Cultivating a Blended Community of Practice to Promote Personalized Learning

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The purpose of this mixed-methods case study was to examine the effectiveness of a blended learning community of practice model in providing professional development to improve K-12 teacher's self-efficacy in the implementation of personalized learning. Eighteen teachers participated in a nine-month professional development program focused on personalized learning. Participants took pre and post self-efficacy tests based on nine personalized learning constructs. Qualitative data was collected from feedback surveys, online postings, and individual interviews. Teachers demonstrated greater levels of self-efficacy with regard to the implementation of personalized learning after their participation in the professional development community. They reported increased confidence with regard to personalized learning in the areas of planning, risk-taking, implementation, continuous improvement, and sharing their knowledge with others. Teachers developed additional competencies such as an increased knowledge of their students and skills related to technology, design, problem-solving, and facilitation. Teachers developed new dispositions such as flexibility and open-mindedness. Teachers found that elements of personalized learning could be implemented without technology, but recommended the integration of technology to effectively implement personalized learning across all nine constructs. The online components of the blended design, enhanced the teachers' sense of community and helped to facilitate collaborative, interdisciplinary work.

INTRODUCTION

The implementation of personalized learning has remained an uncertain and challenging space for most teachers to navigate even as it has received increased attention in PK-12 learning (Keefe, 2007; Pane, Steiner, Baird, Hamilton & Pane, 2017). It is unsurprising that teachers are often unclear about what personalized learning looks like in the classroom given the paucity of research about implementation. Minimal research has been done about the preparation of teachers to implement personalized learning though professional development has been identified as critical to effective implementation (Bingham, 2016; Lin & Kim, 2013; Williams, Moyer, & Jenkins, 2014). There is a need to offer teachers professional development that helps them both clarify and construct their own understandings of personalized learning while developing the knowledge and skills to apply it in classrooms.

National Context

There have been frequent calls for educational reform in the United States throughout much of the history of public schools. In 2005, Achieve, Inc. published a study in which recent high school graduates, their college instructors, and their employers cogently argued the need for more rigorous courses and higher expectations in high school because students were not sufficiently prepared for college and careers (Achieve, 2005). College and career readiness has become an urgent priority of the nation's education agenda because the global, knowledge-based economy of today requires a better-educated workforce than in previous generations. In the 20th century manufacturing economy, a high school graduate was able to earn a middle-class wage, however, by 2020, 65% of all jobs will require some form of postsecondary education or training (Symonds, Schwartz, & Ferguson, 2011). Further, a new study, *Building a Grad Nation: Progress and Challenge in Raising High School Graduation Rates,* reported the number of schools with low graduation rates is actually increasing (Civic Enterprise & the Everyone Graduates Center, 2017).

Another related concern has been student performance scores on standardized tests. Although the number of low-performing students in science in the United States decreased by approximately 6% between 2006 and 2012, the number of low performers in mathematics and reading has remained consistent since 2003 (OECD, 2016). The most recent National Assessment of Educational Progress (NAEP) report documented that the gap between high and low-achieving students widened on a national math and science exam (National Center for Education Statistics, 2017). Nationally, only 37% of fourth-graders were considered proficient in reading, and just 40% reached this benchmark in math on the 2017 exam (U.S Department of Education, National Assessment of Educational Progress, 2017).

Thirty-six percent of eighth-grade students were considered proficient in reading, and just 34% in math (U.S Department of Education, National Assessment of Educational Progress, 2017). The need for educational reform has perhaps never been more urgent than today.

Several policy and reform recommendations have been made to address these far-reaching concerns. One of the most popular of these reforms has been "personalized learning." In 2012, the U.S. Department of Education offered a 4.35-billion-dollar competitive grant opportunity known as Race to the Top to address deficits in college and career readiness and low performing students (U.S. Department of Education, 2012). The first priority of these grants was the development of personalized learning environments (U.S. Department of Education, 2012). In 2014, the Next Generation Learning Challenges (NGLC) offered $7.2 million in grants to schools who developed plans to launch personalized, competency-based programs (Next Generation Learning Grants, 2014).

Personalized learning is also now being encouraged and supported by federal and state policy (Gross, Tuchman, & Patrick, 2018; KnowledgeWorks, 2018; Murphy, 2017). Policy-makers included more assessment flexibility in the federal Every Student Succeeds Act (ESSA) in 2015 hoping to prompt additional innovations in the area of personalized learning at the state level (Murphy, 2017). ESSA gives states and localities flexibility to redefine student success, to create innovative assessment pilots, and to work with communities to redesign more flexible, responsive, and authentic education systems (Gross, Tuchman, & Patrick, 2018). Thirty-nine state ESSA plans reference elements of personalized learning (KnowledgeWorks, 2018). For example, 17 states included personalized learning in their vision statements, 11 states are prioritizing personalized learning for school improvement, and 19 states plan to provide personalized learning plans for all students (KnowledgeWorks, 2018).

These various calls for reform, funding tied specifically to the goal of personalizing education for students, and the inclusion of personalized learning in the ESSA plans of almost half of the states has encouraged some districts in the United States to include personalized learning in their strategic plans, mission statements, and professional development agendas. However, the lack of clarity and consistency about what personalized learning really means in concert with limited support for classroom implementation had made the execution of personalized learning in schools very challenging.

Local Context

Many school districts have updated their mission statements and goals to include personalized learning for students in order to address significant social and economic changes. This study explores how one district addressed these changes in light of the pressing challenge to retool schools.

The Clayfield Township School District is a comprehensive public-school system serving students in pre-kindergarten through 12th grade in New Jersey.[1] The district serves just under 4,000 students and is comprised of seven schools including a K-12 alternative school serving students from surrounding counties in addition to local residents. The district has approximately 350 classroom teachers. The Clayfield Township School District's mission statement included the following

> All students are provided with personalized learning experiences, critical thinking and technology skills needed to become thoughtful, responsible and productive citizens making contributions in local and global contexts fostering respect and accountability in all of their actions. (Clayfield Township School District, 2013).

Personalized learning was also embedded in the Board and district goals. In the fall of 2015, the Board of Education requested a quarterly update on the progress of the personalized learning initiative. Preliminary data revealed that there was no consistent definition or common language being used for personalized learning, a local finding that resonates with current literature. The majority of teachers, or 86%, received no professional development on personalized learning as indicated on a district professional development survey (Clayfield Township School District, 2016). To address the lack of understanding of personalized learning, a professional development program was developed, which formed the basis for this study.

The Innovation

The Personalized Professional Learning Cohort (PPLC) was designed using the Communities of Practice (CoP) framework and a blended learning approach. Key goals of the program included implementing a district-wide framework for personalized learning as well as enhancing teacher self-efficacy with regard to the use of personalization strategies in the classroom.

