coding will be used in all written representations of the data.
- Hard copy data will be locked in <insert description> and will be destroyed on my completion of my graduate program.
- Digital data will be stored on my computer under a secure password-protected system and will be destroyed on my completion of my graduate program.
- Data will be used to complete my EDPS 509 course, my graduate program, and may be used in future presentations and publications in educational contexts.

Thank you for considering this invitation to participate in my research. If you wish to participate, please sign the attached consent form and return it to <insert how to return consent forms> by <insert date>. I have included two copies of the consent form: one is to be signed by you and the other is for your own records.

The plan for this research has been reviewed for its adherence to ethical guidelines and approved by Research Ethics Board 1 at the University of Alberta. For questions regarding participant rights and ethical conduct of research, you can contact the Research Ethics Office at (780) 492-2615.

Should you wish a copy of my research findings, I would be pleased to provide one on your request.

Sincerely,

<Your Name>

Graduate student in the <insert name of program>

Faculty of Education, University of Alberta

<Your Telephone number>

<Your Email address>

University of Alberta Ethics ID# Pro00096710

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E-mail: Jose.da.Costa@ualberta.ca