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Operationalizing and Measuring Personalized Learning in K–12 Schools: The Development and Implementation of an Innovation Configuration Map

Heather E. Arrowsmith, Gary W. Houchens, Trudy-Ann Crossbourne-Richards, Jenni L. Redifer, & Antony D. Norman, *Western Kentucky University*
Jie Zhang, *University of Houston*

Abstract

In 2012, the United States Department of Education announced the Race to the Top-District grants. One joint award was made to two large educational cooperatives in the same state that together represented 111 mostly rural schools in 22 districts. One of the grant's identified four essential projects was the implementation of personalized learning. This article describes how the grant's external evaluation team worked with grantee leadership and school districts to operationalize personalized learning and then develop and implement Innovation Configuration Maps to measure school-level personalized learning environments. Developmental steps, adoption processes, and preliminary school-level results are reported.

Keywords: Personalized learning; Instrument development; Program evaluation

Introduction

In 2012, the United States Department of Education announced the Race to the Top-District (RTT-D) grants. This funding was designed to promote student achievement through the use of personalized learning experiences in schools (Federal Register,

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2012). Most RTT-D awardees were large urban-area school districts; however, this article focuses on a four-year RTT-D grant of $42 million awarded to two large educational cooperatives in the same state, which together represented 111 schools in 22 districts. These schools were identified as mostly rural, and chronically poor, with 16 of the 22 districts identified as districts of high poverty (U.S. Census Bureau, 2012). Seventeen of the districts were designated Improvement, Corrective Action, or Eligible for Assistance based on their Adequate Yearly Progress toward student achievement goals under the federal No Child Left Behind Act (No Child Left Behind, 2002). David Monk (2007) reported that in small schools (defined as having less than 100 students), approximately 21 percent of faculty have fewer than three years of full-time experienced and that both small and rural schools have "a below-average share of more highly-trained teachers"(p. 159). This grant allowed for professional development opportunities for teachers that would help them implement personalized and competency-based learning strategies in the classroom.

The grantee identified four essential projects related to increasing student achievement, educator effectiveness, and students' college and career readiness. These four projects included 1) developing students as leaders, 2) professional development for school leaders, 3) competency-based instruction, and 4) personalized learning. To implement these four projects, grant administrators identified four "drivers" through which students, teachers, and school leaders would gain new knowledge and skills (Green River Region Educational Cooperative [GRREC], 2012). The four drivers included a student empowerment initiative based on *The Leader in Me*, a student-focused program developed in 1989 inspired by the work of Stephen Covey (1989) in his book *The Seven Habits of Highly Effective People*; resources and supports to enhance students' college and career readiness; and professional learning communities to deliver and support professional development for groups of teachers (called communities of practice) and school administrators (communities of leaders).

Although these projects overlapped in their focus, the overarching goal of the grant was to foster more student-centered, personalized learning environments, which the grant's logic model hypothesized would indirectly promote higher levels of student achievement (GRREC, 2012). This article discusses the process the evaluation team used to help grant leaders operationalize personalized learning and create an Innovation Configuration (IC) Map (Hall & Hord, 2006) to evaluate school-level implementation. This task was challenging because definitions of personalized learning are not universally accepted, and grant leaders understandably sought to give schools the maximum flexibility in selecting appropriate personalized learning initiatives. Leadership teams at each of the 111 schools developed a personalized learning plan that established goals and strategies for implementing various elements of personalized learning.

The task for program evaluators was to determine how to assess each school's journey toward personalized learning when so many different approaches were being utilized. Thus, an IC Map was needed to provide a comprehensive framework of the multiple dimensions of personalized learning consistent with empirical research, as well as with the conceptualization of practitioners. The IC Map made it possible to describe what each of those dimensions looked like at various levels of implementation.

The following section offers a review of the literature that guided the operationalization of personalized learning and the development of an IC Map to measure its implementation. This review is followed by an explanation of the steps and processes followed for instrument development and implementation. The article closes with a description of the results and implications from two years of data gathered by schools using IC Maps to self-assess and reflecton their personalized learning progress.

