Preparing for 1:1 Technology: Impact on Collaboration, Instruction, and Student Learning

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PREPARING FOR 1:1 TECHNOLOGY: IMPACT ON COLLABORATION, INSTRUCTION, AND STUDENT LEARNING

by

Pamela R. Schwallier

A project submitted to the Graduate College in partial fulfillment of the requirements for the degree of Specialist in Education
Educational Leadership, Research, and Technology
Western Michigan University
August 2016

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PREPARING FOR 1:1 TECHNOLOGY: IMPACT ON COLLABORATION, INSTRUCTION, AND STUDENT LEARNING

Pamela R. Schwallier, Ed.S.
Western Michigan University, 2016

The purpose of this action research project was to examine how the preparation of a 1:1 technology initiative, through professional development and early access to devices, in secondary (6-12) schools affected personal computing skills of teachers as well as collaboration, instruction, and student learning. This study takes place at West Ottawa Public Schools where district educators received personal Chromebooks and had ongoing professional development throughout the 2015-2016 school year to prepare specifically for the successful adoption of the 1:1 technology model in the 2017-2018 school year. The district is able to provide personal Chromebooks for all students entering grades 7-12 in the 2016-2017 school year and expand to grades 6-12 in the 2017-2018 school year. A survey instrument was developed to assess how the technology-based professional development and early access to digital devices throughout the beginning phases of technology integration have impacted personal computing skills as well as collaboration, instruction, and student learning as demonstrated through teacher perception. Study findings suggest that there has been an overall positive impact on personal computing skills, collaboration, instruction, and student learning, but additional support and time is needed in specific areas to successfully implement the 1:1 technology model in a way that will meaningfully impact the educational process.
ACKNOWLEDGEMENTS

I would like to begin by acknowledging my advisor and committee chair, Dr. Dennis C. McCrumb, and committee members, Dr. Regina L. Garza Mitchell and Dr. Gregory D. Warsen, for their unwavering commitment and support throughout the research process. Their professional mentorship during this research undertaking led to the successful completion of this project. Additionally, I would like to thank my husband, Peter Schwallier, and mother, Rose Wiersma, for their encouragement, unconditional love, and the hours of help with our children as I completed this endeavor.

Pamela R. Schwallier
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CHAPTER I
INTRODUCTION

One-to-one (1:1) technology initiatives in K-12 school districts are changing the way teachers collaborate and design instruction and how students engage in the learning process. Many educators, policy makers, business leaders, and community members have recognized the need to move beyond traditional methods of instruction and move towards a model that incorporates technology in a manner that will prepare 21st century learners for a fast-paced, global economy driven by technological advances. For this study, the term 1:1 technology initiative is understood as a model where every student and teacher has a computing device purchased by the school district that may be in the possession of the students and teachers at all times. While in the school buildings, students and teachers have access to the Internet through the school’s wireless network to facilitate and enhance the educational process. Students and teachers are able to continue the educational process using the devices anytime of day where Internet access is available.

While technology has been shown to enhance instruction, opportunities for differentiation, and communication, it is how it is used and not the technology itself that increases student understanding of the content (Donahue, 2014). As West Ottawa Public Schools prepares to adopt a 1:1 technology model, as supported by the community through a bond, leaders recognize that pedagogy must come first and teachers must be adequately trained and prepared to use the technology in a meaningful way that will positively impact instructional design, collaboration, and ultimately student learning. In order to most effectively transition to a 1:1 model, research-based methods must be
followed, data must be continuously collected and reviewed, and all stakeholders must stay focused on how technology can be a means to reach the greater goal of pursuing the mission of West Ottawa Public Schools to prepare all students to be college, career, and life ready.

**Purpose of Study**

The purpose of this action research project was to examine how the preparation of a 1:1 technology initiative, through professional development and early access to devices, in secondary (6-12) schools affected personal computing skills of teachers as well as collaboration, instruction, and student learning as demonstrated through teacher perception. The study addressed the issue of uncertainty regarding how the technology-based professional development and early access of digital devices in preparation for a 1:1 technology initiative impacted personal computing skills of teachers, collaboration, instruction, and student learning in secondary schools.

Specifically, West Ottawa Public Schools began the preparation for the successful adoption of the 1:1 technology model throughout the 2015-2016 school year in anticipation for the implementation to begin for grades 7-12 in the 2016-2017 school year and expand to grades 6-12 in the 2017-2018 school year. This preparation included early access to Chromebooks for teachers of grades 6-12 and ongoing professional development after school. Teachers attended 4, 2-hour, differentiated professional development sessions throughout the 2015-2016 that were coordinated by the Director of Instructional Technology and led by various staff members that were proficient in the respective areas. Topics of professional development included Google Drive, Google Classroom, YouTube, Chrome Apps and Add-ons, creating screencast videos, online resources, Flubaroo, and developing goals and activities for technology integration. This study examined the effectiveness of this preparation in the areas of personal computing skills for
teachers, collaboration, instruction, and student learning as well as provided meaningful implications for future professional development and support as teachers begin the process of fully adopting the 1:1 technology model.

**Significance of the Study**

As many school districts across the United States invest large sums of money into technology devices, professional development, and the infrastructure necessary to support a 1:1 technology model, it is imperative to have evidence to support this investment. In an era where school funding is highly regulated and often insufficient, it is important to design evaluation tools that can measure critical elements of financial investments. While studies have shown that teachers must have adequate time to learn how to use technology as well as how to facilitate learning through the use of technology before 1:1 implementation, further studies must be done on the effectiveness of the preparation (Schnellert & Keengwe, 2012). Therefore, this study furthers the understanding of the impact of the preparation of a 1:1 technology model and how this practice translates to personal computing skills of teachers as well as collaboration, instruction, and student learning.
CHAPTER II
LITERATURE REVIEW

While there has been a tremendous increase in public school access to the Internet and an increasing investment in various technology tools in recent years, it is imperative that these tools are being used to maximize their potential to positively impact student learning. As many schools begin to provide each student with a computer or device to support academic learning, educational leaders must carefully plan how to fully support teachers and students throughout the transition. Many benefits of 1:1 technology initiatives have been demonstrated including “higher achievement in writing, language arts, math, attendance, student behavior, project-based learning, and higher order thinking skills” (Schnellert et al., 2012, p. 36). The advantages of individual student devices with Internet access can go far beyond the classroom walls and the confines of a school day when used effectively. As Edwards (2013) emphasizes, relevant, personalized, collaborative, and connected learning experiences are possible through the use of technology and can “enhance student engagement, which in turn drives student achievement” (p. 23). In this digital age, technology integration is a critical element of K-12 education, but educators and administrators must be careful to not assume that the tools themselves will increase collaboration, impact instruction design, or increase student learning. Intentional planning, professional development, and ongoing data analysis and support must be integral to the successful preparation and implementation of a 1:1 technology model.