The teacher cohort participated in a blended approach to professional development, engaging in face-to-face learning and sharing sessions as well as online components. Face-to-face sessions focused on specific themes while encouraging flexibility based on the needs of the participants. These sessions also included design time in which teachers could apply their new learnings to the development of personalized learning lesson and unit plans. Online activities served as extension of the face to face sessions and included online discussions and activities administrated through a learning management system. As noted in Table 1, there were a total of ten different sessions.

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1   All proper nouns related to the research site and participants are pseudonyms.

Table 1
Personalized Professional Learning Cohort (PPLC)

Session	Essential Question	Learning Topics
1	What is personalized learning and why do we need it?	• The Changing Educational Landscape • Developing a Common Language • Design Thinking
2	Who are our students and how do we meet their needs?	• Empathy Mapping • Universal Design for Learning • Learner Profiles/Learning Plans
3	How does student responsibility impact achievement?	• Teacher and Student Roles • Building Executive Function Skills • Building Student Responsibility
4	How do we shift to a student centered/led classroom?	• Technology Infusion vs Blended Learning • Learning vs Practice • Designing Learning Centers • Discussion Protocols Leveraging Technology
5	How do I collect and track meaningful data?	• Powerful Facilitation • Formative Assessment • Tiers of Learning • Teacher Cloning
6	How do I create meaningful performance-based assessments?	• Transfer Tasks • Authentic Audiences • Rubrics • Personalized Problem Based Learning
7	How can I leverage blended learning for personalization?	• Blended Teacher Competency Framework • Planning for Blended Learning • Digital Content (Curating and Developing) • LMS: Canvas
8/9	What does PL look like in other schools?	• Visits to Innovative Schools • Virtual Field Trips • Developing Professional Networks
10	What have we learned and accomplished?	• Reflecting on Goals • Sharing and Celebrations • Presentations

LITERATURE REVIEW

Personalized Learning

Personalized learning has been a controversial concept that means different things to different people depending on the experience and perspective of the observer as well as the context in which it was referenced (Herold, 2018). Differences in definitions and approaches to personalization have caused confusion over the past several decades (Keefe, 2007). However, personalized learning is not a new concept. Elements of personalization can be traced to a variety of different educational approaches or philosophies including classical education, child-study, humanist education, progressive education, and individualized instruction. The earliest formal use of the word "personalized" can be found in the Personalized System of Instruction (PSI) introduced by Keller and his colleagues at the University of Brasilia in 1962 (Keefe, 2007). Keller's (1968) PSI included the following components: (1) The ability for students to move at their own pace; (2) Mastery-based learning; (3) Lectures and demonstrations as vehicles of motivation, rather than sources of critical information; (4) Emphasis on the written word in teacher-student communication; and (5) The use of proctors which permitted repeated testing, immediate scoring, and tutoring.

Although personalized learning is not a new concept, it has been revitalized as a part of recent educational reform movements and funding tied to the initiative. Further, the increased availability and affordability of technology has resulted in calls to leverage technology to personalize learning for students. The U.S. Department of Education included personalization as part of their 2010 and 2016 Technology Plans (U.S. Department of Education, 2010, 2016). Support for personalized learning has also emerged out of rising opposition to standardized tests and the "factory model of education" which critics argue has left students feeling like widgets in the classroom (Herold, 2019, para 15). Many curriculum and educational technology companies cite personalized learning as one of their main selling features, as parents demand more personalized approaches for their children (Bray & McClaskey, 2015; Keefe, 2007), yet there is still an absence of consensus on what is meant by the term, despite the increased focus on personalization. Planning and implementation for schools has been difficult because of this lack of consensus and concerns and critiques of personalized learning plentiful (Herold, 2017; Kohn, 2015; Roberts-Mahoney, Means, & Garrison, 2017

Although there has been much dialogue about the meaning of personalization, there has been little research on the effectiveness of personalization on student learning. Perhaps because it is difficult to measure what you cannot define. Nevertheless, two important studies have been conducted. Pane, Steiner, Baird, and Hamilton (2015) at the RAND Corporation com-

pleted a study of 62 public and charter school districts that received NGLC grants to implement personalized learning to support the implementation of college-ready standards. The report acknowledged that personalized learning has been around for some time, but the adoption of such approaches has increased significantly, in part due to rapid advances of technology platforms and digital content, which have been used to personalize learning. Pane et al. acknowledged there was not yet one shared definition of personalized learning, but claimed practitioners in the field generally looked for three characteristics:

> (1) systems and approaches that accelerate and deepen student learning by tailoring instruction to each student's individual needs, skills, and interests; (2) a variety of rich learning experiences that collectively prepare students for success in the college and career of their choice; and (3) teachers' integral role in student learning: designing and managing the learning environment, leading instruction, and providing students with expert guidance and support to help them take increasing ownership of their own learning. (pp. 2-3)

Pane et al. admitted that there was considerable variety in the instructional models of the schools studied, but they identified five strategies that typified personalized learning environments which was based on a framework developed by the Bill and Melinda Gates Foundation. Each strategy encompassed a set of tools or features of the personalized learning environment, some of which were central to the approach whereas others might be viewed as enablers of the approach. The personalization framework included the following:

1. Learner profiles: Learner profiles are records of student's individual strengths, needs, motivations, progress, and goals used to inform learning. Goals are generated cooperatively by teachers and students. Student data is generated from multiple sources including projects, tests, presentations, quizzes, and software. Student data are provided to students, and teachers and students discuss these data.

2. Personal learning paths: Students are held to performance standards but the school model allows for multiple pathways to achieve and demonstrate mastery of these standards. Students make choices about the content and structure of learning and the school uses varied instructional strategies and curriculum materials to meet the needs of all learners. Time for one-on-one academic supports is built into the school day and there are opportunities for students to engage in meaningful learning experiences outside of school.

3. Competency-based progression: Student progress toward clearly de-
    fined goals is consistently assessed. Assessment occurs "on demand"
    when a student is prepared to demonstrate competency. Assessments
    are varied and students advance or earn course credit as they demon-
    strate competency, moving at their own pace.

4. Flexible learning environments: The school uses elements of the
    learning space, such as size, classroom organization, and furniture to
    support the implementation of personalized learning. Schools also le-
    verage staff and time in flexible ways to support personalization. Stu-
    dent learning time and student grouping strategies are flexible, data-
    based, and responsive to student needs. Technology is often a key as-
    pect of the model and available to all students.