Personalized learning

A key challenge for the evaluation team in developing an IC Map for personalized learning was the lack of a universally accepted definition. As recently as 2016, researchers were still highlighting the lack of clarity surrounding personalized learning (Herold, 2016). Benjamin Herold (2016) noted that "results are often highly dependent on local context and how well a particular approach was implemented. That makes it hard to draw sweeping conclusions" (para. 7). Furthermore, administrators for this specific grant wanted to give schools maximum latitude in their personalized learning innovations and did not provide schools or evaluators a concrete definition of personalized learning. Consequently, evaluators faced a need to operationalize personalized learning in order to evaluate whether or not it was being implemented in grant-participating classrooms.

Two groups, the International Association for K–12 Online Learning (iNACOL) and the International Society for Technology in Education (ISTE), have made efforts to define personalized learning and provide clarity for educators and administrators. iNACOL defines personalized learning as "tailoring learning for each student's strengths, needs and interests—including enabling student voice and choice in what, how, when and where they learn—to provide flexibility and supports to ensure mastery of the highest standards possible" (Abel, 2016, para. 4). ISTE defines personalized learning as "learning that is tailored to the preferences and interests of various learners, as well as instruction that is paced to a student's unique needs. Academic goals, curriculum and content—as well as method and pace—can all conceivably vary in a personalized learning environment" (Basye, 2018, para. 12).

The evaluation team, comprised of scholars and researchers, found these and other similar definitions to be a useful starting point for personalized learning, but they also sought to ground the concept in theory and existing empirical research. Thus, a broad range of theoretical and empirical literature that seemed implicitly central to the kind of personalized learning efforts seen in grant-participating schools was consulted. These theories included self-regulation theory (Deci, Ryan, & Williams, 1996; Zimmerman, 1989, 2002), growth mindset (Dweck, 2016), goal orientation theory (Ames & Archer, 1988), self-determination theory (Deci & Ryan, 2000), theoryof flow (Fredricks, Blumenfeld, & Paris, 2004; Furrer & Skinner, 2003; Shernoff, Csikszentmihalyi, Schneider, & Steele Shernoff, 2003), and zone of proximal development (Vygotsky, 1978). A thorough review of the history of personalized learning was also conducted, including personalized systems of instruction (Keller, 1968), learning for mastery (Bloom, 1968),standards-based grading (Guskey & Bailey, 2010), Montessori (1912), and problem-based learning (Barrows & Tamblyn, 1980).

From this exploration of related literature, personalized learning was determined to be a multi-faceted approach to learning that involves distinct changes in the roles of students and teachers, along with a significant shift in the learning environment itself. More specifically, personalized learning has to do with empowering students to take more responsibility for their own learning, as opposed to more traditional models of instruction wherein the teacher makes all the key decisions about what and how students will engage with new content and skills. This reflects research and theoretical frameworks suggesting that students will perform at higher levels when they have a clearer understanding and ownership of the goals of learning (Ames & Archer, 1988) and some say in how they approach learning tasks (Deci & Ryan, 2000). The result is a learning environment where students are less passive and more responsible for learning outcomes (Deci et al., 1996; Deci & Ryan, 2000; Zimmerman, 1989, 2002), more confident in their own eventual success (Dweck, 2016), and where they experience a sense of satisfaction that reinforces their efforts (Fredricks et al., 2004; Furrer & Skinner, 2003; Montessori, 1912; Shernoff et al., 2003).

Furthermore, related theory and research suggest that personalized learning requires a significant change in the way teachers approach the organization of learning tasks. In personalized environments, the teacher does not simply deliver instruction but does so with an attention to students' readiness levels (Vygotsky, 1978) and with opportunities for students to work at their own pace, making and correcting errors until skills or knowledge are ultimately mastered before the next learning task is introduced (Bloom, 1968; Keller, 1968). Moreover, personalized learning would encourage grading and assessment practices that would give students multiple opportunitiesto demonstrate mastery (Guskey & Bailey, 2010). Instructional practices would involve more hands-on opportunities for students to engage with new material to solve problems and draw their own conclusions before the teacher summarizes and synthesizes the material for them (Barrows & Tamblyn, 1980).

Finally, personalized learning approaches involve systemic changes in the learning environment, such as more flexible bell schedules and academic calendars to allow students more time to engagewith hands-on projects at their own pace. Benjamin Bloom's (1968) seminal research on learning for mastery demonstrated how variations in instructional time and pacing could reduce learning gaps among students. Thomas Guskey (2007) continued to champion the relevance of Bloom's early work and findings in instructional planning. More specifically, Kevin Williams and Teny Shapiro's (2018) recent research findings on randomized class schedules confirm how various school environmental factors can affect not only student learning but also teacher performance.