In order for teachers to provide opportunities through the use of technology in which students are able to engage in authentic performance tasks to address the 21st century needs, the varying levels of digital literacy amongst teachers must be accounted for and addressed. High quality professional development, differentiated support, and ongoing formative assessment of
individual computing skills, classroom integration, and overall use must be part of a larger plan to effectively plan for the full implementation of a 1:1 model. According to a study done by William Penuel (2006), “teachers who reported spending nine hours or more in educational technology professional development activities were more likely to report feeling well- or very well-prepared to use computers and the Internet for instruction” (p. 333). Additionally, the form of professional development and its alignment with standards and curriculum can impact its overall effectiveness. Studies have shown that teachers are more likely to integrate technology into content activities after attending professional development activities that were aligned with and relevant to their teaching (Penuel, 2006, p. 333). These professional development activities must be part of a school’s larger commitment to student learning. Teachers and administrators alike must understand and agree that the integration of technology alone is not the goal of a 1:1 initiative. Rather, technology is used as a more effective means to achieve a greater mission pertaining to student learning and the preparation of all students for a productive future in our global society.

While considering the diverse needs of teachers during professional development opportunities, an emphasis on high order thinking skills and a transformation of learning experiences, rather simply an enhancement, must be present. In order for the successful integration of Chromebooks, laptops, or tablets into 21st century learning activities to be maximized, transformative uses must be modeled, explicitly taught, and encouraged through professional development and instructional preparation.

The Substitution Augmentation Modification Redefinition (SAMR) model was developed by Ruben Puantedura (2013) to help evaluate and examine the levels at which educators and other professionals are using technology in practice. Teachers are able to use this model in the
classroom as they plan for instruction and evaluate instruction and learning. At the enhancement levels including substitution and augmentation, computers or devices are used to simply replace activities previously completed with paper and pencil or functionally enhance tasks by using tools such as spell checking. The goal for teachers should be to move beyond these levels and aim to reach the transformative levels of modification and redefinition that can significantly redesign the teaching and learning process. More specifically, in the modification dimension “technology allows for significant task redesign (processes integrated with email, spread sheets and graphing packages) while in redefinition dimension technology allows for creation of new tasks previously inconceivable” (Jude, Kajura, & Birevu, 2014, p. 106). This model, as seen in Figure 1, can help teachers strive towards higher levels of technology use and integration.

*Figure 1.* The SAMR model developed by Ruben Puentedura (2013). This figure illustrates the four levels of technology integration in the SAMR model.

In order to realize the greatest benefit of technology integration, teachers should be trained to utilize the SAMR model to develop academic tasks integrating technology beyond the substitution and augmentation levels and be challenged to truly transform learning experiences using technology resources within the modification and redefinition realms. This poses many challenges for teachers since it forces them to redefine the face of teaching and learning as they may have previously understood and experienced. Many teachers were not formally trained
with this level of technology integration and therefore face greater obstacles as they prepare for the effective adoption of a 1:1 technology model.

Simply using devices to replace a pencil and paper activity at the substitution, or possibly augmentation, level does not take as much planning, training, or teacher preparation, but it also does not necessarily result in increased student learning. Nor does the use of technology at these levels require a daunting level of digital literacy. In order to have the greatest impact on collaboration, instruction, and student learning with the integration of a 1:1 technology model, ongoing, high quality professional development must be provided to support educators in this innovative transition. As shown through a case study at Makerere University, putting any of the levels of the SAMR model into practice, “depends on the user knowledge of integration and availability of the tools” (Jude et al., 2014, p. 106). Not only do teachers need early access to the technological resources necessary in order to prepare for meaningful instruction, effective support of knowledge and skills must be provided. Many of today’s teachers may be considered digital immigrants while many students are now digital natives. Without adequate training and support for teaching staff, this conflict can perpetuate ineffective teaching and learning (Jude et al., 2014, p. 107). Increased learning outcomes, improved instructional design, and enhanced communication can only be expected after teachers are equipped with the knowledge, skills, and resources necessary.

With meaningful, targeted professional development and the purchase and maintenance of high quality resources, schools will be better prepared to effectively maximize the potential of a 1:1 learning environment, however further barriers may persist. Not only do teachers need additional knowledge and skills before implementing a 1:1 technology initiative, mental models, attitudes, and the beliefs held by all stakeholders need to be communicated, understood, and
challenged in order to ensure a shared vision for the initiative. Kotter (2014) suggests that leadership is about “creating a vision, empowering and inspiring people to want to achieve the vision, and enabling them to do so with energy and speed through an effective strategy” (p. 60). School administrators must foster these critical, complex conversations regarding attitudes and beliefs about technology integration. According to a 2012 study, “teachers’ own beliefs and attitudes about the relevance of technology to students’ learning were perceived as having the biggest impact on their success” (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012, p. 423). While resources and professional development are clear necessities of a successful implementation of a 1:1 technology initiative, it is imperative that the beliefs and attitudes of stakeholders are not overlooked. Furthermore, teachers have indicated that “internal factors (e.g. passion for technology, having a problem-solving mentality) and support from others (administrators and personal learning networks) played key roles in shaping their practices” in regards to integrating instructional technologies into pedagogy (Ertmer et al., 2012, p. 423). In the planning and preparation of the implementation of a 1:1 model, it is critical for both internal and external factors to be considered while focusing the stakeholders in the organization around the larger vision and mission.

Shifting mental models can be challenging, but if districts are to spend myriad resources establishing and maintaining the resources, skills, and infrastructure necessary to support a 1:1 technology initiative, educational leaders must be successful at harnessing supportive attitudes and beliefs about the integration of technology in order to realize the full potential of the added technology for student learning. According to a study done by Stanhope and Corn (2014), “teacher commitment (affective and behavioral) was related to the presence of a full-time technology facilitator” (p. 271). A technology facilitator may serve many roles including
providing support, professional development, resources, and cultivating a climate of teaching and learning by modeling its use, advocating for technology integration, and creating and maintaining a focus around the shared vision. While schools continue to struggle to meet the dynamic needs of students within the confines of the current school-funding model, it is highly beneficial for districts to employ a full time technology facilitator to lead the effective implementation of a 1:1 technology model.

While much preparation is necessary in order to maximize the benefits of one-to-one technology initiatives within K-12 education, with strategic planning, ongoing professional development, high quality resources and leadership, and a focus on the school’s overarching vision, the positive impacts can have transformational impacts on collaboration, instructional design, and student learning in order to best prepare diverse populations of students for 21st century demands. It has become evident that “teaching, learning, and technology work synergistically to provide effective and efficient knowledge transfer because educational technology helps teachers create learning contexts that were not previously possible with traditional teaching methods” (Wiske, Franz, & Breit, 2004). With the use of 1:1 technology models, opportunities are available to students and teachers that have previously been inconceivable. Educators must take advantage of these opportunities and maximize the benefits of the devices.