5. Emphasis on college and career readiness: Curriculum, activities,
    and programs are designed to promote college and career readiness
    in terms of academic and non-academic skills. Examples include col-
    lege visits, college level courses, internships, or career surveys. Stu-
    dent advisory strategies and other aspects of the curriculum develop
    skills and competencies beyond academic content to include "habits
    of mind," "learner identity" or "student agency" (Pane et al., 2015, p.
    3)

In this study of 62 public and charter schools that received the NGLC grants
for personalized learning, Pane et al. found positive effects on student per-
formance in reading and mathematics and the lowest performing students
made substantial gains relative to their peers (Pane et al., 2015). Scores
grew substantially relative to national averages and results were wide-
spread with the majority of schools having statistically significant positive
results. No single personalized learning element distinguished the success-
ful schools from other schools in the sample; however, Pane et al. identified
groups of elements that distinguished the successful cases from others when
present together. The three elements included student grouping in which
grouping strategies were flexible, dynamic, and responsive to student needs;
data discussion where students were provided with their own student data
and included in discussions about how the data related to student's learn-
ing goals; and learning space, particularly as the learning space supported
grouping strategies.

   In a follow up study, Pane, Steiner, Baird, Hamilton, and Pane (2017)
identified several benefits associated with personalized learning. The per-
sonalized learning structures allowed for more one-on-one time instruc-
tion between teachers and individual students. Additionally, teachers were
able to maximize flexible grouping strategies based on student data. There
were also modest gains in test scores. Students attending a personalized

learning school scored 3 percentile points better than a student with average test scores in a traditional school. The gains occurred in both reading and math but only the math scores were statistically significant. Students in personalized learning schools who started the year academically behind also made up slightly more ground than comparable students in traditional schools. Pane et al. (2017) also found a cumulative improvement in student test scores after schools completed their second year of implementing personalized learning. It is important to note that Pane et al. (2017) also identified some challenges associated with the implementation of personalized learning and cautioned that more research is needed. Challenges included a lack of sufficient teacher professional development, teachers not having sufficient time to develop customized lessons for each student, balancing the competing priorities of personalized learning, collaborative learning, and meeting common standards, as well as a lack of high quality digital instructional materials to support implementation. Additionally, some of the teachers reported that when students were able to move at their own pace, many of the students moved too slowly based on current requirements.

Professional Development

The increased focus on the implementation of personalized learning environments necessitates effective professional development for teachers who are often unclear about what personalized learning means or looks like in the classroom given the dearth of research about implementation (Keefe, 2007; Pane, Steiner, Baird, & Hamilton, 2017). Teacher professional development has been identified as critical to the effective implementation of personalized learning, yet minimal research has been done on the preparation of teachers to implement personalized learning (Bingham, 2016; Lin & Kim, 2013; Williams, Moyer, & Jenkins, 2014).

Lin and Kim (2013) studied professional development for personalized learning and developed guidelines for designing professional development on personalized instruction to overcome specific difficulties experienced by teachers in enacting personalized instruction including a lack of time, a lack of continuous support, and a lack of knowledge required for personalization. To address the barrier of a lack of time, Lin and Kim (2013) recommended three design components. First, they suggested that teacher professional development for personalized learning be contextualized in that it be designed to address specific teacher needs to solve authentic problems that happen in their classrooms (Lin & Kim, 2013). Next, they recommended that professional development assist teachers to develop individual learners' profiles and diagnose students' learning characteristics (Lin & Kim, 2013). This is consistent with the work of Karmeshu, Ramen, and Nedungadi

(2012) in which they argued that an effective personalized learning model includes the development and maintenance of a profile for each student to provide students with personalized feedback. Finally, Lin and Kim (2013) advocated for the use of a recommendation system which would use technology to analyze various types of student data to suggest learning materials and activities adaptive to each student.

To address a lack of continued support, Lin and Kim (2013) recommended that schools provide various forms of ongoing support for teachers learning to personalize instruction. These supports might include ongoing professional development, continuing support from a personalized learning coach, and on-site technical support and assistance. Fok and Ip (2006) also argued that professional development for personalized learning must help teachers learn to use technology for personalized instruction. In addition, Lin and Kim (2019) recommended continued opportunities for teachers to collaborate regarding their efforts to personalize instruction. This is consistent with the literature on communities of practice which suggests that adult learners work more effectively when placed in a social, collaborative environment (Wenger & Snyder, 2000).

Finally, to address a lack of knowledge required for personalization, Lin and Kim (2019) recommended the development of a personalized professional development environment to prepare teachers with the knowledge and skills needed for personalized instruction. This type of model would expose teachers to the types of pedagogy that are consistent with personalized instruction. Modeling methods such as personalized scaffolding will help teachers to customize their own teaching for individual students. Professional development models should also include inquiry-based training that will help teachers reflect on their current teaching practice, but also learn how to search for solutions for personalized instruction (Lin & Kim, 2013).

Since the literature on personalized learning is limited, guidance for the development of professional development for personalized learning may also be drawn from previous research on professional development more broadly, as the literature indicates that when implemented effectively, professional development can promote changes in classroom practice and have a positive impact on student achievement. Birman, Desimone, Porter, and Garet (2000) found that providing active learning opportunities in professional development increased teachers' knowledge and skills and successfully prompted changes in classroom practice. Additionally, professional development that provides learning and activities that build upon prior knowledge and experience and include discussions related to the real-life experiences of teachers supported similar outcomes (Birman et al., 2000; Signer, 2008). Belland, Burdo, and Gu (2015) recommended that professional development programs provide examples of instructional strategies,

including implementation, to connect what is learned in the professional development course to the existing classroom. Darling-Hammond, Hyler, and Gardner (2017) reviewed more than 35 studies on professional development, all of which resulted in positive outcomes for student achievement when particular factors were present. Darling-Hammond, Hyler, and Gardner (2017) identified seven design elements of effective professional development which were used in the design of the PPLC: (1) Content Focus; (2) Active Learning; (3) Collaboration; (4) Use of Models and Modeling; (5) Coaching and Expert Support; (6) Feedback and Reflection; and (7) Sustained Duration.

Blended Learning

There is currently no standardized definition for what constitutes blended learning, although most agree that it consists of a combination of face-to-face and instructional online strategies. The disagreement arises with regard to the degree to which each is implemented or integrated. Zenger and Uehlein (2001) argue that blended learning does not occur simply by adding a few online strategies to a traditional classroom. Successful blended learning requires an integrated approach, and the blend of methods should depend upon the needs of the students and the school (Zenger & Uehlein, 2001). Allen, Seaman, and Garrett (2007) are more specific in their definition determining that blended courses must have between 30-79% of the course content delivered online. Horn and Staker's (2014) definition made a distinction between blended learning and technology rich instruction arguing that in blended learning the Internet is leveraged to provide students a more personalized learning experience leading to increased student control over the time, place, path, or pace of leaning. The PPLC was designed using the Horn and Staker definition of blended learning.