However, there was still the challenge of how to articulate incremental differences in the implementation of personalized learning across these components in ways that would assist schools in understanding, assessing, and learning from their progress. This can be addressed by the work of Gene Hall and Shirley Hord (2006) and their concerns-based adoption model (Hall, 1974).

Innovation Configuration Maps

Educators continuously encounter new grant guidelines and state and federal gov-

ernment mandates and recommendations that require them to implement new teaching strategies. However,"details of how to do it [the innovation] are [often] not made clear" (Hall & Hord, 2006, p. 58). To address this possibility, the grantees (GRREC, 2012) committed to using Hall and Hord's concerns-based model (Hall & Hord, 2006) and associated IC Map process to measure grant project implementation and school-level movement toward personalization. Fortunately, one of the evaluation team members (Norman & Pfohl, 2002) had experience working with another state's department of education to develop such an instrument. It is also important to note Kentucky's history of developing and using IC Maps to measure the effectiveness of its statewide education reform efforts during the nineties (e.g., Craig & Kacer, 2000; Matthews, 1995).

An IC Map offers clear descriptions so educators and facilitators can visualize how an innovation should be implemented (Hall & Hord, 2006). The IC Map functions much like an assessment rubric used to evaluate students' work. It includes a Likert-style scale with specific descriptions in each column outlining what the innovation looks like at successive levels of implementation. Variations of behaviors and strategies increase toward the ideal practice as the reader moves from column to column of the matrix. Well-developed criteria communicate expectations for full implementation. The IC Map then becomes both prescriptive, guiding users regarding implementation, as well as evaluative, informing users about the level they are at.

Gene Hall and Archie George (2000) identified common applications for an IC Map: self-reflection, peer observation, an observation guide for school leaders, a staff development diagnostic tool, and a means to document implementation for research and evaluation studies. Researchers (e.g., Donovan, Green, & Mason, 2014; Kistler & Wilkerson, 2018; Swain, 2008) continue to advocate for and successfully use IC Maps to measure the effective implementation of education programs. The IC Map's particular relevance to this project was as an observation guide each school could use to assess its implementation efforts and as an opportunity for self-reflection.

As the evaluation team was unable to find any existing personalized learning frameworks that were grounded in empirical research, a four-component framework that included standards for the assessment of student learning, pacing of instruction, location of learning, and presence of student choice was established. These standards were further separated by indicators that described changes in the behaviors of students, teachers, and school administrators. This draft framework established a beginning point for developing an IC Map for implementing personalized learning. That process is further described below.

Instrument development and implementation process

For the reasons previously described, the evaluation team followed Hall's (1974) concerns-based adoption model and the IC Map (Hall & Hord, 2006) as the framework for instrument development. According to Loretta Donovan, Tim Green, and Candice Mason (2014), the "development of an IC Map draws from ethnography and grounded theory (Creswell, 1998) to present a visual model of the range of implementations of an innovation using observation and interviews" (p. 168). Hall and Hord (2006) suggested key questions to guide map development:

1. What does the innovation look like when it is in use?
2. What would I see in classrooms where it is used well (and not as well)?
3. What will teachers and students be doing when the innovation is in use?
4. What are the interactions?
5. What does the classroom look like?

The grantees hypothesized that as schools participated in activities related to the four drivers, they would develop more personalized learning environments. Consequently, it was concluded that two maps were necessary. The first, the Driver Implementation (DI) Map, would be used by schools to assess their understanding of the purpose for each of the grant drivers and their participation in driver-related grant activities. The second, the Personalized Learning (PL) Map, was designed to help schools measure their progress toward implementing competency-based learning and personalized learning strategies. Although a similar process was used to develop both the DI and PL maps, the PL Map was the "linchpin" of the evaluation work. Therefore, the following is a description of the process used to construct the PL Map.

The Department of Education accepted the RTT-D proposal submitted by the two educational cooperatives and awarded $42 million dollars to implement the four drivers and four key projects. After the grant was awarded, the grantee contracted with the evaluation team to evaluate the grant progress and submit data to the Department of Education. One of the first tasks of the evaluation team was to review all of the materials provided by the grantee in an effort to operationally define the criteria for both the DI and PL maps.