When technology is used effectively in classroom instruction, not only has an increase in student achievement been shown, it also motivates active student learning, collaboration, and cooperation with immediate teacher feedback and individualized learning opportunities (Eyyam & Yaratan, 2014). Not only are students more engaged in the learning process due to more attractive activities and positive attitudes towards the use of technology as shown in a 2014
study, the use of technology in lessons has resulted in students receiving higher scores on mathematical tests (Eyyam, et. al., p. 34). Not all students and teachers will hold positive attitudes regarding the integration of technology within the learning process and some may be resistant to change, but technology will indisputably be an integral part of K-12 education as educators prepare students with the 21st century skills of critical thinking, collaboration, communication, and creativity. Schools must prepare to adapt to the changing world around them and “no matter where teachers fall on the technology continuum, they must come to understand that 21st century literacy depends on the integration of technology into the curriculum” (Donahue, 2014, p. 28). It is not sufficient to merely trade a pencil and paper for a Chromebook, laptop, or tablet. Teachers must be supported, trained, and held accountable to effectively transform instructional design, through meaningful collaboration and communication, in order for the use of technology to be used as an opportunity to enhance pedagogy and ultimately increase student learning.
CHAPTER III

METHODOLOGY

The purpose of this action research project was to examine how the preparation of a 1:1 technology initiative at West Ottawa Public Schools, through professional development and early access to devices for teachers of grades 6-12, affected personal computing skills of teachers as well as collaboration, instruction, and student learning as demonstrated through teacher perception. West Ottawa Public Schools was chosen as the location of investigation due to the student investigator’s current employment within the district and an optimal time to conduct action research regarding 1:1 technology preparation due to the current adoption schedule.

West Ottawa Public Schools decided to adopt a 1:1 technology model for secondary staff and students after a bond was passed on May 6, 2014 to support the purchase of Chrombooks for staff and students in grades 6-12. Teachers were given Chromebooks in the fall of 2015, and professional development, named WO Tech Academy, was provided throughout the 2015-2016 school year. This professional development included differentiated sessions for staff to choose from based on interest and need. Areas addressed through professional development included Google Drive (Google docs, sheets, slides, forms, etc.), Google Classroom, Google Apps and Add-ons, educational websites and tools, and Basic Chromebook use. High school students in grades 9-12 will receive Chromebooks in the fall of 2016, and middle school students in grades 6-8 planned to receive Chromebooks in the fall of 2017. However, with current ideal pricing of Chromebooks and a healthy financial status of the bond, all students entering grades 7-12 will receive Chrombooks for the 2016-2017 school year. West Ottawa plans to expand the model to grades 6-12 in the 2017-2018 school year. The infrastructure to
support wireless Internet throughout the middle school and high school campuses was updated during the 2015-2016 school year.

The results of this study will be helpful to the district as they will provide evidence to not only show the effectiveness of the professional development that was provided during the 2015-2016 school year, but also impact the planning and implementation of future professional development during the beginning phases of the 1:1 technology model as it is adopted within the middle and high school buildings. Results will inform district leaders of the current level of personal computing skills of teachers as well as the amount of technology integration that is currently being utilized and how it has impacted collaboration, instruction, and student learning according to teacher perception. This information will provide meaningful feedback that can impact future planning for the implementation of the 1:1 technology model.

Participants

All certified secondary teachers during the 2015-2016 school year at Harbor Lights Middle School (6-8), Macatawa Bay Middle School (6-8), and West Ottawa High School (9-12), part of West Ottawa Public Schools in Holland, Michigan, were invited to participate in the study via email. Participation was voluntary, anonymous, and confidential. All secondary teachers, about 100 middle school (6-8) and 100 high school (9-12) teachers, were invited to participate; however, staff members in these buildings that were not classroom teachers were excluded from the study. A goal was to have at least 100 teachers participate in the study, but the study and data can be evaluated with fewer participants.

Instrument

This study used a survey created through Survey Monkey, Appendix A, to measure how the preparation of a 1:1 technology model, through professional development and early access to
devices, has impacted personal computing skills of teachers as well as collaboration, instruction, and student learning based on teacher perception. The survey contained 11 questions along with consent information preceding participation. A pilot survey was tested prior to data collection with five teachers in other school districts. It was apparent from the feedback that using multiple pages and subheadings would be beneficial to the participants. Because this would assist with the clarity of the survey tool, multiple pages and subheadings were included in the final survey. The pilot study confirmed that the tool will function appropriately and provide the intended data. While the student investigator is a qualifying participant as a secondary teacher at West Ottawa Public Schools, the student investigator did not participate in the survey to avoid influenced results. West Ottawa Public Schools also provided formal consent for the research to be conducted before data was collected. See Appendix B.

**Analysis**

All secondary teachers at West Ottawa Public Schools, 200 teachers total, were invited to participate in this study via email in May of 2016. See Appendix C. Survey data was collected anonymously using an online tool, Survey Monkey, as approved by the Human Subjects Institutional Review Board (HSIRB), to obtain data on personal computing skills as well as perceived impacts on collaboration, instruction, and student learning. See Appendix D. Responses were given using multiple-choice options and matrix style options using a Likert scale.

The intent of this study was to provide descriptive information to the school district as they continue the full implementation of a 1:1 technology model. Descriptive analysis of the data was conducted. This analysis included frequency and percentage of responses, weighted mean scores, standard deviation, and the range of scores for each question/ variable (Creswell,
Comparative analysis between middle school (6-8) and high school (9-12) participant responses was also conducted to determine possible discrepancies of effectiveness and plan for future professional development needs within the district.

**Limitations**

This study has some limitations. First, the results and findings are based on only 71 participants that voluntarily took the survey out of 200 secondary teachers total. Additionally, West Ottawa Public schools is undergoing the initial phases of the integration of a 1:1 technology model. At the time of the survey, professional development during the 2015-2016 school year was complete, but further professional development will be provided throughout the following year. It is important to emphasize that students did not have Chromebooks or devices during the 2015-2016 school year and not all classrooms had access to wireless Internet so the integration of technology-based skills and strategies were limited in the classroom. Students may have used personal devices or the limited devices in the schools found in computer labs and various classrooms during the 2015-2016 school year. Finally, results from the survey are limited since responses represent teacher perception on personal computing skills, collaboration, instruction, and student learning.
CHAPTER IV
RESULTS AND FINDINGS

Out of the 200 certified secondary (6-12) teachers at West Ottawa Public Schools, a total of 71 secondary teachers (35.5%) completed the voluntary survey for this action research project. Specifically, 31 middle school (6-8) teachers, 33 high school (9-12) teachers, and 7 teachers who teach both middle and high school students, grades 6-12 completed the survey. Table 1 shows the frequency and percentage of the teachers who participated in the survey.

Table 1

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>Total Teachers</th>
<th># of Participants</th>
<th>% Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-8</td>
<td>95</td>
<td>31</td>
<td>32.63</td>
</tr>
<tr>
<td>9-12</td>
<td>95</td>
<td>33</td>
<td>34.74</td>
</tr>
<tr>
<td>6-12</td>
<td>10</td>
<td>7</td>
<td>70.00</td>
</tr>
<tr>
<td>Totals</td>
<td>200</td>
<td>71</td>
<td>35.50</td>
</tr>
</tbody>
</table>

Current Technology Use

To better understand the current technology use within the educational setting at the secondary level at West Ottawa Public Schools, a Likert-type scale was used in the survey instrument to measure how often teachers currently use technology to collaborate for educational purposes, to plan for instruction, during instruction, and for student assessment (formative and summative). Participants were asked to select their responses on a Likert-type scale with answer choices including never, less than weekly, weekly, or daily. These results are important for contextualizing findings regarding the impact technology has had throughout the preparation process for the 1:1 technology model.