In developing the PPLC, blended learning was used as a modality and as part of the content because it can help teachers to transition from more traditional teacher-centered instruction to more student-centered, active, personalized classrooms (Christensen, Horn, & Staker, 2013; Gemin, Pape, Vashaw, & Watson, 2015). Blended learning has been shown to enhance learning outcomes when compared with traditional face-to-face classrooms (Bernard, Borokhovski, Schmid, Tamim, & Abrami, 2014) and online classrooms (Chen, 2012). This is particularly true when the learning takes place through collaboration and community building (Agosto, Copeland, & Zach, 2013) which is why the design included the integration of both the blended learning and community of practice models.

Blended learning was also used as the modality for the PPLC to extend the learning beyond the face-to-face sessions and to connect teachers across multiple schools as well as with experts outside of the district.

Belland, Burdo, and Gu (2015) recommend that professional development programs offer flexible learning using a blended learning approach. Further, professional development should provide models of instructional strategies, including implementation to connect what is learned in the course to their existing classrooms (Belland, Burdo, & Gu, 2015; Darling-Hammond, Hyler, & Gardner, 2017). The goal was for teachers to gain a better understanding of how to leverage blended learning to personalize instruction by participating in blended, personalized profesional development. Additionally, blended learning has been shown to be an effective professional development modality to promote sustainable change in educational practice, particularly in difficult teaching situations (Acree, Gibson, Magnum, Wolf, Kallogg, & Branson, 2017; Graham, Woodfield, & Harrison, 2013; Onguko, 2014; Moore, Robinson, Sheffield, & Phillips, 2017).

Theoretical Perspectives

Self-Efficacy

The construct of self-efficacy refers to an individual's belief in his or her capability to "organize and execute the course of action required to manage prospective situations" (Bandura, 1997, p. 2). It is a task-specific belief that regulates choice, effort, and persistence in the face of obstacles and in concert with the emotional state of the individual (Bray-Clark & Bates, 2003). Expectations of personal efficacy determine how much task-related effort will be expended, how long that effort will be maintained, and whether an individual's coping behavior will be initiated (Bandura, 1982).

Research has indicated a positive relationship between self-efficacy and different motivational and behavioral outcomes in clinical, educational, and organizational settings (Stajkovic & Luthans, 1998). Self-efficacy has been consistently recognized as an important attribute of effective teaching and has been positively correlated to teacher and student outcomes (Tshannan-Moran, Hoy, & Hoy, 1998). Evidence suggests that positive self-efficacy beliefs can increase the extent to which teachers are willing to transfer skills learned through professional development to the classroom (Bray-Clark & Bates, 2003). Additionally, research has also shown that teachers with high levels of self-efficacy tend to explore more alternative methods of instruction, seek improved teaching methods, and experiment more extensively with instructional materials (Allinder, 1994). Further, directing resources at enhancing self-efficacy can initiate and sustain an on-going process of individual improvement because of the nature of the reinforcing feedback cycle, a cycle in which initial increases in self-efficacy beliefs lead to increased teacher effectiveness that in turn enhances subsequent self-efficacy beliefs (Bandura, 1991).

Communities of Practice

Communities of practice are defined as "groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (Wenger-Trayner & Wenger-Trayner, 2015). Communities of practice are formed by people who engage in a process of collective learning in a shared domain of human enterprise. Wenger (1998) identified three dimensions of communities of practice: mutual engagement, joint enterprise, and shared repertoire. These dimensions were later updated to identify three critical elements that constitute a community of practice:

1. The Domain: A community of practice has an identity defined by a shared domain of interest.

2. The Community: In the process of pursuing their domain, members engage in joint activities and discussions, help each other, and share information. The relationships they develop help them to learn from one another. Members must interact and learn from one another for a community to be a community of practice.

3. The Practice: Members of a community of practice are practitioners. They developed a shared repertoire of resources such as experiences, stories, tools, techniques, and approaches to problem solving. They develop a shared practice. (Wenger, McDermott, & Snyder, 2002; Wenger-Trayner & Wenger-Trayner, 2015).

The concept of communities of practice has been applied to different types of organizations and has been shown to have a positive impact on learning and improving the efficacy of work (Brown & Duguid, 1991; Goddard, Hoy, & Hoy, 2000; Hoadley, 2012; Lin & Kim, 2013; Wenger, 1998; Wenger, Trayner, & de Laat, 2011; Wenger-Trayner & Wenger-Trayner, 2015). Wenger, McDermott, & Snyder (2002) identified several benefits of implementing communities of practice (CoPs), both to the individual and to the organization. They describe both short-term and long-term value. In the short-term, an employee can get help with an immediate problem, receive multiple perspectives on an issue, and practice risk-taking and problem-solving in a supportive, collaborative environment. In the long-term, this structure helps the employee to develop professionally and engage in productive ongoing practices. Ultimately, they connect professional development and the strategy of the organization (Wenger, McDermott, & Snyder, 2002).

Over time, the concept of community of practice has evolved from a descriptive one (Lave, 1987; Lave & Wenger, 1991) to a more prescriptive one (Cox, 2007; Wenger, McDermott, & Snyder, 2002). Communities of practice occur naturally, but can they be cultivated? Wenger, McDermott, & Snyder (2002) developed seven design principles for cultivating a commu-

nity of practice which were leveraged in the design of the PPLC: (1) Design for evolution; (2) Open dialogue between inside and outside perspectives; (3) Invite different levels of participation; (4) Develop both public and private community spaces; (5) Focus on value; (6) Combine familiarity with excitement; and (7) Create rhythm for the community. These principles were used in the design of the PPLC innovation.

METHOD

The purpose of this study was to examine the effectiveness of a blended learning community of practice model in providing professional development to improve K-12 teacher self-efficacy with regard to the implementation of personalized learning. The research question was: RQ1: To what extent does participation in a blended learning community of practice affect K-12 teachers' knowledge, skills, and self-efficacy for implementing personalized learning? The study employed a mixed-methods design in which the quantitative and qualitative methods were implemented concurrently for the purposes of triangulation and expansion (Johnson & Onwuegbuzie, 2004; Mertler, 2014).

