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Studying Teachers' Self-Efficacy and Experience While Empowering Technology Use Through Personalized Professional Learning

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The purpose of this mixed-methods study was to investigate the impact and experiences of teachers who had engaged in a personalized professional learning program to promote ICT integration in preK-12 classrooms. Survey results (n=344) showed that teachers' perceptions of their ability to use technology tools and their self-efficacy towards using technology in the classroom improved significantly after the training. Interview results indicated support, choice, and coherence as positive aspects of the program with content support, community, and the overarching struggles of teaching as challenges to improvement. Overall, being able to have their individual needs met empowered teacher progress towards their learning goals despite their initial teaching, academic, and technology self-efficacy levels.

Keywords: personalized professional learning, personalized learning, professional development, technology integration, self-efficacy, one-to-one

INTRODUCTION

One-to-one technology implementations are increasingly commonplace in K-12 education. This form of technology integration is thought by many to be a panacea of righting the balance of equity and access for students in public education. However, research has found that when these programs are implemented without appropriate support and training, there may be little to no impact on student learning (Borko, 2004; Dishon, 2017; Yoon, Duncan, Lee, Scarloss, & Shapley, 2007). As a result, researchers have begun to examine the changes needed to transform classroom models of education that are reflective of the industrial era, to models that support skill sets required of a 21st-century society. Among these are blended and personalized learning models which have been noted as both key trends and significant challenges (Johnson, Adams Becker, Estrada, & Freeman, 2015). To accompany this shift in pedagogy, research suggests there must also be a change to personalized professional learning models for teachers (Borko, 2004; Desimone, 2009; Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009). The intention of this study was to explore teachers' change in technology skills and self-efficacy towards using technology after engaging in a personalized professional learning experience. Viewed through the structure of Desimone's Core Conceptual Framework (2009), learning experiences examined in this study will be compared against standardized professional learning best practices.

While there are studies on personalized learning (PL) (Grant & Basye, 2014; Karmeshu, Raman, & Nedungadi, 2012) and professional development (PD) (Borko, 2004; Desimone, 2009, Lawless & Pellegrino, 2007; Wei et al., 2009), there are a limited number of studies concerning personalized professional learning (PPL) for educators (Fok & Ip, 2006; Webster-Wright, 2009). This study contributes to the canon of existing literature by providing an in-depth exploration of a PPL experience from the perspective of K-12 educators. The experiences of the educators in a professional learning program of this design and scope could provide professional learning specialists with considerations for future program development.

CONCEPTUAL FRAMEWORK

Personalized Professional Learning (PPL)

The definition of PL is as individualistic as the concept itself which can lead to a variety of opinions on the validity of the method (Abamu, 2017;

Walker, 2017). Some may view PL purely as adaptive technology programs in which the learner engages with an elearning program that guides the learning (Attwell, 2007). However, that diminishes the importance of the pedagogical frameworks necessary for personalization to be effective (Bartolomé, Castañeda, & Adell, 2018). For the purpose of this study, PL is viewed through the following definition:

> "Personalized learning refers to instruction in which the pace of learning and the instructional approach are optimized for the needs of each learner. Learning objectives, instructional approaches, and instructional content (and its sequencing) may all vary based on learner needs. In addition, learning activities are meaningful and relevant to learners, driven by their interests, and often self-initiated." (U.S. Department of Education, 2017, p. 9)

It is acknowledged that a one-size-fits-all approach to traditional PD does not provide teachers with the specific knowledge and support necessary to meet their individual learning goals, but the long history of lecture style PD has inhibited movement towards changing how PD is delivered (Webster-Wright, 2009; Koellner & Jacobs, 2015). Teacher ICT training often follows the stages model of leveled skills acquisition (Dreyfus & Dreyfus, 1986) which focuses on the cognitive aspects of learning a skill. This does not account for fundamental understanding of practice and has been found to be a reductionist approach to PD (Dall'Alba & Sandberg, 2006). As a result, training in how to operate ICT does not translate into changed pedagogical practices and appropriate integration of ICT in the classroom (Albion et al., 2015). Design-based (Lawless & Pellegrino, 2007; O'Hara, Pritchard, Huang, & Pella, 2013) and coaching models (Albion et al., 2015; Avalos, 2011; Borko, 2004; Wenger, 2011) have begun to shift PD practice towards more continuous learning experiences that integrate teacher autonomy. However, Philipsen, Tondeur, Pareja Roblin, Vanslambrouck, and Zhu's (2019) recent review of literature on PD for online and blended learning highlights a need for additional studies of PD for ICT integration.

Typical measurement of PD is based on the type of activity or seat time (Albion, Tondeur, Forkosh-Baruch, & Peeraer, 2015), but Desimone's (2009) review of the literature on teacher PD suggests instead evaluating the desired outcomes. She proposes the examination of the relationships between PD, teacher knowledge and beliefs, classroom practice, and student outcomes as a way of developing a complete understanding of what constitutes successful PD. This method supports the idea of transforming one-time, sit-and-get PD into the just-in-time, continuous growth process

of PPL. She identified five components as key to successful PD: content, coherence, duration, collective participation, and active learning (Desimone, 2009; Desimone & Pak, 2017). This Core Conceptual Framework is a foundational component of designing PPL experiences and is used to describe teachers' experiences in this study. Studies of PD programs based on Desimone's framework have demonstrated mixed results necessitating a need for continued examination the framework in practice (Desimone & Garet, 2015: Fischer, Fishman, Dede, Eisenkraft, Frumin, Foster, Lawrenz, Levy, & McCoy, 2018).

The majority of PPL studies focus on the need for further investigation and continued program development rather than teachers' perceptions or impact on learning (e.g. Biehn & Rice, 2016; DeMonte, 2013; Gamrat, Zimmerman, Dudek, & Peck, 2014; Gynther, 2016; Parks, Oliver, & Carson, 2016). However, the elements of personalization that have been identified in those studies, such as choice, relevance, and active learning, align with the elements of the Core Conceptual Framework (Desimone, 2009). The setting of this study offers teachers PPL options by providing choice in modality, content, timeframe, and application. In terms of Koellner and Jacobs's (2015) PD continuum, this falls on the highly adaptive range of the spectrum. By creating a learning plan that is personalized to their own needs, teachers are provided with a model for how to personalize learning for students. This in turn supports the diffusion of PL models in the classroom by demonstrating the potential for educational technology to enhance, not replace traditional learning experiences (Karmeshu & Nedungadi, 2012; Malone, 2008; Mouza & Barrett-Greenly, 2015).

Self-Efficacy

Bandura (1997) addressed the necessity of supporting teachers' pedagogical, academic, and technology self-efficacy growth in order to ease them through the educational shifts that are necessary with the technology-enhanced classrooms of the 21st-century. When teachers feel confident and competent in their ability to use technology, they are more apt to initiate utilizing technology when teaching (Bandura, 1997; Sadaf, Newby, & Ertmer, 2016). However, when professional learning for educational technology is focused purely on learning how to manipulate the technology, teachers are not as inspired to shift their practice as when there is a specific focus on pedagogy and how appropriate technology integration can benefit themselves and their students (Bandura, 1997; Ertmer, 2005; Mishra & Koehler,

2006). This can be a challenging task due to the variety of content, age levels, curricular focus, and experience both as an educator and with using technology that is present in any group of teachers. The creation of PPL can make the process of accommodating the needs of individuals logistically feasible for professional developers (Koellner & Jacobs, 2015).