Of the 70 teacher participants that responded, 61 (87.1%) used technology to collaborate for educational purposes weekly or daily. Nine (12.9%) used technology to collaborate for
educational purposes less than weekly, and zero participants responded that they never use technology to collaborate for educational purposes. Results were similar for the frequency of technology use to plan for instruction and during instruction. Out of 71 participants that responded, 66 (93.0%) used technology weekly or daily while only 5 (7%) used technology less than weekly and 0 never used technology for planning instruction or during instruction. The frequency of technology use for student assessment declined. Only 4 participants (5.6%) responded that they use technology for student assessment daily while 23 (32.4%) responded they use technology for student assessment weekly. Thirty-four (47.9%) participants use technology for student assessment less than weekly and 10 (14.1%) never use technology for student assessment. Table 2 represents a summary of these responses. Figure 2 represents responses broken down by grade level taught by participants.

Table 2

*Frequency that Participants are Using Technology for the Identified Tasks (N=71)*

<table>
<thead>
<tr>
<th>Task</th>
<th>Never</th>
<th>≤ Weekly</th>
<th>Weekly</th>
<th>Daily</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P  %</td>
<td>P  %</td>
<td>P  %</td>
<td>P  %</td>
</tr>
<tr>
<td>Collaborate</td>
<td>0  0.0</td>
<td>9  12.9</td>
<td>28  40.0</td>
<td>33  47.1</td>
</tr>
<tr>
<td>Plan for Instruction</td>
<td>0  0.0</td>
<td>5  7.0</td>
<td>19  26.8</td>
<td>47  66.2</td>
</tr>
<tr>
<td>During Instruction</td>
<td>0  0.0</td>
<td>5  7.0</td>
<td>18  25.4</td>
<td>48  67.6</td>
</tr>
<tr>
<td>Student Assessment</td>
<td>10 14.1</td>
<td>34 47.9</td>
<td>23 32.4</td>
<td>4  5.6</td>
</tr>
</tbody>
</table>
**Figure 2.** Frequency of technology use by grade level. This figure illustrates a comparison of technology use between high school and middle school teachers.

### Personal Computing Skills of Teachers

Teacher participants were asked how the technology based professional development, named WO Tech Academy, provided during the 2015-2016 school year, along with the early access to Chromebooks, impacted personal computing skills according to his or her perception. A Likert-type scale was used to measure impact using five options: strong positive impact, slight positive impact, no impact, slight negative impact, and strong negative impact. There was no identified negative impact on personal computing skills in any area according to participant responses. The strongest positive impact on personal computing skills for secondary teachers was in the areas of Google Drive and basic Chromebook use. Table 3 represents a summary of

<table>
<thead>
<tr>
<th>How often participants use technology to collaborate for educational purposes</th>
<th>How often participants use technology to plan for instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Middle School</strong> (6-8)</td>
<td><strong>Middle School</strong> (6-8)</td>
</tr>
<tr>
<td><strong>High School</strong> (9-12)</td>
<td><strong>High School</strong> (9-12)</td>
</tr>
<tr>
<td>Daily</td>
<td>50%</td>
</tr>
<tr>
<td>Weekly</td>
<td>40%</td>
</tr>
<tr>
<td>Less than weekly</td>
<td>10%</td>
</tr>
<tr>
<td>Never</td>
<td>0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often participants use technology during instruction</th>
<th>How often participants use technology for student assessment (formative or summative)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Middle School</strong> (6-8)</td>
<td><strong>Middle School</strong> (6-8)</td>
</tr>
<tr>
<td><strong>High School</strong> (9-12)</td>
<td><strong>High School</strong> (9-12)</td>
</tr>
<tr>
<td>Daily</td>
<td>90%</td>
</tr>
<tr>
<td>Weekly</td>
<td>80%</td>
</tr>
<tr>
<td>Less than weekly</td>
<td>70%</td>
</tr>
<tr>
<td>Never</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 3: Summary of personal computing skills for secondary teachers.
these responses. Figure 3 represents responses broken down by grade level taught by participants.

Table 3

**Impact Participants Reported for the Identified Areas (N=69)**

<table>
<thead>
<tr>
<th>Area</th>
<th>Strong + (1)</th>
<th>Slight + (2)</th>
<th>No Impact (3)</th>
<th>Slight – (4)</th>
<th>Strong – (5)</th>
<th>Weighted M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Google Drive</td>
<td>36</td>
<td>52.17</td>
<td>27</td>
<td>39.13</td>
<td>6</td>
<td>8.70</td>
<td>0</td>
</tr>
<tr>
<td>Google Classroom</td>
<td>25</td>
<td>36.23</td>
<td>30</td>
<td>43.38</td>
<td>14</td>
<td>20.29</td>
<td>0</td>
</tr>
<tr>
<td>Apps &amp; Add Ons</td>
<td>13</td>
<td>18.84</td>
<td>34</td>
<td>49.28</td>
<td>22</td>
<td>31.88</td>
<td>0</td>
</tr>
<tr>
<td>Educational Websites</td>
<td>15</td>
<td>21.74</td>
<td>36</td>
<td>52.17</td>
<td>18</td>
<td>26.09</td>
<td>0</td>
</tr>
<tr>
<td>Chromebook Use</td>
<td>23</td>
<td>33.33</td>
<td>34</td>
<td>49.28</td>
<td>12</td>
<td>17.39</td>
<td>0</td>
</tr>
</tbody>
</table>

*Figure 3. Impact participants reported for the identified areas by grade level. This figure illustrates a comparison between high school and middle school teachers.*
Collaboration

Additionally, teacher participants were asked their perception of how the technology based professional development, named WO Tech Academy, provided during the 2015-2016 school year, along with the early access to Chromebooks, impacted collaboration (ease, quality, and/or amount), between teachers, administrators, and/or other school staff members, teachers and students, students, and teachers and parents/guardians. A Likert-type scale was used to measure impact using five options: greatly increased, slightly increased, no impact, slightly decreased, and greatly decreased. No responding participants identified a decrease in ease, quality, and/or amount of collaboration. The greatest impact was on collaboration between teachers, administrators, and/or other school staff members with the least impact on collaboration between teachers and parents/guardians. Table 4 represents a summary of these responses. Figure 4 represents responses broken down by grade level taught by participants.

Table 4

<table>
<thead>
<tr>
<th>Constituents</th>
<th>Greatly + (1)</th>
<th>Slightly + (2)</th>
<th>No Impact (3)</th>
<th>Slightly – (4)</th>
<th>Greatly – (5)</th>
<th>Weighted M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers/Staff</td>
<td>23 33.82</td>
<td>35 51.47</td>
<td>10 14.71</td>
<td>0 0.00</td>
<td>0 0.00</td>
<td>1.81</td>
<td>0.67</td>
</tr>
<tr>
<td>Teachers/Students</td>
<td>12 17.65</td>
<td>38 55.88</td>
<td>18 26.47</td>
<td>0 0.00</td>
<td>0 0.00</td>
<td>2.09</td>
<td>0.66</td>
</tr>
<tr>
<td>Students/Students</td>
<td>9 13.24</td>
<td>28 41.18</td>
<td>31 45.59</td>
<td>0 0.00</td>
<td>0 0.00</td>
<td>2.32</td>
<td>0.70</td>
</tr>
<tr>
<td>Teachers/Guardians</td>
<td>5 7.35</td>
<td>24 35.29</td>
<td>39 57.35</td>
<td>0 0.00</td>
<td>0 0.00</td>
<td>2.50</td>
<td>0.63</td>
</tr>
</tbody>
</table>
Figure 4. Impact participants reported on collaboration between constituents by grade level. This figure illustrates a comparison between high school and middle school teachers.