Participants

The participants consisted of 18 K-12 teachers from across the district, drawn from volunteers. Teachers were selected with the goal of creating a representative sample by including teachers of varied genders, education levels, years of experience, teaching assignments, and schools. Sixteen of the participants were female. Eight of the participants were general education elementary teachers and two of the participants were elementary special education teachers. Ten of the teachers taught secondary education with five teaching middle school and four teaching high school. Secondary subjects included English language arts (ELA), science, social studies, math, business, world languages, and health and physical education. The participants varied in their years of teaching experience. Four of the teachers had between one and four years of teaching experience and were therefore non-tenured teachers. Five of the teachers had been teaching between five and 10 years. Five of the teachers had been teaching between 11 and 15 years. Two of the participants had been teaching between 16 and 20 years and two of the participants had more than 20 years of teaching experience. All seven district schools were represented by this participant group.

Quantitative Data

Quantitative data were obtained by administering self-efficacy surveys to teachers before and after the PPLC intervention. The self-efficacy scale was based on Bandura's (2006) one hundred-point scales of perceived competence in which individuals are asked to rate themselves on their perceived competence, or what they "can" do. Participants were presented with items portraying different levels of task demands related to nine personalized learning constructs and asked to rate the strength of their belief in their ability to execute the requisite activities. The constructs included instruction, learning profiles, personal learning paths, competency-based learning, data use, choice, technology for personalization, college and career readiness, and project-based learning. Plano Clark and Creswell (2010) asserted that scores from a data collection instrument must be reliable. Cronbach's alpha was used to measure the internal consistency of the instrument and its constructs. The self-efficacy survey demonstrated high reliability with a value of .97.

Qualitative Data

Qualitative data were obtained from individual participant interviews, emails, online discussion board postings, online assignment submissions, and feedback surveys completed after each face-to-face session. Data were analyzed using an inductive grounded theory approach (Charmaz, 2000; Glaser & Strauss, 1967).

RESULTS

Teacher Self-Efficacy Quantitative Data

The personalized learning self-efficacy instrument was administered to 18 participants prior to beginning the PPLC. Fifteen participants completed the post test. Means were calculated for each construct and then a paired t-test was conducted to compare the means of each construct for the pre- and post-tests. Table 2 displays the results of the paired t-test and includes the pre-and post-test means for each construct and the standard deviation, the difference, standard error and the t and p values.

Table 2
Personalized Learning Self-Efficacy Survey Comparison of Means (n=15)

	Pre-Test		Post-Test		Change			
	Mean	SD	*Mean*	SD	Difference	Standard Error	*t*	*p*
Instruction	74	9	83.4	6.5	9.4	2.5	3.8	.002
Learning Profiles	65	10.6	84.3	6.9	19.3	2.7	7.1	<.001
Personalized Learning Paths	70.8	13.1	87.1	7.6	16.3	3.4	4.8	<.001
Competency-Based Learning	74.3	12.3	87.7	7.6	16.3	3.4	4.8	<.001
Data Use	69.7	16.2	85.7	7.7	16	3.9	4.1	.001
Choice	66.4	14.1	88.5	6.5	22.1	3.2	7.0	<.001
Technology for Personalization	59.8	19.4	80.8	17.8	21.1	4.8	4.4	.001
College & Career Readiness	80.9	13.9	94.3	4.3	13.4	2.9	4.5	<.001
Project-Based Learning	67.9	20.8	90.4	8.4	22.6	4.4	5.1	<.001

Since the p value for all constructs is $p < .05$, it can be said that there was a change in the pre-and post-test values and it was substantial in terms of the pre-test variation. Since the post-test values were higher, the teachers demonstrated greater levels of self-efficacy with regard to the implementation of personalized learning in all nine constructs after their participation in the PPLC. This is important because one of the main district barriers to the implementation of personalized learning in the district was a lack of professional development. After participating in the PPLC, the teachers were more confident in implementing personalized learning, thus moving the district closer to its goal. This finding is also important because there has not been any other research done related to teacher's self-efficacy with regard to the implementation of personalized learning and this evidence indicates it is possible to increase confidence levels related to the implementation of personalized learning with an intervention specifically designed to do so.

Teacher Self-Efficacy Qualitative Data

The qualitative data also revealed an increase in teachers' self-efficacy levels related to personalized learning but provided more information as to the specific ways in which the teachers felt more confident. Teachers reported higher levels of confidence with regard to planning, implementing,

reflecting, and refining personalized learning. The teachers also articulated increased confidence in teaching other teachers how to implement personalized learning, largely because of the specific knowledge and skills gained as a result of their participation in the PPLC. Table 3 provides an overview of the areas of teacher self-efficacy.

Table 3
Teacher Self-Efficacy

Planning	Teachers effectively planning for personalized learning in their classrooms; teachers planning to integrate technology into their lessons	I really appreciated having this time to learn and work so I made the most of it. I got a lot done in every session and then I was able to roll this over into my regular planning. I feel good about planning for personalized learning.
		I sign up for the computers every day now. I never knew what to do with them before other than to have students take notes or do research.
Risk-Taking	Teachers became more comfortable taking risks in their classrooms.	It's ok to not have all the answers now and we are permitted to fail.
		I feel like the cohort has created a safe space to try new things and that I won't be penalized for things that don't go well right away. This allows me to model failing forward for my students.
Implementation	Teachers felt more confident about the implementation of personalized learning and the use of technology.	I was able to discuss ideas and find a way to begin to implement a flipped classroom and more choices into my math instruction.
		I used to get nervous when I had the kids on the computers. Now, I don't even bat an eye.
Continuous Improvement	Teachers were reflective about implementation and were focused on continuous improvement.	I feel really good about it. I'm actually really excited for this next student group, because I have most of the work done. So, now I feel like I can tweak it. I wanted to put it into stages. I know I can keep making it better.
Sharing	Teachers shared their learning with teachers outside of the cohort.	I think this has been just such a learning experience for me. I know I'm sharing out with others who have not participated in it. I've been pushing it on them.

Planning

Teachers reported increased confidence with regard to planning for personalized learning as well as planning for technology integration, which is important because planning is a key component of teacher effectiveness, particularly when integrating technology into learning (Lee & Lee, 2014; McBer, 2012). Sarah, a high school science teacher, stated

I came to each cohort meeting very eager to see what I could do, and then I'm the type of person who immediately puts it into action the next day. So that night, I'll be changing my lesson plan, trying to experiment with something I learned in the cohort. That's what I did throughout the year. It really affected my planning.

Teachers reported on the importance of the planning, or design time, included in the PPLC. They found planning for personalized learning overwhelming in the beginning because, in order to allow students to move at their own pace, multiple lessons or content units must be ready to implement in the beginning of a unit. Since the cohort included design time for planning and because the teachers had each other and a coach available to support them, rather than just receiving information without the time to apply it, teachers were able to make a permanent shift in the way that they planned so that they could embed personalized learning in their planning. Audrey, a middle school social studies teacher, reinforced this in her interview:

Sometimes if you're sitting through a workshop and now it's like, okay, great, hope you enjoyed that. Then you go home and now it's everything else that comes up, you sometimes forget what you learned and how you wanted to implement it.