Relationship to ICT integration. While there are limited studies measuring the impact of PPL on self-efficacy for teachers, studies on PD that include elements of personalization indicate a positive correlation between teacher self-efficacy and technology integration (Gonzales, 2013; Moore-Hayes, 2011; Schnackenberg & Still, 2013). Gonzales (2013) emphasized the importance of directing PD experiences to support teacher's weaknesses and enhance their self-efficacy towards their technology usage. Schnackenberg and Still's (2013) study of preservice teachers found a significant, positive correlation between positive perceptions of ability to integrate technology and the use of technology tools that encourage more meaningful, pedagogical interactions. Moore-Hayes's (2011) study of pre and in-service teachers' self-efficacy attitudes showed that once it is established, it is difficult to change. This study found that with both pre and in-service teachers their lack of technological preparation prevented them from seeking out continuous PD on their own. She noted that high self-efficacy is essential to successful technology integration. These studies support the connection between teacher self-efficacy and technology integration but are largely quantitative in design and do not include the presence of teacher voice reflecting on their experiences as is included in this study.

RESEARCH QUESTIONS

In order to reach a greater understanding of teachers' experiences in a PPL program and to respond to the need for continuous research on PD for ICT integration and the Core Conceptual Framework (Desimone & Garet, 2015), this study was guided by the following research questions:

Central research question: "To what extent and in what ways did the personalized professional learning program served to support teachers' technology skills and self-efficacy toward the integration of ICT in their classrooms?"

Research sub-question 1: "Did the personalized professional learning program significantly impact teachers' technology skills and self-efficacy toward the integration of ICT?"

Research sub-question 2: "How do participants describe their experiences in the personalized professional learning program?"

The central research question serves to connect the quantitative and qualitative sub-questions in this mixed-methods study. The first sub-question assesses the impact of the PPL program on teachers' self-reported perceptions of their relationship with ICT before and after the learning experience. The second sub-question contributes deeper understanding of individual experiences within the program.

CONTEXT OF THE STUDY

This study was set in a preK-12 public school district located in the southwest. The school district is one of the largest in the United States serving 86 schools and programs including six high schools, nine junior high schools, 55 elementary schools, eight choice schools, four success schools, three preschools, and one online school program. In 2012, voters approved a bond for the purpose of upgrading facilities, transportation, and technology infrastructure. A portion of this bond was earmarked to support a multi-year distribution of one-to-one (1:1) and mobile classroom cart models of devices to facilitate wireless teaching and learning. Between the 2013 and 2018 school years, 1:1 devices were distributed to each of the six comprehensive high schools and two elementary schools. Mobile classroom sets of devices were distributed to the Mathematics and English departments at each of the junior high schools and each of the elementary schools received a minimum of three carts. The goal of the device distribution was to transition traditional classroom learning to blended and personalized learning environments.

The first year all teachers received new devices and wireless projection systems and the training was rolled-out as a unified learning experience. However, due to the time-release distribution of devices, the professional learning needs of teachers rapidly began to diversify. Over the course of six years, 72 schools received 1:1 devices or mobile device carts. Teachers that were receiving classroom devices required intensive training to prepare for teaching in blended or PL environments. Those that were not receiving classroom devices had no context or perceived use for receiving training to prepare them for blended or PL environments. Thus, PPL was explored as a potential model to both differentiate instruction to meet the needs of all teachers and to allow teachers to experience a PL environment themselves before constructing such a learning environment in their own classrooms.

The PPL experience called the *Program of Study* mirrored a university degree program and included both required and elective components culminating in the creation of a capstone project that was unique to each teacher. Teachers were assigned an educational technology trainer to be their program guide and to assist them in the implementation of their capstone project in the classroom once the school year began. The program was open for two months allowing participants to adjust their learning time frames according to their personal schedules and learning preferences. Courses, created by the district educational technology department under the guidelines of the Quality Matters Standards (Standards from the Quality Matters continuing education and professional development, 2nd edition) were offered online and in-person to allow for increased choice in learning modalities. A sample selection of course titles can be viewed in Appendix A. Optional "guided practice" sessions were offered to support those struggling with online learning components and to allow participants to meet with their assigned educational technology trainer. The capstone project was a plan for implementing blended or PL during the school year. This plan was shared with the site-based educational technology trainers, as well as school administration to help support teachers in the implementation of their technology integration plan once the school-year began. Since the program took place outside of the regular school year contract, teachers were compensated $300 for completion of the program.

The 2017 Program of Study was designed as a PPL experience inclusive of the components of the Core Conceptual Framework (Desimone, 2009). Teachers initially chose between two learning pathways: Introduction to Blended Learning (IBL) and Designing for Innovation (DFI). While there was required content targeted to the foundational needs and understandings, the program contained over 75 million possible combinations ($_{60}C_{10}$) as long as the required number of primary anchor courses, LMS courses, and focus area courses were met (see Table 1).

Table 1
PPL Program Structures 2017

IBL Program		DFI Program	
# of required courses	Type of Course	# of required courses	Type of Course
1	Required Anchor Course (ex. classroom management, TPACK, digital citizenship)	1	Required Anchor Course (ex. personalized learning, mastery learning, digital citizenship)
3	Learning Management System courses	3	Learning Management System Courses
4	Electives (ex. Kahoot, Google Docs, LanSchool)	4	Focus Area courses (any combination of electives that support the design plan including station rotation, PBL, gamification, flipped classroom)
1	Content Area Course	1	Content Area Course
	Capstone		Capstone

This allowed teachers to adapt their course selections as they progressed through the program and choose the courses that best met their needs improving coherence. However, this volume of choice and flexibility can be overwhelming. To assist teachers in the selection of their coursework, two learning pathways were provided geared towards teachers new or uncomfortable with ICT integration and another pathway for those who were ready to attempt more blended and personalized forms of learning.

The Introduction to Blended Learning (IBL) pathway for teachers new to ICT integration included required courses that covered topics such as classroom management of devices, the TPCK framework, growth mindset, and learning management system courses, as well as over 60 elective choices. The electives for both pathways included courses in how to leverage ICT tools for pedagogical purposes such as, presentation, assessment, collaboration, and active learning through Web 2.0, Google, and Microsoft educational tools. All products produced in these courses were intended to be used in the classroom, which, in turn, promoted active learning for the teachers since they were engaged in creating artifacts to immediately use in their classrooms.

The pathway for more advanced teachers, Designing for Innovation (DFI), assisted teachers in identifying a problem of practice within their classroom or curriculum, developing a plan to integrate an innovative instructional practice to address the problem of practice, and then determining how they would assess that plan to identify next steps for improvement. By

mirroring the concept of design-based research in the classroom, teachers were prepared to apply the skills from these anchor courses, not just in the area of education technology, but indefinitely as they improved their practice over time. All of the same elective courses available to the IBL cohort were also available to the DFI cohort but they were encouraged to select one learning innovation to focus their plan around. Support for this included courses in gamification, flipped classroom, station rotation, project based learning, and the SAMR model. The goal of this approach was to integrate design-based models of PD into classroom practice and attempt to bridge the gap between research and practice (Lawless & Pellegrino, 2007). Helping teachers to design their own learning plan within their classroom supports coherence, duration, content focus, and active learning by encouraging teachers to apply what they learned during the summer training to their classroom practice once the school year began and applying the needs of their students directly to the creation of lesson plans and resources (Desimone, 2009).

METHOD

In order to thoroughly consider the main research question of this study: "To what extent and in what ways did personalized professional learning program serve to support teachers' technology skills and self-efficacy toward integration of ICT in their classrooms?", a mixed-methods, explanatory sequential design (Creswell & Plano Clark, 2018) was selected to guide the methodology of this study. The quantitative survey provided a large-scale overview of participants demographics, self-perceptions of their technology skills, and self-efficacy towards using technology in the classroom before and after their work in the PPL. The qualitative interviews were purposefully selected based on the initial survey results to provide a more in-depth view of participants perceptions of their learning experience. This method provided a constructivist ontology and epistemology combined with a pragmatic methodology (Creswell & Plano Clark, 2018).