The grantee defined competency-based instruction as schools focused on the standards students meet rather than the amount of seat-time or compliance tasks they complete (GRREC, 2012), and personalized learning as purpose-driven students mastering standards individually and in small teams, using technology and alternative learning environments (GRREC, 2012). In addition, several of the outcomes for the grantee's competency-based instruction key driver aligned with Chris Sturgis and Susan Patrick's (2010) working definition of competency-based pathways. This definition includes three parts:

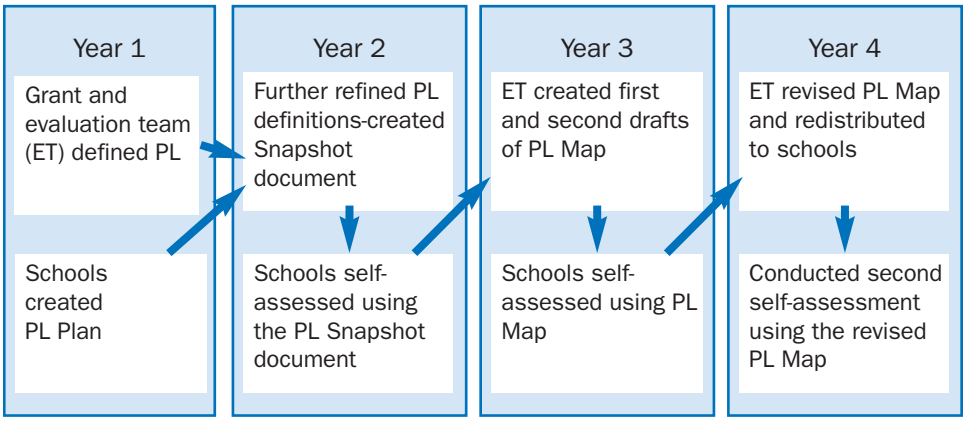
1. Students advance through a curriculum by demonstrating mastery.
2. Learning outcomes should be explicit and measurable.
3. Assessment should be a positive and meaningful learning experience.

Although the definitions provided by the grantee and Sturgis and Patrick (2010) identified a student-centered education as the desired outcome, the description of these outcomes did not include guidelines for the implementation of personalized or competency-based learning. In response, the evaluation team reviewed the literature and the many topics that are relevant to personalized learning in order to try to answer four key questions adapted from Hall and Hord (2006):

1. What does personalized learning look like when implemented?
2. What would an independent visitor observe in a school where personalized learning had been implemented?
3. What will teachers be doing when a personalized approach to learning has been adopted?
4. What will students be doing when a personalized approach to learning has been adopted?

After a thorough review of the literature, briefly described above, the evaluation team worked collaboratively with the grantee leadership team, which was made up of former educators and administrators. These practitioners helped the evaluation team to further narrow the operational definition of personalized learning. See Figure 1 for a timeline of key grant and evaluator activities.

Figure 1. Description of the activities of the evaluation team and schools in years one to four



Additionally, during the fall 2013 semester, each school completed a personalized learning plan. The plan was a description of the school's overall efforts to individualize learning for their students. Participating schools were asked to prioritize the personalized learning strategies they chose to implement. An early evaluation task was to review these plans to identify common personalized learning themes and strategies to report back to grant leadership. Detailed findings related to these plans is beyond the scope of this article and did not significantly inform the development of the Personalized Learning IC Map. But, as might be expected from Herold's (2016) note about personalized learning, schools were "all over the map" in terms of the projects they were implementing (and products they were purchasing) in the name of personalized learning. Still, this early work by schools and the evaluation team's subsequent analysis helped gather information regarding the various ways schools were defining and thinking about personalized learning.

During the summer of 2014 (year two of the grant), meetings included the review and discussion of multiple drafts to reach mutual agreement around the content and future implementation of theIC Maps. In addition, the evaluators engaged in numerous meetings with grant implementation leaders to discuss definitions of personalized learning, logic models (collaboratively developed by DE consultants, grant leadership, and evaluation team members), and each school's individual personalized learning plan.