This highlights the importance of offering professional development for a sustained duration in job-embedded contexts and using active learning models (Darling-Hammond, Hyler, & Garner, 2017). It also indicates that embedding design time into professional learning may also be an essential design element of effective professional development.

Risk-taking

Teachers reported increased confidence with regard to taking risks in their classrooms. This is important in the change process. When asked about her level of confidence in implementing personalized learning, Lori, a middle school ELA teacher, stated the following, illustrating growth in the area of risk taking,

I do now (feel confident). I was tentative in the beginning, and I think that's just normal. Any time you try something new, there's risk involved. But I just felt like, what's the worst that can happen?

Teachers openly discussed their fears in the cohort sessions and became more open to taking risks as they connected with and shared experiences with their colleagues. Some teachers even became excited to come in and discuss their "failures" because they knew they would get more ideas and assistance from the group. Amy, an elementary special education teacher, commented,

> Sharing the different strategies that we have tried and worked have been extremely beneficial. It has also been helpful to learn from the failures of others and to get help with our own failures.

This is important because risk-taking is an essential part of the change process (Fullan, 2007). The community may have played a significant role in promoting risk-taking as Zinn (2017) found that social motivation affects risk-taking and that one's risk-taking identity can be shaped by social forces.

Implementation

Teachers reported increased confidence in the implementation of personalized learning. Leighanne, a middle school ELA teacher stated,

> I have always put 100% of myself into my classroom and my students, but I was the one "in charge." It has been unbelievably eye opening to take a step back and just guide them to become problem solvers, collaborate with their peers, and navigate their own learning process. I am a much better teacher (and learner) after participating in this cohort!

There were numerous discussions of various types of personalized learning implementations in the PPLC cohort. The teachers began implementing personalized learning strategies in their classrooms after the second cohort session. As the year continued, they reported more and more implementation goals and accomplishments. They also reported being more comfortable using technology for personalization. For example, Deirdre a high school German teacher, stated, "My class is now completely blended. I think you could give me any topic in my field and I could figure out how to personalize it." These changes were also observed by their personalized learning coach and their principals and reflected in their teaching observations. All of the teachers agreed to open their classrooms to other teachers who were interested in learning more about personalized learning because of their improved confidence with implementation which may lead to more teachers being willing to try this instructional approach (Hendry & Oliver, 2012).

Continuous Improvement

Teachers reported increased confidence in reflecting and making modifications for continuous improvement. Leighanne discussed how she did this in consultation with her students:

> Something doesn't go well, so I change it for the next class. I do have the luxury of teaching the same class three times a day, so you almost feel badly for that first period. You're like, "Sorry, guys. You're the guinea pigs," and they laugh. But I'm very open with my students, and I'll say to them, "Hey, this is the first time I'm doing this." And then I always do a self-reflection. It's something that I've always done. I always have a sheet at the end. It's a survey and it asks them, "What did you like? What didn't you like? How could we do it differently?" Then we talk about it.

Leighanne was also modeling reflection and continuous improvement for her students, processes embedded in personalized learning generally. She was open to feedback and comfortable with failure, some of the dispositions and skills the teachers identified as being important for students. In the cohort sessions, teachers sought feedback from their colleagues and coaches. They were eager to receive feedback that would improve personalized learning implementations. During their interviews, teachers frequently discussed the changes they implemented based on the feedback they received from the personalized learning coach. In the last cohort session, the teachers discussed their plans for next year, and they were generally focused on improving and expanding their personalized learning work which is important because continuous improvement is a critical component of effective innovation (Bessant & Caffyn, 1997; Fullan, 2007).

Sharing

Finally, teachers demonstrated increased confidence in sharing their knowledge of personalized learning with their colleagues. Deirdre presented at her faculty meeting. She stated,

> They asked, "What are you doing differently?" And I showed them what I'm doing and they're like "Oh this is- I can do that for the English class," and I'm teaching math and they're like "Oh, I can do the same thing." They do the same thing but with their own subjects.

All of the PPLC teachers shared with their colleagues the personalized learning work they were doing in faculty or department meetings. This type of teacher sharing and leadership is critical to promoting educational change (Guskey, 1986; Harris, 2010).

Teacher Competencies

Increased Knowledge of Students

The teachers reported learning more about their students, including their interests and abilities. What teachers reported learning varied based on the grade level of the students. Prior to their participation in the PPLC, elementary teachers seemed to know more about the interests and families of their students but less about their academic abilities. The secondary teachers seemed to know more about students' academic abilities but less about their students as people, such as their interests and goals. This is consistent with the findings of Hargreaves (2000) in which he argued that elementary teaching is generally characterized by physical and professional closeness, resulting in greater emotional intensity, while secondary teaching is characterized by professional and physical distance, which threatens the emotional understanding on which high quality teaching and learning depends. To implement personalized learning, the teacher has to know their students and have some type of emotional connection. The cohort participants began to learn about their students in ways they had not before, deepening their emotional connections. A focus on personalized learning may help to develop the emotional connections that are sometimes lacking at the secondary level.

The teachers also realized that the students were capable of more than they had originally expected. Amy said, "I learned that students, especially the younger ones, can do a lot more than we think. They can really rise to the challenge." Annette, a kindergarten teacher, said, "I will never go back to the other way. It has just been amazing watching them grow and take charge of their own learning and just everything that they've accomplished has been amazing." This is an important finding because the relationship between teacher expectations and student achievement has been well documented in the research literature (Brattesani, Weinstein, & Marshall, 1984; Brophy, 1986; Cooper, Findley, & Good, 1982; Cotton, 1989; Edmonds, 1979; Rosenthal & Jacobsen, 2003; Trouilloud, D., Serrazin, P., Martinek, T., & Guillet, E., 2002). If the PPLC or the approach to personalized learning increased teacher expectations regarding student performance, this is likely to have a positive impact on student achievement.

Technology Skills

The teachers reported the development of a variety of technology skills including the use of Excel, Google Classroom, Canvas, discussion layering techniques, teacher "cloning," and blended learning strategies, which have been identified as important 21st century learning skills for both teachers and students (Bellanca & Brandt, 2010). There was widespread agreement amongst the teachers that technology could be used to support and help facilitate personalized learning. For example, an Excel spreadsheet could be used to track student mastery of content standards. Sites such as Answer Garden and Padlet can be used to layer conversations ultimately improving the quality of class discussions. Aggie, a middle school social studies teacher stated,

> Padlet really helped students to think deeply about my content and interact with each other online before we talked about the topic in class. Whenever we did a Padlet before a class discussion, I always got better participation. There were more volunteers. I could also call on people by referencing their Padlet contributions.