A longitudinal, cohort survey methodology was adopted to measure the quantitative portion of this study. A Likert scale survey created by Wang, Ertmer, and Newby (2004) was adapted for use in this portion of the study with their permission. It was delivered pre- and post-program to measure teachers' self-perceptions of their technology skills and self-efficacy towards using technology in the classroom. The original survey contained twenty questions focused on teachers' self-efficacy towards ICT integration.

One additional question was added to the self-efficacy section, as well as ten questions focusing on technology skills. The distributed survey can be viewed in its entirety in Appendix B. This was a voluntary survey containing Likert scale questions serving to answer research sub-question 1: Did the personalized professional learning program significantly impact teachers' self-efficacy toward the integration of ICT?

Phenomenology was the chosen method for the qualitative portion of the study in order to "describe(s) the common meaning for several individuals of their lived experiences or a concept or phenomenon" (Creswell, 2013, p. 76). This study aligns with phenomenology in the examination of the phenomenon of PPL through the descriptions of the lived experience of the teachers involved. Through a series of interviews with selected participants, a thorough description detailing the essence of what the teachers experienced in the PPL program was constructed. Specifically, a hermeneutic lens was employed in the interpretive process due to the idea that "...all understanding is connected to a given set of fore-structures, including one's historicality, that cannot be eliminated" (Laverty, 2008). Given the first author's involvement with the development of the program and the possibility that some of the subjects may have engaged in this program more than once, it is unlikely either could view the phenomenon as if for the first time as is needed in transcendental phenomenology. The act of tracking educator experience through multiple points in the program and the influence of past experiences with professional learning in any form also contributed to the selection of a hermeneutic phenomenological method. The three-interview series model was selected in order to establish rapport with the subjects, focus on the details of the PPL experience, and reflect on the meaning behind the experience (Seidman, 2013). Once data was collected, it was assessed "to reflect on the content to discover something 'telling', something 'meaningful', something 'thematic'" (Sloan & Bowe, 2013, p. 1292) in order to answer research question 2: How do participants describe their experiences in the personalized professional learning program?

Participants

All teachers involved in the program were asked to voluntarily complete pre- and post-program surveys. Within the program 344 teachers responded to both the pre- and post- program surveys with 228 participating in the IBL program and 116 in the DFI program. Participants' years of teaching experience was fairly evenly distributed from 0 to 15+ years of

teaching as is reflected on Table 2. While Table 3 initially reflects that elementary teachers had the highest frequency, the remaining subjects were all secondary (7-12) grade level teachers making that group the majority of respondents.

Table 2
Participant's Years of Experience

Years of Experience	# of Participants	% of Participants
0-3 Years	74	21.5
4-8 Years	79	23.0
9-14 Years	84	24.4
15+ Years	107	31.1
Total	344	100.0

Table 3
Academic Subject Areas Taught by Participants

Subject Area	# of Participants	% of Participants
Elementary	83	24.1
English Language Arts	57	16.6
Math	43	12.5
Science	38	11.0
Special Education	37	10.8
Social Studies	32	9.3
World Language	14	4.1
Physical Education	13	3.8
Career and Technical Education	13	3.8
Fine/Performing Arts	10	2.9
Other	3	0.9
ROTC	1	0.3
Total	344	100.0

Maximum variation sampling was utilized to identify interview participants from the pool of teachers involved in the program. The criteria sought to include multiple school sites, grade levels, content areas, and incoming teacher experience in terms of years in the classroom, technology skill level, and self-efficacy towards using technology in the classroom. Prior to the start of the program all teachers completed a survey measuring the previously mentioned criteria. An email was sent to respondents of the survey inquiring into their interest towards participating in the interview portion of the study. Based on the responses of those interested, six teachers were initially selected to represent a diverse cross-section of the population. Upon the initial interview, one participant was found to no longer qualify. A summary of the interview participant demographic information is shown in Table 4.

Table 4
Overview of Interview Participants

Participant Pseudonym	Grade Level	Content Area	Years Experience	ICT Skills	Self-Efficacy	Participated in 2016 Program	Years teaching with devices
Ann	9-12	Math	15+	High	High	Yes	2
Brenda	9-12	Math	0-3	Low	Moderate	No	1
Charlotte	9-12	World Language	15+	Low	Low	No	0
Denise	K-6	Kinder-garten	9-14	High	High	Yes	3
Erika	7-8	Art	0-3	Moderate	Low	Yes	3

At the time of this study, Ann was entering her 22nd year teaching math at the same high school she had taught at for her entire career. She was the department head and also taught Advancement Via Individual Determination (AVID) classes which is a program focused on closing the achievement gap by preparing all students for college and postsecondary education. She participated in both the 2016 Program of Study and the 2015 1:1/Blended Learning Workshop. She had a high self-perception of ICT skills and self-efficacy towards integrating ICT in her classroom. As department head she strongly encouraged her department to integrate ICT and regularly organized her own ICT trainings and observational rounds. She was entering the third year of having 1:1 devices in her classroom.

Brenda was also a high school math teacher but taught at a different school site from Ann. She had a class set of devices in her classroom for

two years prior to the study but used them infrequently. At the time of the study, her school site was receiving 1:1 devices in the 2017-2018 school year and all teachers were strongly encouraged to participate in the *Program of Study*. She did not have much experience with ICT tools but felt moderately confident about being able to incorporate them into her teaching at the beginning of the program. This was her first time participating in the *Program of Study*.

Charlotte has been teaching for over fifteen years as both an English Language Arts (ELA) and World Language teacher, but was only teaching World Language classes at the time of the study. She was not comfortable with ICT tools or her ability to use them in the classroom but her high school was also receiving 1:1 devices in the 2017-2018 school year (the year of this study) and was strongly encouraged to participate in the program. This was her first time participating in the Program of Study.

Denise was a kindergarten teacher at the district's first 1:1 school that served as a pilot program for future implementations. She participated in the 2016 Program of Study and served on her school's Teacher of Teachers Technology committee (TOTT) which is a train-the-trainer PD model for ICT at her school. She has both high skill and self-efficacy levels for ICT integration going into the program.

Erika previously taught K-6 art at the same school as Denise but was moving to teach art at a 7-8 junior high for the 2017-2018 school year. She participated in past PD including the 2016 Program of Study but self-assessed herself as having low to moderate skills and self-efficacy at the beginning of the study. Her new school did not have a 1:1 device program but they did have device carts and Erika wanted to prepare to apply her skills to a new grade level and curriculum.

Data Collection

The data collection process included two parts. One part collected quantitative data to measure change in teachers' perceptions of their skills to integrate technology and their self-efficacy. The second part collected qualitative data from interviews with the purpose of understanding their experiences in the PPL that prepare them to integrate technology in their classrooms.

Quantitative Data. Pre- and post-program data were collected through the use of a voluntary Likert scale survey including demographic information as well as participant self-perceptions of ICT skills and self-efficacy

towards technology integration. Demographic information that was collected included name, username, number of years teaching, teaching subject, school location, and in which program that they participated in. Identifying features such as name and username were removed from the data after serving the purpose of tracking program and survey completion.

Determining if teachers' perceptions of their technology skills improved during the course of the program is an important measure of program success and source of information to guide future program design. Ten questions on the survey collected information on teachers' comfort level with technology tools, which were selected by the educational technology department based on the content of the elective course options that were offered as part of the program. Participants ranked their current comfort level using these technology tools for instruction as very uncomfortable, uncomfortable, neutral, comfortable, or very comfortable.

Twenty-one questions on the survey concerned teacher self-efficacy towards integrating technology for classroom teaching. Teacher self-efficacy towards technology has been shown to be an indicator of willingness and ability to successfully integrate technology in order to create blended and personalized learning environments for students (Bandura, 1977; Gonzales, 2013; Malone, 2008; Moore-Hayes, 2011; Wang et al., 2004). In the process of examining current studies of professional learning models, a 20-question survey developed by Wang, Ertmer, and Newby (2004) was identified as a proven, valid instrument through which to measure self-efficacy in regard to integrating technology for learning. Dr. Wang granted permission to use and modify the instrument for this study. One question was added to the original survey: 'I feel confident letting students explain how to use or troubleshoot technology, even if I don't understand it.' This question was added to the survey as it was identified by the educational technology department as an important issue to address with the participants both as a measurement of their mindset as well as to support the idea that their students are a resource.