Instruction

Furthermore, teacher participants were asked how the technology based professional development, named WO Tech Academy, provided during the 2015-2016 school year, along with the early access to Chromebooks, impacted instruction according to his or her perception in the areas of lesson preparation (time it takes to plan and quality), the quality of the delivery of instruction, feedback for students (amount and quality), and assessment (quality and ease of grading). A Likert-type scale was used to measure impact using five options: greatly increased, slightly increased, no impact, slightly decreased, and greatly decreased. Nearly half of
responding participants, 29 out of 66 (43.94%), reported that technology has slightly increased the time it takes to plan lessons while the same number of participants, 29 out of 66 (43.94%), reported no impact on the time it takes to plan lessons. There were a few outliers that reported a decrease in the quality of lesson preparation, delivery of instruction, feedback for students, and assessment, but overall respondents reported an increase in quality in these areas or no impact.

Table 5 represents a summary of these responses. Figure 5 represents responses broken down by grade level taught by participants.

Table 5

*Impact Participants Reported on Instruction in the Identified Areas (N=66)*

<table>
<thead>
<tr>
<th>Areas</th>
<th>Greatly + (1)</th>
<th>Slightly + (2)</th>
<th>No Impact (3)</th>
<th>Slightly – (4)</th>
<th>Greatly – (5)</th>
<th>Weighted M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Preparation Time</td>
<td>4</td>
<td>6.06</td>
<td>29</td>
<td>43.94</td>
<td>29</td>
<td>43.94</td>
<td>3</td>
</tr>
<tr>
<td>Preparation Quality</td>
<td>6</td>
<td>9.09</td>
<td>39</td>
<td>59.09</td>
<td>20</td>
<td>30.30</td>
<td>1</td>
</tr>
<tr>
<td>Instruction Quality</td>
<td>3</td>
<td>4.55</td>
<td>37</td>
<td>56.06</td>
<td>25</td>
<td>37.88</td>
<td>1</td>
</tr>
<tr>
<td>Feedback Amount</td>
<td>7</td>
<td>10.61</td>
<td>26</td>
<td>39.39</td>
<td>33</td>
<td>50.00</td>
<td>0</td>
</tr>
<tr>
<td>Feedback Quality</td>
<td>7</td>
<td>10.61</td>
<td>22</td>
<td>33.33</td>
<td>35</td>
<td>53.03</td>
<td>2</td>
</tr>
<tr>
<td>Assessment Quality</td>
<td>10</td>
<td>15.15</td>
<td>14</td>
<td>21.21</td>
<td>41</td>
<td>62.12</td>
<td>0</td>
</tr>
<tr>
<td>Assessment Ease</td>
<td>7</td>
<td>10.61</td>
<td>18</td>
<td>27.27</td>
<td>34</td>
<td>51.52</td>
<td>7</td>
</tr>
</tbody>
</table>
Finally, teacher participants were asked how the technology based professional development, named WO Tech Academy, provided during the 2015-2016 school year, along with the early access to Chromebooks, impacted student learning according to his or her perception in the areas of quality of work, ability to retain information, active participation, amount of on-task behavior, and motivation/interest. A Likert-type scale was used to measure impact using five options: greatly increased, slightly increased, no impact, slightly decreased, and greatly decreased. No respondents reported any area of student learning as greatly decreased. There were a few outliers that reported a slight decrease in the quality of work (1 of 65 responses, 1.5%), ability to retain information (4 of 65 responses, 6.15%), and amount of on-task behavior (7 of 65 responses, 10.77%). The majority of responding participants reported either no impact or an increase in all areas of student learning. The greatest impact was on
motivation/ interest and the least impact was on ability to retain information based on teacher perception. Table 6 represents a summary of these responses. Figure 6 represents responses broken down by grade level taught by participants.

Table 6

<table>
<thead>
<tr>
<th>Areas</th>
<th>Greatly + (1)</th>
<th>Slightly + (2)</th>
<th>No Impact (3)</th>
<th>Slightly – (4)</th>
<th>Greatly – (5)</th>
<th>Weighted M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of Work</td>
<td>2</td>
<td>3.08</td>
<td>33</td>
<td>50.77</td>
<td>29</td>
<td>44.62</td>
<td>1.54</td>
</tr>
<tr>
<td>Retain Information</td>
<td>2</td>
<td>3.08</td>
<td>14</td>
<td>21.54</td>
<td>45</td>
<td>69.23</td>
<td>6.15</td>
</tr>
<tr>
<td>Participation</td>
<td>5</td>
<td>7.81</td>
<td>34</td>
<td>53.13</td>
<td>25</td>
<td>39.06</td>
<td>0.00</td>
</tr>
<tr>
<td>On-task Behavior</td>
<td>6</td>
<td>9.23</td>
<td>18</td>
<td>27.69</td>
<td>34</td>
<td>52.31</td>
<td>10.77</td>
</tr>
<tr>
<td>Motivation/ Interest</td>
<td>9</td>
<td>13.85</td>
<td>35</td>
<td>53.85</td>
<td>21</td>
<td>32.31</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Figure 6. Impact participants reported on student learning by grade level. This figure illustrates a comparison between high school and middle school teachers.
Planning for Future Professional Development

Because the implementation process is ongoing at West Ottawa Public Schools, further professional development will be provided during the 2016-2017 school year and beyond. The final question that participants were invited to answer on the survey instrument for this action research project asked teachers to identify areas in which they feel additional support to successfully implement the 1:1 technology model is needed. Participants were able to choose all areas that applied from the following choices: Google Drive, Google Classroom, Google Apps & Add-ons, educational websites & tools (Screencastify, Kahoot, Flubaroo, etc.), and basic Chromebook use. Additionally, participants could specify other needs pertaining to the preparation for the implementation of the 1:1 technology model not listed by typing responses. The greatest need reported was in the area of educational websites and tools (Screencastify, Kahoot, Flubaroo, etc.) with 41 participants (68.3%) responding that they need further support in this area. Additionally, 32 participants (53.3%) reported a need for further training with Google Apps and Add-ons. Most responding participants did not report a need for further training with basic Chromebook use with only 3 participants (5%) still desiring support in this area. From the open response section, a need for more time, department specific resources/professional development, and student access to devices were recurring topics. Table 7 represents a summary of these responses.
Table 7

*Frequency Participants Reported Additional Support Needed in the Identified Areas*

<table>
<thead>
<tr>
<th>Areas</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google Drive</td>
<td>11</td>
<td>18.33%</td>
</tr>
<tr>
<td>Google Classroom</td>
<td>22</td>
<td>36.67%</td>
</tr>
<tr>
<td>Apps &amp; Add-ons</td>
<td>32</td>
<td>53.33%</td>
</tr>
<tr>
<td>Educational Websites</td>
<td>41</td>
<td>68.33%</td>
</tr>
<tr>
<td>Chromebook Use</td>
<td>3</td>
<td>5.00%</td>
</tr>
<tr>
<td>Other</td>
<td>18</td>
<td>30.00%</td>
</tr>
</tbody>
</table>