Blended learning strategies and online content could offer students more choices in terms of subject-matter, more control over pace, and anywhere, anytime access. Steve, a high school health teacher and an admitted "techno-phobe," embraced the use of technology. At the end of the cohort he said, "My class is completely computer based at this point. I have not printed a single thing since the second marking period." He also discussed innovative ways that he used technology with students. For example, he was home sick one day and he managed to still teach class from home. "I had 102 fever, bronchitis and a sinus infection. And it was funny, because I taught one of my classes, an entire unit on tobacco and nicotine, all through Google Classroom when I was at home." Mary, a high school science teacher, learned "how to facilitate a flipped classroom." She created her own YouTube channel with close to 100 videos to help students learn biology. She liked that they could review them as many times as they needed to understand the concepts.

Some of the teachers were already very skilled in the use of technology and they helped to teach their colleagues. Melony, for example, is a business teacher and very skilled in the use of Excel. She taught many of the teachers how they could use Excel for personalized learning such as using it as a facilitation guide for students and as a mastery tracker. Kelly, an elementary teacher, said of Melony's teaching, "I learned how to use Excel and how to send class lists from Power School to Excel. This is very helpful because it helped me make checklists for standards."

Design and Problem-Solving Skills

The teachers reported the development of a variety of skills including design thinking and problem-solving skills. Design thinking was introduced in the first cohort session, and the philosophy was carried throughout the year. Several of the teachers responded positively to the idea of teachers as designers. After participating in a course in design, one of the teachers indicated on the feedback form, "The last partner activity was valuable, as it taught me how to analyze and identify a problem that I didn't actually even know existed prior to looking, while engineering a possible solution to not only solve the problem but to also improve a situation." Some teachers implemented subsequent design challenges with students. This is an important finding because employees with these types of design and problem-solving skills are beneficial to organizations, particularly those with complex knowledge bases (van Laar, van Deursen, vam Dijk, & de Haan, 2018). In addition, having good design thinking skills assists individuals in solving complex problems and to be able to adjust to unexpected changes (Razzouk & Shute, 2012). Moreover, teaching these skills to our students will help them to develop their critical thinking skills and promotes dispositional traits such as persistence and creativity which have been defined as essential 21st century skills. (Bellanca & Brandt, 2010; Henriksen & Puriva, 2014; Razzouk & Shute, 2012).

Facilitation

The teachers learned how to shift their roles to facilitate student learning rather than being the sole content provider in the classroom. The development of facilitation strategies was critical as this helped the teachers implement more student-centered classrooms. In one of the anonymous feedback forms, a teacher reported that they had learned "the ability of stepping back and giving the students the independence and opportunity they need to grow as learners. To be a facilitator." Another teacher reported learning, "to act as a facilitator instead of always as the instructor." Similarly, a teacher recounted "learning specific strategies for scaffolding student learning and taking the steps towards giving students greater responsibility." It was not easy for all of the teachers to step back and relinquish this control.

In the beginning, Melony kept reporting that inevitably the class would return to whole group instruction because the students were not able to work independently. Eventually, she came to the realization that it was not the students that could not handle working independently or in small groups, but it was she, herself, who was uncomfortable not "commanding the room." "At first, I felt like I wasn't really teaching if I wasn't talking to everyone all at once." There is a common sense of discomfort when teachers shift to a learner-centered classroom. Evertson and Neal (2006) found

that many teachers grappled with finding a balance in how active they should be in guiding students in a learner-centered classroom. Teachers often struggled with the degree to which they should relinquish their authority in the classroom (Evertson & Neal, 2006). The PPLC cohort provided opportunities for the teachers to discuss and work through some of these challenging questions.

New Dispositions

The teachers reported dispositional changes such as increased flexibility and open-mindedness which have been identified as important skills for managing the uncertainty around educational change and in developing creative thinking and problem-solving skills (Barak & Levenberg, 2016; Kenett, Levy, Kennett, Stanley, Faust, & Havlin, 2018). Some of this work was evident in observing them and their discussions throughout the cohort but they also articulated this in their interviews. Noel, a middle school Spanish teacher said, "The biggest skill that I'd say I'd gained would probably be ... keeping an open mind. Being flexible. I felt like I was flexible, but I'm a lot more now, even with assignments." When asked about skills gained as a result of the cohort, Aggie said, "The ability to be open and receptive to a flexible classroom." Leighanne said, "I now offer a variety of seating/learning/reading options, as well as a more individually paced, personalized learning environment." After one of the cohort sessions, Amy said that she was going to now be more open to other district initiatives because she was getting so much out of the cohort and it made her wonder what else she might be missing. This kind of flexibility and open-mindedness helped to make the teachers more receptive to learning about different ways of teaching. It also helped them to be supportive of students as they began to express and assert themselves in terms of learning pathways, demonstration of mastery, and seating preferences.

Community and the Blended Learning Environment

Community played a very important role in teacher learning and the blended learning environment enhanced community building. The teachers got to know their colleagues in the PPLC. Teachers reported learning from one another, but they also talked about expanding their relationships and their networks. They enjoyed this camaraderie and the idea that they were "all in this together." This theme came up frequently in the data. Leighanne reported, "I met a few people that I thought were ... that I didn't know before…So I felt that the interactions were great and the fact that you're (with others) always helps because ... we were working together, so it was good."

The teachers reported being isolated from other teachers, even in their own buildings. As the cohort continued, their relationships became more meaningful over time and they established plans for them to continue beyond the cohort meetings. Lori said:

> At first, I was sitting with a couple of people from my school, which was nice because I normally don't get to speak with those people. Then as the cohort went along, I started branching out and then I even started working and talking with the language arts teachers from other schools. On the last day, we even said, "Wow, we never really got to talk to one another," because they were seventh grade, I was sixth grade, they were at different schools, so that was really good. We even used the online tools to keep in touch with what we were doing.

Noel concluded,

> I just would like to share that I am very thankful for being a part of the cohort. I felt like it's given me so much in terms of just strategies and a network of colleagues that can support my ideas and at the same time I can bounce my ideas off of, which is really neat…now I feel like my network is much larger, and we are all in it together.

The blended learning environment was essential in the development of the community and the deepening of relationships and collaborative projects. Caleb, a middle school math teacher, said, "The online components were crucial because I got to interact with everyone and not just the people I usually sit with." Beatrice, one of the elementary teachers stated. "The online part really promoted interdisciplinary and cross grade level work. Who would have thought that me, as a grade three teacher, would be partnering with a high school teacher?" There were several instances of class partnerships. In that instance, the high school students came to work with the third graders on their writing. Lori remarked,

> The online component made it so that none of our conversations ever had to stop because our face-to-face class was over. We continued our discussions and work online and in between classes. I got more done and I felt more prepared for each of the face to face classes.