Qualitative Data. Five participants engaged in three semi-structured interviews before and after participating in the program of study over a period of six months. These interviews followed the three-interview series model described by Seidman (2013). The first interview occurred at the beginning of the PPL experience and served to establish rapport and collect information on past teaching and PD experiences. The second interview took place after summer coursework was completed and focused on the PPL experience. A third interview was conducted at the end of the first nine weeks of the school year to explore the conveyance of learning from the summer into the school year and the utilization of the capstone project. Interviews

were recorded, transcribed, and reviewed to identify common themes that emerged from the participants experiences. An example of the semi-structured interview questions is provided in Appendix C.

While the initial, common questions formed the core of the interviews, additional questions were asked throughout the process to help clarify and elaborate the responses of the participants. At times, these new questions were unique to the individuals and their experiences, but some would also become recurring questions asked of all participants based on emerging themes. The process of theoretical sampling was used between interview sets to guide the identification of themes and potential question strands (Boeije, 2002). Theoretical sampling served to not only focus and guide the interview and data collection process but the analysis of data as well.

Interview Methods & Analysis

The first in the series of interviews occurred at the beginning of the program and focused on establishing rapport and learning about the experiences of the teachers in regard to their overall teaching experience, past experiences with professional learning, and experience integrating ICT into their classroom practice. Since a diverse group of teachers was purposefully selected, their experiences in their areas varied widely. The teaching experience ranged from 28 years to four with some having great consistency in regard to their subject matter, grade level, and school placement while others had changed positions over time. When discussing past PD experiences, all participants had different internal and external factors driving their participation, but all agreed that, for the most part, they were unlikely to gain information that was useful for their application in their own classrooms and less likely to apply what they learned. Ann, Denise, and Erika had previously participated in the 2016 program, but Brenda and Charlotte were new to the 2017 program. Those that participated in the 2016 program had more experience integrating ICT, but Erika still did not feel comfortable applying it purposefully in a way that enhanced her curriculum. Of the two that were new to the program, Brenda had devices in her classroom the previous year but used them minimally and had little previous training in how to do so. Charlotte had just received her first cell phone and was not comfortable with technology in general but very excited about the possibilities for her students.

The second round of interviews took place after the completion of the program. This round focused on the teachers' experiences in the courses,

working with their trainers and peers, and overall successes and challenges in completing the program. Brenda and Charlotte had some issues initially navigating the program but were able to gain their footing by working with their assigned trainer. The presence of a designated trainer seemed to be a source of support and comfort for all teachers throughout the program. The teachers that were less experienced used their trainers for questions about the learning materials and completing assignments. The more experienced teachers used the trainers less overall but when they did engage them it was to discuss aspects of their plan and brainstorm possibilities.

The third interview followed up with the teachers after the first nine weeks of school to see how they fared implementing their capstone projects and to capture their reflections on the learning experience now that some time had passed, and they were applying what they learned. While Brenda was unable to participate in the final round of interviews, only Denise reported implementing her plan as it was conceived. Ann entered the program with a plan in mind but the teaching assignment that she was planning for changed during the program. She did still implement a plan based on the principles she learned in the DFI program but simultaneously planned and taught in the fall. Charlotte experienced the most skill and self-efficacy growth during the program but was overwhelmed once the school year began. She implemented some of the lessons she had created in classes and established classroom management with the devices but did not feel like she would be ready to implement her plan until the 2nd or 3rd quarters of the school year. Erika did not think she would be implementing her plan at the end of the program and also did not start the year with devices in her classroom. At the time of the third interview, her trainer was still working on obtaining her devices to keep in her room but the teacher had moved on with her curriculum planning to anticipate not having them during the year.

Analysis of the interviews began during the transcription process by noting recurring topics and ideas as well as points that intersected with the elements of the Core Conceptual Framework (Desimone, 2009). During the second round of analysis each participants' interview series was reviewed to develop an understanding of each individual's experience throughout the program. In the third round of analysis, the interviews were reviewed in sequential order (ie. first round interviews of all participants, 2nd, 3rd) to view the experiences from each moment in the program timeline. Throughout each round of analysis color coding and annotation were made to the transcripts to identify emerging themes in addition to the elements of the core conceptual framework. At the conclusion of this process, the coded quotes were classified into a spreadsheet annotated with participant code and inter-

view round number. Individual sheets within the spreadsheet were divided to reflect the classification into technology skills, self-efficacy, support, collective participation, choice, pacing, coherence/duration, modality, content, struggle, and experience in other PD. This revealed connections between the categories that were combined into six themes: three positives (P1, P2, P3) and three challenges (C1, C2, C3). Examples of the quote, code, and theme classification can be viewed in Table 5. Additional details and examples of these theme will be discussed in the following results section.

Table 5

Examples of quote, code, and theme classification

Theme	Code	Example Quote
P1. Support from both trainers and other teachers in the form of collective participation	Support	"They've been so eager to help and always expressed whenever you need me whenever you need me whenever you need me and we also have our own part-time teachers that are trainers as well and they're awesome." *Brenda, Interview 1*
	Collective Participation	"I kind of joked that we had a [school name] table going because I was like, 'Oh I know that teacher and I know that teacher and another one of our teachers.'" *Charlotte, Interview 2*
P2. Enhanced coherence, duration, and content focus compared to traditional PD	Coherence	"I think I chose classes that will be effective and helpful to me. That I'll be using, and I didn't have exposure to." *Brenda, Interview 2*
	Duration	"…this is the only PD that I've taken that I actually set up stations like station rotation in my classroom and implemented it so I feel like I've been able to take my blended learning and apply it to my classroom very easily." *Denise, Interview 3*
	Choice/ Content/ Past PD	"I felt there were way more choices this year as far as like which route you could take. There were tons of ELA classes which if you were looking at more of focusing your technology integration into your ELA block there were tons of options there." *Denise, Interview 1*
P3. Choice in regard to pacing, modality, and courses	Pacing	"I thought it was arranged very intelligently and progressively it went very well and even just take 3 classes here, 4 classes here and one in your content area and by the time I took one in world language, I felt very encouraged by all the things that were out there" *Charlotte, Interview 2*

Theme	Code	Example Quote
P3. Choice in regard to pacing, modality, and courses	Choice/ Modality	"I think definitely giving people more options I would have been much more apt to do it in an online format." *Ann, Interview 3* "Online things drive me crazy. I read slow, I process, I'm distracted, and it was a lot longer and arduous and not as enjoyable as the one on one." *Brenda, Interview 1*
	Content/ Choice	"I think that I wish there were more PDs that were developed in this manner because it has the accountability piece but it also has the differentiation for people so whether you're brand new to technology or you've been using technology, they model so many different ways to include technology. I just think that it's huge because it allows for me to take my PD and cater it towards my needs. I think because of that, I'm more willing to go back and implement it." *Denise, Interview 2*
C1. The minimal offering and inconsistent format of content specific courses	Content	"I guess it's been sort of frustrating for me because I think as an art teacher there's a lot of professional development that's offered through the school district that's directed towards your standardized test curriculum like English and math and social studies all those sort of things but they don't provide any professional development that's specifically related to visual art." *Erika, Interview 1*
	Modality	"I do think that the content course, I did pick the easiest path rather than the one I was interested in just because of the mode in which it was given." *Ann, Interview 3*
C2. A desire for increased community among the teachers participating in the program	Collective Participation	"Yeah, I definitely feel that could be a piece because people can go out and find really great things but then they come back to their site or their building and share it with their teammates but that's where it stops and I feel like we're constantly reinventing the wheel and there might be some awesome things happening at other campuses that we'll never know about because nobody shares" *Denise, Interview 3*
C3. The overarching struggles of teaching with and without technology	Struggles	"I can't think of anything they could have done to change that life. I think that was just a myriad of challenges that I don't think anybody could have saw coming. It had nothing to do with professional development." *Ann, Interview 3*

RESULTS & DISCUSSION

This section is organized by the research questions. The first research question was answered based on the results from the survey data, the second research question was answered based on the findings from the interview

data. The overarching research question is answered at the conclusion of this section.