- Time to collaborate with others in the same subject area to develop lessons and units using the tools we learned in professional development.
- Department specific programs and usage. We need the majority of district provided PD to be in this format, departments getting together to figure out how to ACTUALLY use technology in our classrooms.
- WiFi
- While learning about how to use technology with students has been helpful, what has NOT helped is the limited amount of time I could get my students into the computer lab to USE the technology. Plus, not having wifi in my classroom also limited the apps that I could use without students having a device. It’s been frustrating.
- More work with finding/ connecting through hangouts, etc.
- Time and group development of legitimate curriculum that enhances the learning, not just dresses it up.
- I’m a special education teacher and need to do more research into tools that will provide adaptive skills for students with physical and cognitive impairments.
- Much of the improvements in my class came from PD we received before this year. The training we have received will have a much larger impact, I believe, next year, when the kids all have devices.
- Classroom management for 1:1 devices
- How to control students from being on sites they shouldn’t be and still be able to teach to their faces and not always standing to see what screen they are on.
- Brainstorming session
- While we did have our own Chromebooks, using them to enhance instruction was extremely limited as the students did not have access to devices. Next year, once students have their own devices, teachers will be able to practice using what we’ve learned this year. Perhaps WO Tech Academy would have been more productive if it had been differentiated: the high school staff is farther ahead in their integration, and they didn’t get that our kids have very limited access to even the computer labs.
- How to best get information to students.
- None
- Is Chromebook use appropriate in all classes? Physical Wellness in class use? More PW PD.
- We just need time.
- I would like to see how other teachers are using technology. I don’t know what I don’t know right now.
- Resources by subject matter
CHAPTER V
CONCLUSIONS AND FUTURE IMPLICATIONS

Based on the findings of this action research project, while students were not provided
devices during the 2015-2016 school year, it is evident that teachers were able to integrate
technology into the educational process on a regular basis. The majority of both middle and high
school teachers used technology either weekly or daily to collaborate for educational purposes, to
plan instruction, and during instruction. Many teachers are not using technology for student
assessment currently; however, this could change as students have access to devices and teachers
receive more training.

Personal Computing Skills of Teachers

While acknowledging that West Ottawa Public Schools was at the beginning phases of
the integration of the 1:1 technology model during this study, findings suggest that teachers are
experiencing positive outcomes from the preparation through professional development and early
access to devices for staff in the areas of personal computing skills, collaboration, instruction,
and student learning. First, a slight to strong positive impact on personal computing skills, as
perceived by teacher participants in this study, was demonstrated. The professional development
and early access to devices in the 2015-2016 school year allowed the majority of middle school
and high school teachers to report a positive impact in the areas of Google Drive, Google
Classroom, Google Apps and Add-ons, educational websites and tools, and basic Chromebook
use. Evidence from this study suggests that there was a larger impact for high school teachers
in the area of Google Apps & Add-ons than middle school teachers. About 85% of high school
teachers reported a positive impact in this area whereas only 55% of middle school teachers
reported a similar outcome. The other 45% of middle school teachers reported no impact in the
area of Google Apps & Add-ons. This suggests that middle school teachers may need additional support in this area during future professional development.

Collaboration

Because collaboration is a key component to the educational process where technology can greatly enhance the quality, ease, and amount, this was an essential component of the action research study. Findings suggest that the professional development in preparation for the 1:1 technology model had a positive impact for middle school and high school teachers on collaboration between teachers, administrators, and/or other school staff members and between teachers and students. There was less of an impact on collaboration between students and between teachers and parents/guardians. According to the middle school teacher participants in this study, 50% indicated no impact on collaboration between students, and 40% of high school teacher participants indicated no impact in the same area. Additional professional development may be needed to ensure greater collaboration between students. As students have greater access to devices in the continued stages of the adoption of the 1:1 technology model, one would expect to see an increase in collaboration between students. The area of strongest concern in the realm of collaboration is the lack of impact on collaboration between teachers and parents/guardians. According to Sahin and Atabey (2014), strong and qualitative communication and collaboration between teachers and families increases the quality of education and yields positive outcomes in terms of children, families and teachers (p. 76). The findings of this study demonstrate that 57% of teacher participants indicate that there has been no impact on collaboration between teachers and parents/guardians. Technology can be a beneficial tool to connect and communicate with families when used effectively. Perhaps additional training or resources can be shared with the teaching staff to promote active collaboration between school and home.
Instruction

Overall, the findings of this action research project indicate that the professional development provided during the 2015-2016 school year in preparation for implementation of the 1:1 technology model had a positive or neutral impact on instruction. While 43.94% of teacher participants indicated a slightly increased amount of time it takes to prepare lessons, 68.18% of teacher participants indicated that the quality of lesson preparation increased. An increased amount of time in the preparation of lessons would be expected with the implementation of new strategies and devices, but teachers are experiencing an even greater increase in the quality of the lesson preparation. Additionally, 60.61% of teacher participants indicated an increased quality in the delivery of instruction. This is noteworthy since students did not have access to devices in many classrooms. It is expected that there will be a greater positive impact on the delivery of instruction when all students have access to devices, as the possibilities for differentiation, immediate feedback, and individualized participation will be expanded.

While a majority of participants indicated a positive impact on lesson preparation, there was less of an impact on feedback for students and assessment as perceived by teacher participants. While 50% of participants saw an increase in the amount of feedback for students, 50% saw no impact. Similarly, 53% of participants saw no impact on the quality of feedback for students, while 44% saw increase in quality of feedback and 3% indicated a slight decrease in the quality of feedback for students. Finally, over 50% of all teacher participants indicated no impact on assessment quality or ease of grading. While 36% of participants saw an increase in assessment quality and 38% indicated an increase in the ease of grading assessments, 1 participant found the quality of assessments was greatly decreased and 7 participants (10.61%) found a slight decrease in the ease of grading for assessments. Results were fairly consistent
between middle school and high school participants as indicated in Table 9. This evidence suggests that further study must be conducted after students have devices to truly understand the impact of the 1:1 technology model once it is fully implemented. Because many teachers are not seeing an impact on feedback or assessment, this may suggest that a greater impact may be evident once students have access to devices or that further training is needed. Additionally, negative mental models may exist for some teachers surrounding the adoption of the 1:1 model as many have indicated no impact or a negative impact by perception on some areas of instruction. It will be essential moving forward to not only provide the needed devices and resources for teachers and students, but also provide further training and leadership in the area of instruction, specifically regarding feedback and assessment.

**Student Learning**

While the focus of much of the professional development for middle school and high school teachers at West Ottawa Public Schools during the 2015-2016 school year was focused on technology and the preparation for the adoption of the 1:1 technology model, it is important to recognize that technology integration is a means to reach the greater goal of pursuing the mission of West Ottawa Public Schools to prepare all students to be college, career, and life ready. Ultimately, the implementation of the 1:1 technology model is being used to increase student learning and directly linked to the school’s mission.