In fall 2014, while IC Map development continued, grant leaders chose to ask schools to submit a more focused and abbreviated personalized learning snapshot to conceptualize and guide their individual personalized learning efforts. Again, the evaluators collected and reviewed the snapshots; again, the evaluators stressed to grant leadership that the inconsistent structure and quality of these snapshots would continue to make reliable judgments about individual school progress toward personalized learning outcomes difficult. The evaluation team and grant leaders agreed

that work should continue toward developing an IC Map to assess implementation efforts and provide individual progress indicators.

The first draft of the PL Map was organized by clusters of personalized learning innovations based on three different roles (student, teacher, and school community) and assessed areas, such as the comprehensiveness of the school's personalized learning plan, assessment procedures, pacing, the location of student learning, opportunities for student choice, and competency-based learning characteristics. Once the first draft was developed, the evaluation team decided that organizing the map this way led to a lengthy assessment process with too many redundancies.

The evaluation team reconvened to explore more elegant, streamlined ways to organize the map. After many drafts and much discussion, another map was created. This iteration was more clearly based on the research literature and would capture the experiences of students, teachers, administrators, and other school community stakeholders. Specifically, closely related indicators were collapsed within the same standard to minimize redundancy. In addition, indicators from the first iteration that read the same from one stakeholder to the next were eliminated. For example, indicators of assessment, pacing, and the location of learning that appeared in multiple places in the first IC Map draft were removed.

The evaluation team also cleaned up the map by more intentionally aligning each indicator with the research literature. Indicators that did not clearly align were removed. For example, in an early version of the PL Map one indicator at the highest level of implementation read, "Teachers may spend extended periods of time outside of the school during and after the regular school day as they monitor and support students pursuing performance tasks in real-world environments." This indicator was meant to capture the kinds of hands-on learning and flexible learning environments that were expected to feature in personalized learning, but there was little in the literature describing such a specific rendering of the teacher's role in the process. The structure of trying to force-fit indicators for each stakeholder role into the broad categories of assessment, pacing, location, and student choice was artificial and bent the alignment with the literature too far. In the final version of the PL Map, "location" became its own, single indicator under the largercluster/standard of "climate."

During this process the evaluators also consulted the Institute for Personalized Learning (2014) honeycomb alignment model for personalized learning rubric. This rubric helped the evaluators tocreate different levels of configuration because it provides a clear description of legacy (or traditional education models) versus personalized learning models.

The final iteration of the PL Map included four clusters/standards: 1) the learning process, 2) climate, 3) teachers, and 4) students. Each component/indicator was assessed on a five-point Likert-style scale, and each variation had a clear description (see Figure 2 for an example of the learning process standard at the pre-assessment phase). Indicators described the implementation of personalized learning at five levels of development: 1) continuing status quo, 2) starting (implementation), 3) implementing, 4) scaling up, and 5) sustaining (implementation). Each indicator included a list of possible sources by which to assess that indicator. For access to the complete map, see the supplementary file (Rock Solid Evaluation Team, 2017).

Standard 1: The learning process

This standard was defined as how the school community works collaboratively toward assessment and instructional outcomes. The map includes nine indicators that help schools evaluate their progress toward implementing personalized learning through the use of research-based instructional and assessment practices (Brickhouse & Bodner, 1992; Burns, 1987; Deci et al.,1996; Gray & Chanoff, 1986; Guskey & Bailey, 2010; Keller, 1968; Vygotsky, 1978).

Standard 2: Climate

This standard was designed to help schools evaluate their progress toward creating a school environment that was conducive to the success of personalized learning. This standard tried to capture elements of both the internal school climate and the wider community to determine if there was an adequate setting for personalized learning to thrive (Eggen & Kauchak, 2009).

Standard 3: Teachers

This standard was used to determine if teachers demonstrated an understanding of personalized learning concepts by implementing strategies that helped students achieve their learning goals (Dweck, 2016; Eggen & Kauchak, 2009; Zimmerman, 2002).

Standard 4: Students

This standard was used to evaluate whether or not students understood personalized learning and were able to set growth goals. Indicators from this standard are grounded in the self-regulation research literature and include student goal setting, goal monitoring, and seeking help from others (Ames & Archer, 1988; Meece, Anderman, & Anderman, 2006; Zimmerman, 2002).

Preparing schools for using the self-assessment map

Because of the large number of schools participating in this grant, it was not feasible for the evaluation team to assess the schools using the DI and PL maps through site visits. Instead, each school was asked to create a self-assessment team. This team would use the DI and PL maps to self-assess the school's progress toward personalized learning. It was critical that these teams received effective training so that they could self-assess accurately.