Research sub-question 1: "Did the personalized professional learning program significantly impact teachers' technology skills and self-efficacy toward the integration of ICT?"

To answer this question, quantitative data was collected through a pre and post survey as described in the methods section. The survey results portrayed a significant difference between the pre- and post-surveys for both technology skills $t(344)=-20.207$, $p<0.05$; and self-efficacy towards technology integration $t(344)=-14.164$, $p<0.05$, as shown in Table 6. When examining the IBL and DFI mean scores separately, there is also significant increases in pre-post technology skills and self-efficacy scores as shown on Tables 7 and 8. Results from the analyses indicate that the program had a positive impact on teachers skills and self-efficacy, answering research sub-question 1 and providing a basis for a more in-depth exploration into the experiences of those in the program through the interview portion of the study.

Table 6
Overall Paired Samples T-Test

	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Pre-test Tech Skill- Post-test Tech Skill	-.615	.565	-20.207	343	.000
Pre-test Self-efficacy - Post-test Self-efficacy	-.362	.474	-14.164	343	.000

Table 7
Descriptive Statistics For Each One of the Two Programs for Technology Skills

PPL Program	Technology Skills Pre-Test		Technology Skills Post-Test		Post-Pre Mean
	Mean	SD	Mean	SD	
IBL (N=228)	2.99	0.70	3.63	0.71	0.64
DFI (N=116)	3.60	0.72	4.15	0.51	0.55

Table 8
Descriptive Statistics For Each One of the Two Programs For Self-Efficacy

PPL Program	Self-Efficacy Pre-Test		Self-Efficacy Post-Test		Post-Pre Mean
	Mean	SD	Mean	SD	
IBL (N=228)	3.59	0.65	3.98	0.55	0.39
DFI (N=116)	4.16	0.59	4.46	0.53	0.30

Research sub-question 2: "How do participants describe their experiences in the personalized professional learning program?"

To answer this question, qualitative data were collected through interviews as described in the methods section. By tagging and code mapping the interview transcripts a constant comparative analysis methodology was used to identify themes surrounding the teachers' experiences in the PPL program (Anfara, Brown, & Mangione, 2002). The initial tagging process began by identifying instances of references to technology skills, self-efficacy and the components of the core conceptual framework: active learning, coherence, collective participation, content, duration (Desimone, 2009). Additionally, trainer support, learning modality, pacing, and general struggles of teaching also emerged as key concepts. As described in the interview methods and analysis section, this coding and classification led to six overarching themes. By comparing these codes among participants and interview rounds teachers' positive experiences in the program were attributed to:

P1. Support from both trainers and other teachers in the form of collective participation
P2. Enhanced coherence, duration, and content focus compared to traditional PD
P3. Choice in regard to pacing, modality, and courses

The challenges that emerged from the interviews focused on:

C1. The minimal offering and inconsistent format of content specific courses
C2. A desire for increased community among the teachers participating in the program
C3. The overarching struggles of teaching with and without technology

P1: Support from both trainers and other teachers in the form of collective participation

One of the most frequent references the teachers reported as contributing to their positive experiences in the PPL program was the support of the educational technology trainers, the other teachers in the program, and the ability to reference learning materials once the program was over via the learning management system which aided program completion as well as increased technology skills and self-efficacy. As Ann expressed this in her second interview, "I always felt supported and I felt like what I had was valuable." This aligns the findings of Desimone and Pak (2017) that indicated the effectiveness of instructional coaching to encourage teachers to work collectively to create actionable plans for their classrooms. Additionally, this contributes to the findings of Lawless and Pellegrino (2007) that strong mentor/mentee relationships encourage continuous growth of comfort with ICT in the classroom.

Charlotte and Denise developed the closest working relationships with their trainers. Charlotte's low initial technology skills and self-efficacy caused her a great deal of stress when she began the program because of the number of new terminologies such as link, upload, and download. She began to communicate with her trainer more via email, phone, and in-person by coming to the trainer's office and attending the guided practice sessions. She described her experience with her trainer as, "I felt like I was getting individual attention. She handled anything I asked her to do she handled it for me."

Denise was on the other end of the technology skill and self-efficacy spectrum but also worked a great deal with her trainer because she was engaged in a research project for a company that she planned for throughout the program of study. She felt that his partnership "...did a good job to reassure me that I'm on the right path and that everything was good." Denise worked with her trainer to select her coursework and focus area before the program began and then checked in with him during the program to check that her capstone plan was realistic and aligned with the learning outcomes she wanted to achieve with her students.

The support of other teachers was also prevalent and instrumental to the participants' success in the program upholding previous research in professional learning communities (Albion et al., 2015) and communities of practice (Wenger, 2011). As the department head of a team of around 25 math teachers, Ann was the only member able to participate in the program due to the limited capacity of the program. She then developed trainings for her department to share what she learned and also to help her teammates share what they were doing in their classrooms. She wanted to pass on the posi-

tive attitude and experience to help her teachers see each other implementing blended learning and having fun with the process. Brenda worked closely with her professional learning community and department teammates as well. They developed their capstone goals together so that they could help each other when the school year began and so that they had a unified approach for their students. Erika found her largest support system outside of the program and the district. While she appreciated the help that was offered and knew that the district trainers would help her if they could, she wanted to connect specifically with other art teachers integrating technology. She was able to do this primarily through online resources and forums not connected to the program which raises the question of how these support systems can be integrated into the coursework to ensure all teachers are supported, no matter their content area. As Brenda shared in her second interview, "What it [the program] did do as well was expose us to all the people, a lot more people, that are there to help us, so we understand the support system we have behind us."

P2: Enhanced coherence, duration, and content focus compared to traditional PD

The ability to apply learning directly to the teachers' specific content areas and student populations contributed to the strong presence of coherence as well as active learning strategies that resulted in the creation of learning assets to be used directly in the classroom. The learning artifacts that the teachers were asked to produce were designed to allow teachers to adapt what they were learning and tailor it directly for use in their classrooms to provide coherence and as Ann put it, "There's nothing worse than sitting through a class on reading or writing and being a math teacher." The use of authentic assessment design proved to increase coherence and personalization of the learning experience which in turn supports the self-efficacy of teachers' use of ICT tools (Albion et al., 2015). This supports Polly and Hannafin's (2010, 2011) findings that place coherence as a key element of learner-centered PD. Denise participated in the DFI program and created a plan to implement station rotation for math in her Kindergarten classroom. She felt, "It wasn't just a scenario where there was someone else talking to me about what they've done in their classrooms. I was able to actually take my professional development time and analyze ok I want this outcome." She was able to plan her stations for the first nine weeks of the school year and created a plan with her trainer for how she could assess if it was improving learning for her students. At the time of our final interview, she was still using the stations with her students and was planning to continue and expand the plan.