The idea that the online components contributed to the completion of more work was widely shared. Aggie, Audrey, Leighanne, and Lori developed units together online even though they were all in different buildings. Lori said this of the experience,

> Being able to reflect on our experiences days after the ses-
> sions was powerful. The conversations and the learning kept
> going. The fact that we had an online private work space was
> amazing. Four heads are definitely better than one. It was
> also a time saving strategy. The four of us got so many more
> units developed working together that I would have ever done
> alone. The funny thing is that none of us ever see each other in
> person outside of the [professional development].

The importance of the blended learning environment in building and devel-
oping community is consistent with Rovai and Jordan's (2004) findings in
which blended environments were found to create a better sense of com-
munity than face-to-face or online classes. Further, teaching can be an iso-
lating profession because teachers are in their own classroom all day, often
with little interaction with colleagues (Schlichte, Yssel, & Merbler, 2005;
Flinders, 1988; House & Lapan, 1979; Sarason, 1966). Flinders (1988) ar-
gued for the importance of addressing teacher isolation in reform move-
ments. The PPLC helped to eliminate teacher isolation by providing the
teachers with time to connect with one another and to share ideas and strate-
gies, developing lasting relationships. This is consistent with the research
of de Jong, Moolenaar, Osagie, and Phielix (2016) in which they found that
there was a positive relationship between teacher social networks and teach-
er self-efficacy and commitment. The concept of a cultivated community of
practice may offer a way to provide all participating teachers with these crit-
ical social networks to support the development of self-efficacy and com-
mitment.

DISCUSSION

This study demonstrated that it is possible to cultivate a community of
practice (CoP) for professional learning and that the blended learning en-
vironment helped to promote community and collaborative working rela-
tionships. The importance of the online components in addition to the face
to face sessions supports previous findings that demonstrated that online
communities of practice (CoP) can increase communication and collabora-
tion among teachers (Vavasseur & MacGregor, 2008). Further, the blended
learning CoP increased teacher's self-efficacy with regard to the implemen-
tation of personalized learning and enhanced teacher confidence in several
areas including planning for personalized learning and technology integra-
tion, risk-taking, making modifications for continuous improvement, and
sharing personalized practices. Additionally, the teachers developed new
competencies such as an increased knowledge of their students, improved
technology skills, design and problem-solving skills, and facilitation skills.

This outcome is consistent with research that has demonstrated CoPs to have a positive impact on learning and improving the efficacy of work (Brown & Duguid, 1991; Goddard, Hoy, & Hoy, 2000; Hoadley, 2012; Lin & Kim, 2013; Wenger, 1998; Wenger, Trayner, & de Laat, 2011; Wenger-Trayner & Wenger-Trayner, 2015).

Teachers reported dispositional shifts such as being more flexible and open-minded which have been identified in previous research as important skills for managing the uncertainty around educational change and in developing creative thinking and problem-solving skills (Barak & Levenberg, 2016; Kenett, Levy, Kennett, Stanley, Faust, & Havlin, 2018). Teachers made substantial changes to their classroom practice resulting in greater student agency which has been found to play a key role in students' academic success (Ferguson, Phillips, Rowley, & Friedlander, 2015; Nogura, Darling-Hammond, & Friedlander, 2015). Agency and agency-related factors are helpful concepts for encapsulating multiple educational goals including the academic skills measured by standardized testing, but also the emotions, behaviors, skills, and dispositions necessary for effective learners and problem solvers (Hitlin & Elder, 2007).

Teachers recognized that some aspects of personalized learning could be implemented without technology, such as providing opportunities for student voice in the classroom, but they were convinced that technology should play a key role in personalized learning implementations. Technology facilitated opportunities for teachers to "clone" themselves and "flip" their classrooms by making videos, to offer students increased choices by having a variety of content and materials available via the Internet and content repositories, to use technology applications to layer and improve student discussion, track student progress and mastery, support independent student research, and to expand their own professional learning networks. This outcome is consistent with the findings of McLoughlin & Lee (2007) that technology can support greater student choice, self-direction, and participatory learning. To optimize personalized learning, teachers recommended 1:1 tech environments, additional technology support, and technology coaches that could assist with implementation in the classrooms.

The nation is struggling to figure out how to adequately prepare our students for college and career, to promote creativity, and to eliminate achievement gaps so as to compete in a new and rapidly changing global economy. Given this desire and the many challenges we face in schools, there are frequent calls for reforming education. One of the more recent reform initiatives is personalized learning. Many policy-makers, funders, vendors, board members, and school leaders have jumped on this bandwagon, yet there is no consensus on what this term actually means, and there has been little support for schools in trying to implement personalized learning.

The increasing prevalence of personalized learning, as a discourse, policy, and practice, is challenged by the scarcity of meaningful professional development. Gross and DeArmond (2018) found that personalized learning had strong support in schools and had the potential to change instruction, but that principals let teachers define personalized learning on their own, miring schoolwide approaches. They also recommended establishing communities of practice to recruit and support collaborative learning among teachers and leaders from several schools (Gross & DeArmond, 2018). (Pane et al. 2017) documented professional development for personalized learning as a challenge. Pane, who spent time observing in classrooms as part of the research, stated, "Some schools I visited just left the teachers to do (personalized learning) on their own. There was no PD" (in Bushweller, 2019, para 17).

In a recent Education Week study, 21% of teachers viewed personalized learning as a transformational way to improve schools and more than half described personalized learning as a tool in their school improvement toolbox or a promising idea (Klein, 2019). However, two thirds of the teachers indicated that they rarely or never implemented key components of personalized learning, such as allowing students to set their own learning goals, using digital software to construct learner profiles, or allowing students to select the metrics that determine progress toward learning goals (Klein, 2019). Additionally, more than half of the teachers said they rarely or never allowed students to choose how they wanted to demonstrate what they had learned or leverage technology to allow students to work at their own pace (Klein, 2019). This is not surprising, given that 21% of the teachers reported professional development for personalized learning as non-existent, 14% of teachers reported it as ineffective, and 42% reported it as effective but inconsistent (Klein, 2019).

There is a documented need for more effective professional development on personalized learning. Given the number of participants and the research methodology, the PPLC study is not generalizable, but it may have transferrable value (Mertler, 2014). The Personalized Professional Learning Cohort (PPLC) project offers one approach that is grounded in research and may be helpful as a model in supporting school districts to work toward creating more personalized learning environments by offering meaningful professional development.

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