Overall, the findings from the initial stages of the preparation for the implementation of the 1:1 technology model suggest a positive or neutral impact on all areas of student learning including quality of work, ability to retain information, active participation, amount of on-task behavior, and motivation/interest. The greatest positive impact was on active participation and motivation/interest while the least positive impact was on amount of on-task behavior. Of
responding participants, 52.31% reported no impact on amount of on-task behavior and 10.77% indicated a slight decrease in on-task behavior. There was also a considerable difference between middle school and high school participant responses regarding perceived on-task behavior. More than 40% of middle school teacher participants reported an increase in on-task student behavior while only 3% saw a decrease. On the contrary, only 30% of high school teacher participants observed an increase in on-task behavior while 20% saw a decrease. Roughly 50% of both middle school and high school teacher participants observed no impact on on-task behavior. Incorporating student devices in a classroom adds a new dimension of classroom management and will necessitate effective modeling and monitoring. Findings suggest that further training and support may be needed regarding classroom management with the implementation of a 1:1 technology model, especially at the high school level. This may become more evident as students have access to additional devices in the coming years. New challenges and distractions are present with the addition of devices and teachers must be prepared to consistently keep students on-task in order to obtain the greatest benefit for student learning.

Additionally, it is important to recognize that 69.23% of teacher participants reported no impact on student ability to retain information. Further data collection must be conducted once students have access to devices to more fully understand the impact of technology on students’ ability to retain information. This evidence may suggest that teachers may need additional support using technology at the transformational levels of the SAMR model rather than the enhancement levels. If devices are simply used to replace pencil and paper activities rather than truly transforming the educational process, little impact is to be expected. Because schools across the country are investing substantial amounts of time and resources in the adoption of 1:1
technology model, it is important that devices are used in a manner that will have the strongest positive impact on the educational process. Technology alone will not increase student learning; however, it provides opportunities to improve pedagogy, collaboration, and assessment practices that can impact student learning and prepare 21st century learners for the digital age. Recent research suggests that institutions usually have no incentives to encourage innovative integration of educational technologies, but that institutions should reward staff via non-monetary incentives to recognize those that are innovatively using educational technologies (Jude et. al., 2014, p. 114). As West Ottawa Public Schools and other secondary schools prepare for the implementation of a 1:1 technology model, an incentive program could be developed to encourage teachers to transform instruction and ultimately student learning by utilizing the devices in more meaningful ways.

Planning for Future Professional Development

As West Ottawa Public Schools continue to effectively prepare middle and high school teachers for the full implementation of the 1:1 technology model, it is important to address the specific needs communicated by teachers. According to this action research study, the majority (68.33%) of participants reported a need for additional support with educational websites and tools. Also, 53.33% reported a need for support with Google Apps and Add-ons. Future professional development should address these needs, but it is essential to also keep in mind the diverse needs of staff and provide differentiated learning opportunities for teachers in order to use time and resources effectively. Only 5% of participants reported a need for further support with basic Chromebook use, and small percentages of participants reported needs in the areas of Google Classroom (36.67%) and Google Drive (18.33%). Through comments written by teacher participants, it was evident that there is a strong need for department specific professional
development and resources and time to collaborate with others in similar subject areas to develop technology integrated activities and assessments. According to Keengwe and Onchwari (2011), “professional development that does not support teachers eventually in terms of providing time to learn, time to collaborate and is generic, that is, has no direct connection to the curriculum will not address the goals of technology integration in the classroom” (p. 5). As demonstrated in the findings of this action research study, teachers are aware of the need for more time to collaborate and professional development that is directly connected to curriculum.

Throughout the initial stages of the implementation of the 1:1 technology model at West Ottawa Public schools, it is clear that preparation time has been focused on learning new technology rather than planning lessons with technology. While there are strong positive outcomes seen from the WO Tech Academy in the 2015-2016 school year and the early access of devices for staff in the areas of personal computing skills, collaboration, instruction, and student learning, this is only the beginning phase of the process. Through this study, it is evident that teachers need the time to plan with others within departments how to effectively implement the tools and resources they have learned about. Because teachers are limited by time, as Wiske et. al. (2004) eloquently state, “it is important to ask repeatedly, ‘Is this topic really central to curriculum priorities, and is it something that can’t be taught and learned just as easily with less complicated technology?’ After all, there is no need to cultivate a pocket garden with a huge tiller when a small spade will do; complicated technologies should be reserved for topics that are both important and difficult” (p. 39). Implementing a 1:1 technology model can be a daunting task for teachers that feel overwhelmed with the daily demands of a classroom. By focusing on how technology can alleviate some of the challenging tasks and acknowledging that complicated technology is not always the best means to student learning, teachers can be reassured that when
used correctly, technology can be highly beneficial both for educators and students. Teachers not only need the time to learn the new technologies, but they also need time to collaborate with each other to decide how to most effectively integrate technology meaningfully into curricular activities.

Planning for the implementation of a 1:1 technology model can be an arduous and complex task, but the potential benefit for students preparing for the rapidly advancing demands of the 21st century are great. Previous research has shown that the “integration of 1:1 laptop computing increased student engagement and learning, motivation, and ability to work individually” (Keengwe, Schnellert, & Mills, 2012, p. 144). The dynamic nature of technology that will provide these positive outcomes requires continual support, development, and leadership as schools prepare to move toward a 1:1 model. As demonstrated through the findings of this action research study, teachers not only need the tools and resources necessary to integrate technology into the educational process, but they also need professional development and time to coordinate technology, curriculum, and pedagogy. Similarly, research conducted by Cox (2013) suggests that educators need time for effective planning that includes a technology plan within their pedagogical structures in order to have a more technologically integrated classroom (p. 214). With effective preparation for the adoption of a 1:1 technology model through professional development, leadership, resources, and time, technology integration can translate to meaningful student learning by enhancing and transforming collaboration and instruction.

Further studies must be done in the future to comprehensively evaluate the effectiveness of the preparation and the adoption of a 1:1 technology model. The adoption of technology as a tool to support 21st century learners places additional requirements on teacher knowledge and
innovative teaching strategies that must be supported with professional development, tools, resources, and time. As Swallow (2015) argues, “21st-century digital learning tools continue to be utilized in traditional teaching models” (p. 134). If schools are to invest enormous amounts of time, resources, and money towards the adoption of 1:1 technology models, the focus must remain on teaching and learning goals and outcomes, not the digital tool alone. Long-term research studies on the topic are limited, but some studies have illustrated “initial positive experiences and feedback, followed by a sudden dissatisfaction with the initiative” (Swallow, 2015, p. 122). Further research must be conducted to evaluate long-term results as West Ottawa Public Schools and other secondary schools proceed with the preparation and implementation of the of 1:1 technology model to ensure the intended positive outcomes related to collaboration, instruction, and student learning are achieved.
Appendix A

Survey Instrument

Preparation for 1:1 Technology: Impact on Collaboration, Instruction, and Student Learning

Please read this consent information before you begin the survey.

You are invited to participate in an action research project entitled “Preparing for 1:1 Technology: Impact on Collaboration, Instruction, and Student Learning” designed to evaluate the effectiveness of professional development and early access to devices in preparation of a 1:1 technology model. The study is being conducted by Dr. Dennis McCrumb and Pam Schwallier from Western Michigan University, Department of Educational Leadership. This research is being conducted as part of the requirements for the Specialist in Education degree for Pam Schwallier.