Providing teachers the opportunity to plan and create resources that they need is paramount to encouraging the application of learning during the school year increasing the potential for duration and provided a starting point for working with their trainers and integrating ICT once the school year resumed (Mouza & Barrett-Greenly, 2015). While many of the teachers involved in the study did not implement their full learning plan, they all were able to use elements of what they learned and created during the summer program. For example, Charlotte was able to carry over her new knowledge of technology skills, "So I felt like I learned something that I can just put into practical use! Even like a screenshot, a snipping tool, terminology I'm not familiar with and suddenly there it is and there's a little tutorial to help me how to do it. So I felt that it was valuable that it could equate to other things." Even though Denise had completed the program before, she gained new skills that were modeled but not explicitly taught in the program, "I liked the classes in Google Classroom because I can see how it is applicable in my own classroom. Like I see how it was used for adult education but how I could modify that for my own classroom, and it was meaningful because Google Classroom is something that we use so it was just transitioning into my own teaching as well."

The ability to choose the skill level and content of the courses contributed to the improvement of each teachers' technology skills and self-efficacy. Ann, Denise, and Erika had participated in the program of study the previous summer in addition to several other trainings during the school year. They went in concerned that there would not be anything new for them, but all found they were able to select courses that were new to them and walk away with something useful from every course. As Ann put it,

> "Ok so obviously the personalized was much better catered to what I wanted to do and I didn't have to start at the bottom and waste my time. I think one of the big failures of education is you sit a big group of teachers and drone on about something that they already know and granted sometimes they think they know and they don't know but as a 29 year veteran I can't tell you how many meetings I've sat through and gone oh this is the spiel about this that I've already heard and this is the moment we're interjecting for this purpose so it was really nice not to have that feeling last year."

On the other end of the spectrum Charlotte appreciated being able to look for "Intro to…" courses that she knew would be designed for her experience level. "So I felt like it narrowed it down for me and I wanted it to

be narrowed down, I didn't want to be overwhelmed with what do I do with that but I felt like I took the ones that I could utilize the easiest. That was my thought process." The ability to select appropriate content and difficulty level was essential for these teachers.

P3: Choice in regard to pacing, modality, and courses

The elements of choice that were integrated throughout the program in teachers' ability to have autonomy over course selection, learning modality, and how they applied and demonstrated their learning arose from the interview analysis to support previous research on the elements of PD (Pane et al., 2015; U.S. Department of Education, 2017). While Pane et al.'s (2015) research focused on PL for K-12 students, the elements that they recognized as being integral to PL included "tailoring instruction to each student's individual needs, skills, and interests" (p. 2) which are key elements of the PPL program. These findings support Webster-Wright's (2009) call to action for PD to evolve into continuous professional learning models in order to address the complexities of today's educational ecosystem. As the teachers involved in the study share, their needs would not have all been met had they received the same training, at the same time, in the same manner. As Denise noted, "Like everyone's familiar with just sitting in a classroom and just listening and then you have those jaded people that just leave angry because they feel like you just wasted three hours of my time and I gained nothing. Like if you don't gain something from this blended learning opportunity that's on you." Even with the elements of choice and personalization built into the program, the greatest asset was the autonomy given to the teachers to determine and plan for their own teaching and learning needs (Webster-Wright, 2009).

The integration of online and blended learning served to provide access to those that would not have otherwise been able to participate in the program, support for learners that wanted to move at their own pace, and references for all teachers to refer back to when needed in the future. Ann and Charlotte took advantage of these choices in opposite ways. Ann had multiple personal and family commitments that summer preventing her from attending in-person courses and took all of her classes online. "I prefer that I can do it at my own pace, at my own time, start and stop it when I wish because my life was kind of crazy." Charlotte soon found herself overwhelmed by the online coursework. "Everything they wanted me to do I had to learn how to do it. I had to go to all these tutorials. Snip..snipping tool? I gotta watch that tutorial. You want me to download something, you want me to upload something, you want me to cut and paste? I literally did not budge

from the computer for three hours." She quickly revised her schedule to take as many in-person classes as possible and made use of the guided practice sessions to have personal support for the online classes she did have to take. The fact that these online learning experiences did not result in lesser results than the face-to-face learning experiences supports previous research (Dede, Ketelhut, Whitehouse, Breit, & McCloskey, 2009; Fishman, Konstantopoulos, Kubitskey, Vath, Park, Johnson, & Edelson, 2014).

Brenda also experienced the impact of choice of learning modality with her teammate. Brenda and the teacher next door to her chose to go through the program and plan together since they teach the same subject to support each other and create continuity for their students. However, when it came time to register for classes, Brenda only wanted in-person classes and her teammate only wanted online. "I did all the in-person ones which worked better for me and she did all online because it worked better for her." They found that by sharing their separate experiences in the same courses, it enhanced their collective learning. Brenda wanted the immediate feedback of an in-person class but also appreciated having the resources online to refer back to.

C1: The minimal offering and inconsistent format of content specific courses

While the inclusion of content specific courses in the program was noted as an improvement in the learning experience by Ann, Denise, and Erika who had participated in the program in previous years, they were still in need of additional improvements. Three areas that of identified improvement for content courses were their consistency of format, diversity of modality, and the depth of their offerings. These needs were expressed by all of the interview participants. The majority of the content specific courses were only offered face-to-face which limited the ability for participants to access the courses that they needed to fulfill their learning goals. Ann was unable to take any in-person courses due to personal circumstances and noted, "I do think that the content course, I did pick the easiest path rather than the one I was interested in just because of the mode in which it was given." It is not a question of a single modality being offered as is emphasized in the exchange between Moon, Passmore, Reiser, and Michaels' (2014) and Fishman et al. (2013, 2014) questioning the validity of online PD. The rough 50% split of the interview participants' modality preferences between online and face-to-face, reflect the arguments of both Moon et al. (2014) and Fishman et al. (2013, 2014) as to the appropriate deployment of online PD.

Charlotte, Denise, and Erika also felt a need for a greater diversity of content courses. As world language and visual art teachers, respectively,

Charlotte and Erika appreciated the offering of "Technology in the… Classroom" courses that consisted of ideas that the trainers collected and curated from the teachers they worked with during the school year. The goal was to create a living, growing resource of actual lessons and strategies and also provide content specific resources for those with limited access to other subject matter experts or resources. However, they both felt that they were a bit shallow and limited. They appreciated have a course that was explicitly for their content area but noted that "core" subjects had several offerings. Denise also felt this limitation in another way since she took core subject courses but then needed to adapt them to her Kindergarten classroom when most participants taught junior and high school levels. Even when in groups with primary teachers, she found it to be focused more on experienced teachers helping new teachers, than an exchange of ideas on how to improve a content delivery. Continuing to grow content course offerings for all subjects and grade levels is recommended to improve the PPL experience over time.

C2: A desire for increased community among the teachers participating in the program

Another area in which participants were divided on their PPL experience was in regard to community. Participants were able to engage in the level of collective participation that best suited their need, but this impacted the level of collective participation they felt was present (Desimone, 2009). In general, the participants reached out to others to achieve the level of community that they desired even though that took a different form for each member. However, Erika and Denise expressed a need for increased community quite strongly.

Erika did feel like there were limited options for her to achieve the level of community she desired due to her content area. She found her largest support system outside of the program and the district. While she appreciated the help that was offered and knew that the district trainers would help her if they could, she wanted to connect specifically with other art teachers integrating technology. She was able to do this primarily through online resources and forums not connected to the program which raises the question of how these support systems can be integrated into the coursework to ensure all teachers are supported, no matter their content area to avoid the "disenfranchisement" that Erika felt, "I guess it's been sort of frustrating for me because I think as an art teacher there's a lot of professional development that's offered through the school district that's directed towards your standardized test curriculum like English and math and social studies

all those sort of things but they don't provide any professional development that's specifically related to visual art. And yeah that just really bothers me."

Denise felt she was able to achieve the level of engagement she desired but sought greater transparency among teachers in the district in regard to practice. She requested an easier method for teachers to exchange ideas, resources, and discoveries as a form of collective participation and practice, "Yeah, I think that would be good and kind of encourage people to share. I know everyone's competitive and they want to be the best at everything, but I think if we moved towards more of an approach of sharing and opportunity to easily connect that doesn't require a lot of extra time like I would be willing to share a lot of things I have." The creation of a global community in which teachers could easily interact with those in their domain and share elements of practice would contribute to the PPL experience.

C3: The overarching struggles of teaching with and without technology

The single greatest challenge for all teachers was the overarching struggles of teaching in the current educational ecosystem. Charlotte expressed that, "Just about as much as I can handle is what's going to happen in the next day or two." Brenda shared that her greatest concern was, "the 150-180 students' learning curve is what I see as the biggest challenge." Interview participants expressed that the PPL experience improved their technology skills and increased their self-efficacy towards using technology in the classroom for the upcoming school year, but it could not allay the consistent flow of change and increasing expectations. As Ann put it, "...every profession changes but ours has changed exponentially and our kids have changed exponentially and every variable in our career has changed exponentially so it's a lot to keep up with." While Sadaf, Newby, and Ertmer's (2016) study found self-efficacy to be a strong indicator of teachers' intentions and ability to integrate technology, this can be offset by overwhelming additional elements of change. For the teachers interviewed in this study, in addition to the complex change of implementing 1:1 technology for the purpose of blended and PL they also contended with a lack of access to technology, a delay of updated technology infrastructure, required implementation of additional pedagogical and instructional changes, and increased managerial responsibilities. The goal of PPL is to create learning environments that are "optimized for the needs of each learner" (U.S. Department of Education, 2017) but it is important for PPL designers and academic administrators to be empathetic to the requirements being placed on teachers in order to create truly effective PL experiences.

Central Research Question: "To what extent and in what ways did the personalized professional learning program served to support teachers' technology skills and self-efficacy toward the integration of ICT in their classrooms?"

The data collected from both of the sub-questions served to support the overall understanding of the central research question: "To what extent and in what ways did the personalized professional learning program served to support teachers' technology skills and self-efficacy toward the integration of ICT in their classrooms?" The PPL experience was able to help teachers significantly improve their use of technology tools and self-efficacy towards using technology in the classroom demonstrated in the significant positive growth of the survey results. When questioned about the elements of the experience that contributed to their technological and self-efficacy growth, interview participants' descriptions of their experiences in the PPL program revealed six focus areas: support, choice, coherence, content, community, and overarching struggles of teaching which intersect with the components of the Core Conceptual Framework (Desimone, 2009). The interview participants' responses indicated that these components particularly connected with the technology skills that demonstrated the greatest growth in the survey results (LMS, assessment, study aids) and questions 13, 14, 15, and 16 in the self-efficacy portion of the survey. Mean differences for individual survey questions can be viewed in Appendix D. While all six focus areas contained positive and negative comments, support, choice, and coherence were noted as strengths of the PPL experience while content, community, and teaching struggles were noted as challenges. The interview responses that highlighted these focus areas emphasized that even though the participants came to the program with a variety of teaching experience, technology experience, and self-efficacy from multiple subject areas and grade levels, they were able to have their learning needs met through the personalized elements of the PD program. These elements inform the evolution of PD and PPL practices to better support teachers' technology integration and pedagogical practices (Ertmer et al., 2012; Koellner & Jacobs, 2015).

CONCLUSIONS, IMPLICATIONS, AND FUTURE WORK

PL can often be interpreted as the use of a specific technology or software system but we take care in this study to use the more broad definition set forth by the U.S. Department of Education (2017) as learning environ-

ments in which objectives, content, and instructional approach are based on the needs of the learner. To imply that any singular technology could accomplish this is to belie the complexity of teacher PD for integrating ICT and PL into the classroom (Bartolomé, et al., 2018; Philipsen et al., 2019). PPL developed with the elements of the Desimone's framework (2009) created more accessible learning opportunities for individuals to meet the needs of themselves and their student populations. This personalization contributes to the improvement of instructional, academic, and technological self-efficacy necessary to shift classroom practices (Bandura, 1997). However, it should be noted that recent literature shows that not all use cases of the framework are successful (Desimone & Garet, 2015). A possible key element in the case of this study was the involvement of learner feedback in the creation of this PPL program. The design of the program for this study was informed by a study of the previous year's program (Hall & Trespalacios, 2019), as well as, feedback from educational technology trainers embedded in the schools for support. Continuous reflection and iteration based on the learner experience of participants is necessary to understand what is needed in practice, not simply in theory (Wang, Hsu, Reeves, & Coster, 2014).

Throughout the analysis, the core conceptual framework components of active learning, content, collective participation, coherence, and duration (Desimone, 2009) were used to guide presence of PPL best practices and how the elements of the framework supported the growth of teachers' perceptions of their technology skills and self-efficacy. From this base, emerged additional elements of PL that supported teacher learning growth such as choice over pace, place, modality, and content (Pane at al., 2015). This suggests that perhaps a sixth element, choice, should be considered as an addition to the core conceptual framework. The combined presence of these elements resulted in an environment in which teachers of varying teaching experience, technology skill level, subject matter, and grade level were able to have their individual learning goals met within a single, cohesive, PPL experience. Through a mix of constructivism and direct instruction teachers were provided with the scaffolded support to become learning designers for their own students by designing their own learning environments (Bower, Hedberg, & Kuswara, 2010; Norton & Hathaway, 2015; O'Hara, Pritchard, Huang, & Pella, 2013). Being able to have their individual needs met empowered teacher progress towards their learning goals despite their initial instructional, academic, and technology self-efficacy levels (Bandura, 1997; Moore-Hayes, 2011; Yeşilyurt, Ulaş, & Akan, 2016).

This study focused on teachers' experiences in a PPL program in relation to their self-efficacy for ICT integration but did not venture to ex-

tend measurement into the resulting changes in classroom practice or student success. The ability of PPL programs to support teachers' continuous growth and produce positive student learning experiences remains an area of need (Bartolomé et al., 2018; Desimone & Garet, 2015; Fischer et al., 2018; Philipsen et al., 2019). Future study of PPL programs would benefit from further examination into what determines measures of success for both teachers and students. In additional to traditional measures of student achievement, elements such as self-efficacy towards learning, metacognition, and collective participation for students would be valuable. A part of PPL is to serve as a model for PL in the classroom. If teachers are expected to PL for the benefit of students, their learning should be personalized as well. In the same way they we measure teacher self-efficacy as a measure of learning in this study, we should be measuring multiple dimensions of the student experience to understand if we are creating healthy learning environments in which all students can thrive (Chong, Liem, Huan, Kit, Ang, 2018; Gane, Zaidi, Pellegrino, 2018).

LIMITATIONS

To establish trustworthiness in the results of this study we have attempted to be transparent in the areas of credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). Since phenomenology is the art of describing the lived experience, a credible reconstruction of the participants' experience is essential to demonstrate the "truth value". We have attempted to ensure credibility by recognizing that one of the researchers was involved in the creation of the PPL program that may potentially taint the perspective of the participants' experience. This potential bias was addressed in the form of member checking of the data analysis by the other researchers. The applicability and transferability of this study is supported by the selection of participants. By utilizing maximum variation sampling, we hope to provide readers with a wide variety of experiences within the personalized professional learning phenomenon that could apply to multiple contexts. Dependability was attempted to be established throughout the interview process by retaining focus on the core interview questions and central questions of the study. While neutrality might be impossible due to researcher involvement with the construction of the program and previous work experience with the participants, we continuously sought to support all descriptions with raw data taken from the transcripts.