This survey is comprised of 11 questions and will take approximately 10 minutes to complete. Your replies will be completely anonymous. When you begin the survey, you are consenting to participate in the study. If you do not agree to participate in this research project simply exit now. If, after beginning the survey, you decide that you do not wish to continue, you may stop at any time. You may choose to not answer any question for any reason. If you have any questions prior to or during the study, you may contact Dr. Dennis McCrumb (269-387-1720), Pam Schwallier (616-648-5595), Western Michigan University Department of Educational Leadership, the Human Subjects Institutional Review Board (269-387-8293) or the vice president for research (269-387-8298).

This study was approved by the Western Michigan University Human Subjects Institutional review Board (HSIRB) on (date). Please do not participate in this study after (one year after approval).

Participating in this survey online indicates your consent for use of the answers you supply.
### Current Technology Use

1. Are you a certified, secondary, classroom teacher at West Ottawa Public Schools?
   - Yes
   - No - If no, please discontinue your participation in this survey.

2. What grade levels do you teach?
   - 6-8
   - 9-12
   - 6-12

3. How often do you use technology to collaborate for educational purposes?
   - Never
   - Less than weekly
   - Weekly
   - Daily

4. How often do you use technology to plan for instruction?
   - Never
   - Less than weekly
   - Weekly
   - Daily
5. How often do you use technology during instruction?
   - Never
   - Less than weekly
   - Weekly
   - Daily

6. How often do you use technology for student assessment (formative or summative)?
   - Never
   - Less than weekly
   - Weekly
   - Daily
7. How has the technology based professional development (WO Tech Academy) provided during the 2015-2016 school year, along with your early access to a Chromebook, impacted your personal computing skills, according to your perception, in the areas of:

<table>
<thead>
<tr>
<th>Area</th>
<th>Strong positive impact</th>
<th>Slight positive impact</th>
<th>No impact</th>
<th>Slight negative impact</th>
<th>Strong negative impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google Drive (Google Docs, Sheets, Slides, Forms, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Google Classroom</td>
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<tr>
<td>Google Apps &amp; Add ons</td>
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<tr>
<td>Educational websites &amp; tools (Screen castify, Kahoot, Flubaroo, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic Chromebook use</td>
<td></td>
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<td></td>
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</tbody>
</table>
Preventing Technology:
Impact on Collaboration, Instruction, and Student Learning

**Collaboration**

8. How has the technology-based professional development (WO Tech Academy) provided during the 2015-2016 school year, along with your early access to a Chromebook, impacted collaboration (ease, quality, and/or amount), according to your perception, between:

<table>
<thead>
<tr>
<th></th>
<th>Greatly increased</th>
<th>Slightly increased</th>
<th>No impact</th>
<th>Slightly decreased</th>
<th>Greatly decreased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers, administrators, and/or other school staff members</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Teachers and students</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Students</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Teachers and parents/guardians</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
9. How has the technology-based professional development (WO Tech Academy) provided during the 2015-2016 school year, along with your early access to a Chromebook, impacted instruction, according to your perception in the following areas:

<table>
<thead>
<tr>
<th>Area</th>
<th>Greatly increased</th>
<th>Slightly increased</th>
<th>No impact</th>
<th>Slightly decreased</th>
<th>Greatly decreased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson preparation - the time it takes you to plan</td>
<td></td>
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<tr>
<td>Lesson preparation - quality</td>
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<tr>
<td>Delivery of instruction - quality</td>
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<tr>
<td>Feedback for students - amount</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Feedback for students - quality</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Assessment - quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Assessment - ease of grading</td>
<td></td>
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</tbody>
</table>
10. How has the technology-based professional development (WO Tech Academy) provided during the 2015-2016 school year, along with your early access to a Chromebook, impacted student learning, according to your perception, in the areas of:

<table>
<thead>
<tr>
<th></th>
<th>Greatly increased</th>
<th>Slightly increased</th>
<th>No impact</th>
<th>Slightly decreased</th>
<th>Greatly decreased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of work</td>
<td></td>
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<tr>
<td>Ability to retain information</td>
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<tr>
<td>Active participation</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Amount of on-task behavior</td>
<td></td>
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<tr>
<td>Motivation/ Interest</td>
<td></td>
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</tbody>
</table>
11. In what areas do you feel you need additional support to successfully implement the 1:1 technology model? (Choose all that apply)

- [ ] Google Drive (Google Docs, Sheets, Slides, Forms, etc.)
- [ ] Google Classroom
- [ ] Google Apps & Add ons
- [ ] Educational websites & tools (Screencastify, Kahoot, Flubaroo, etc.)
- [ ] Basic Chromebook use
- [ ] Other (please specify)

\[\text{Other (please specify)}\]
Appendix B

Letter of Approval from West Ottawa Public Schools

March 11, 2016

To Whom It May Concern:

This letter constitutes permission given by West Ottawa Public Schools for Mrs. Pamela R Schwallier to conduct research within her project titled:

Preparing for 1:1 Technology:
Impact on Collaboration, Instruction, and Student Learning

I offer this permission as the Assistant Superintendent for Employee Relations and Marketing, stipulating that the involvement of staff is of course of their own accord.

Sincerely,

[Signature]

Gregory Warsen, Assistant Superintendent for Employee Relations and Marketing
West Ottawa Public Schools
Appendix C

Invitation to Participate in the Study

To: HL Teachers/Administrators, MB Teachers/Administrators, HS Teachers/Administrators
Subject: 6-12 Teacher Technology Survey

Teachers,

You are being invited to participate in a short, 10 minute or less, confidential online survey to assist in my Educational Specialist research project through Western Michigan University titled “Preparing for 1:1 Technology: Impact on Collaboration, Instruction, and Student Learning.” I will be evaluating the effectiveness of our technology-based professional development throughout this school year (2015-2016) while having early access to Chromebooks as we prepare to adopt a 1:1 technology model.

Please read the informed consent form found on the first page of the online survey. Thank you for your participation! Feel free to contact me via email or phone if you would like further information regarding this study.

https://www.surveymonkey.com/r/WOTechAcademy

Thank you!

--
Pam Schwallier
6-8 ESL Teacher
Harbor Lights Middle School
616-786-1157 work
616-648-5595 cell
Appendix D

Letter of Approval from HSIRB

Date: April 19, 2016

To: Dennis McCrumb, Principal Investigator
    Pamela Schwaller, Student Investigator

From: Amy Naugle, Ph.D., Chair

Re: HSIRB Project Number 16-03-41

This letter will serve as confirmation that your research project titled “Preparing for 1:1 Technology: Impact on Collaboration, Instruction, and Student Learning” has been approved under the exempt category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note: This research may only be conducted exactly in the form it was approved. You must seek specific board approval for any changes in this project (e.g., you must request a post approval change to enroll subjects beyond the number stated in your application under “Number of subjects you want to complete the study.”) Failure to obtain approval for changes will result in a protocol deviation. In addition, if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

Reapproval of the project is required if it extends beyond the termination date stated below.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: April 18, 2017