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APPENDIX A

Sample Course List (not complete listing of course offerings)

Course Title	Course Title
Blended Learning Program of Study Anchor Course: Introduction to Blended Learning	Using Your Lenovo Thinkpad Helix: An Introduction to OneNote
Blended Learning Program of Study Anchor Course: Designing for Innovation	Using Your Lenovo Thinkpad Helix: OneNote Class Notebook
Blended Learning Program of Study: In-Person Guided Practice	Using Your Lenovo Thinkpad Helix: Annotation Tools for Presenting
Canvas 101: Intro to Canvas & Modules	Using Your Lenovo Thinkpad Helix: Planning and Meetings
Canvas 101: Introduction to Discussion Design	Get Smart with Architeck Online
Canvas 101: Introduction to Quiz Design	Interactive Blended Learning Tools with Student Devices: Using Quizizz
Canvas 101: Introduction to Assignment Design	Interactive Blended Learning Tools with Student Devices: Using Zaption
Canvas 202: Engaging Students in Canvas	Interactive Blended Learning Tools with Student Devices: Using Nearpod
Canvas 202: Outcomes and Rubrics	Interactive Blended Learning Tools with Student Devices: Using Socrative
Canvas 202: Templates & Commons	Digital Citizenship: Internet Safety
Canvas 202: Structuring Modules for Differentiation	Digital Citizenship: Helping Students Find Credible Online Resources
Google Classroom: An Introduction	Digital Citizenship- Communication-Netiquette, Blogs, Memes, and More!
Google Classroom: Beyond the Basics	Collaborative Lesson Planning with Google Docs
PBL 1: What is PBL?	Technology in the ELA Classroom
PBL 2: Choosing Your Project and the Driving Question	Technology in the World Language Classroom
PBL 3: Assessments, Evaluation and Project Completion	Technology in the Music Classroom
Gamification 1: Theory	Google Forms for Student Data Collection
Gamification 2: Assets	Managing Teacher & Student Artifacts with Google Drive
Gamification 3: Delivery	Professional Learning Networks: How to Harness Social Media
Flipping the Classroom: Intro & Background	Getting Started with Screencasting

APPENDIX B

Technology Comfort Level Survey

Sample Survey:

Name
Years Teaching
School
Subjects currently teaching
Program of Study selection

Technology Skills

How would you rank your current comfort level using the following technology tools for instruction? (Very Uncomfortable, Uncomfortable, Neutral, Comfortable, Very Comfortable)

1. Learning Management System (Canvas, Google Classroom)
2. Word Processing (Google Docs, Word)
3. Spreadsheets (Google Sheets, Excel)
4. Presentation Tools (Google Slides, PowerPoint, Nearpod, SMART Notebook)
5. Assessment Tools (Google Forms, Canvas quizzes, Formative, Quizizz, Socrative)
6. Digital Portfolios (OneNote, Google Drive, Google Sites, Weebly)
7. Digital Note Taking Tools (OneNote, Google Docs, Google Drawing)
8. Study Aids (Quizlet, Khan Academy, Newsela, ReadWriteThink)
9. Screencasting Tools (PowerPoint Mix, Educreations, Screencast-o-matic)
10. Mobile Technologies (cell phones, tablets, convertible laptops)

Technology Comfort Level

The purpose of this portion of the survey is to determine how you feel about integrating technology into classroom teaching. For each statement below, indicate the strength of your agreement on the scale. (Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, Strongly Agree). Used with permission of Dr. Ling Wang, Nova Southeastern University.

1. I feel confident that I understand computer capabilities well enough to maximize them in my classroom.
2. I feel confident that I have the skills necessary to use the computer for instruction.
3. I feel confident that I can successfully teach relevant subject content with appropriate use of technology.

4. I feel confident in my ability to evaluate software for teaching and learning.
5. I feel confident that I can use correct computer terminology when directing students' computer use.
6. I feel confident I can help students when they have difficulty with the computer.
7. I feel confident I can effectively monitor students' computer use for project development in my classroom.
8. I feel confident I can motivate my students to participate in technology-based projects.
9. I feel confident I can mentor students in appropriate uses of technology.
10. I feel confident I can consistently use educational technology in effective ways.
11. I feel confident I can provide individual feedback to students during technology use.
12. I feel confident I can regularly incorporate technology into my lessons, when appropriate to student learning.
13. I feel confident about selecting appropriate technology for instruction based on curriculum standards.
14. I feel confident about assigning and grading technology-based projects.
15. I feel confident about keeping curricular goals and technology uses in mind when selecting an ideal way to assess student learning.
16. I feel confident about using technology resources (such as spreadsheets, electronic portfolios, etc.) to collect and analyze data from student tests and products to improve instructional practices.
17. I feel confident that I will be comfortable using technology in my teaching.
18. I feel confident I can be responsive to students' needs during computer use.
19. I feel confident that, as time goes by, my ability to address my students' technology needs will continue to improve.
20. I feel confident that I can carry out technology-based projects even when I am opposed by skeptical colleagues.
21. I feel confident letting students explain how to use or troubleshoot technology, even if I don't understand it.

APPENDIX C

Sample Semi-structured Interview Questions

Interview 1 (Beginning of program) - Establishing rapport and past experience

- Tell me about your teaching experience thus far.
- What is your past experience with professional learning?
- How did you come to participate in the program of study?

Interview 2 (End of program) - Collecting details of program participation

- Tell me about your experience in the program of study.
- How would you describe how learning was personalized for you?
- How did you personalize your learning experience?
- How would you describe how this personalized learning experience compares to other professional development experiences?

Interview 3 (School year follow-up) - Reflecting on the meaning of the experience

- In what ways did your personalized learning experience prepare you to teach in a technology enhanced classroom this year?
- Where do you see the direction of your professional learning experiences going in the future?
- How has experiencing personalized learning affected your teaching practice?

APPENDIX D

Individual Survey Question Results

Mean Differences for all Items Measuring Technology Skills

Technology Skills	Mean Differences
Learning Management System	-.730
Word Processing	-.133
Spreadsheets	-.202
Presentation Tools	-.238
Assessment Tools	-.798
Digital Portfolios	-.597
Digital Note Taking Tools	-.656
Study Aids	-.715
Screencasting Tools	-.688
Mobile Technologies	-.302

Mean Differences for all Items Measuring Self-Efficacy

Comfort Level	Mean Differences
1. I feel confident that I understand computer capabilities well enough to maximize them in my classroom.	-.319
2. I feel confident that I have the skills necessary to use the computer for instruction.	-.198
3. I feel confident that I can successfully teach relevant subject content with appropriate use of technology.	-.177
4. I feel confident in my ability to evaluate software for teaching and learning.	-.335
5. I feel confident that I can use correct computer terminology when directing students' computer use.	-.246
6. I feel confident I can help students when they have difficulty with the computer.	-.238
7. I feel confident I can effectively monitor students' computer use for project development in my classroom.	-.387

Comfort Level	Mean Differences
8. I feel confident I can motivate my students to participate in technology-based projects.	-.238
9. I feel confident I can mentor students in appropriate uses of technology.	-.294
10. I feel confident I can consistently use educational technology in effective ways.	-.335
11. I feel confident I can provide individual feedback to students during technology use.	-.355
12. I feel confident I can regularly incorporate technology into my lessons, when appropriate to student learning.	-.331
13. I feel confident about selecting appropriate technology for instruction based on curriculum standards.	-.419
14. I feel confident about assigning and grading technology-based projects.	-.468
15. I feel confident about keeping curricular goals and technology uses in mind when selecting an ideal way to assess student learning.	-.391
16. I feel confident about using technology resources (such as spreadsheets, electronic portfolios, etc.) to collect and analyze data from student tests and products to improve instructional practices.	-.403
17. I feel confident that I will be comfortable using technology in my teaching.	-.234
18. I feel confident I can be responsive to students' needs during computer use.	-.270
19. I feel confident that, as time goes by, my ability to address my students' technology needs will continue to improve.	-.133
20. I feel confident that I can carry out technology-based projects even when I am opposed by skeptical colleagues.	-.234
21. I feel confident letting students explain how to use or troubleshoot technology, even if I don't understand it.	-.137