In order to improve the reliability of the instruments by reducing the room for error during implementation, the evaluators created a Driver Implementation and Personalized Learning Innovation Configuration Map Manual that served as the self-assessment protocol for the self-assessment team. This manual included directions about who to include on the self-assessment team and guided the team through each step of using the DI and PL maps. In addition, this manual was used as the framework for in-person training provided to the grant leadership team, which then provided in-person training to each school's self-assessment teams. Each self-assessment team comprised the school principal, members of the school's leadership team, and one or more teachers. These individuals would later conduct the self-assessment that measured their school's progress toward the full implementation of personalized learning.

Figure 2. An example of one of the PL Map indicators

#	*Standard*	Description						Average rating	
1	The learning process	The school community works collaboratively to develop instructional and assessment practices that are in harmony with personalized learning.							
	Indicators	Possible sources of evidence	5: Sustaining	4: Scaling up	3: Implementing	2: Starting	1: Continuing status quo	Rating (1–5)	Evidence
1.1	Pre-assessment	Classroom assessment, lesson and unit plans, teacher and student interviews	Teachers regularly pre-assess students' prior knowledge or skill before teaching a lesson or unit and then regularly use pre-assessment data to make changes in their instructional plans, including differentiating for individual student's readiness to learn new content.	(Evidence suggests your school falls somewhere between 3 and 5.)	Teachers regularly pre-assess students' prior knowledge or skill before teaching a lesson or unit, but pre-assessment data rarely lead to changes in teachers' instructional plans.	(Evidence suggests your school falls somewhere between 1 and 3.)	Teachers rarely pre-assess students' prior knowledge or skill before teaching a new lesson or unit.		

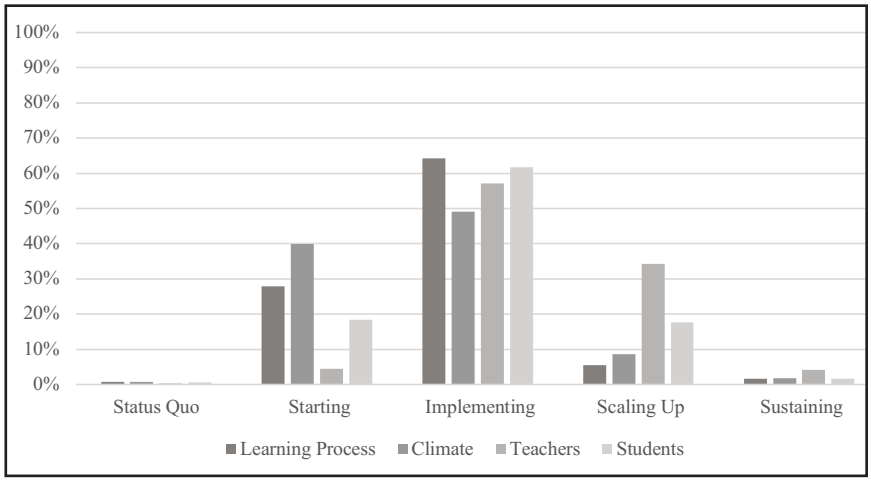
The self-assessment team was given a window in which to complete the self-assessment in the early spring semester of year three of the grant. As part of the protocol, each member was asked to first independently score the school's progress during year three of the grant using the DI and PL maps. Next, members were asked to complete a secondary review of the evidence supporting their scores, including lesson plans, classroom observations, and school and bell schedules. Then, the self-assessment team discussed their scores, further analyzed the evidence, and continued discussions until they were able to come to a consensus regarding the school's overall score for each category. A similarly composed self-assessment team evaluated the school again during year four of the grant. These data were used to measure progress from year three to year four.

When the self-assessment team had come to a consensus, they were asked to complete the self-reflection and planning tool. This tool asked schools to identify their two highest ratings and two lowest ratings. They were asked to write about their strength areas and areas for growth. Schools were also asked to theorize about how their rating on the DI Map corresponded to their rating on the PL Map.

Preliminary distribution of schools based on the PL Map

The RTT-D grant was implemented over four years. In the first two years, the evaluation team worked to construct a working definition of personalized learning and develop a tool to measure the progress schools were making to implement it. Year three of the grant was the first year the PL Map was distributed and used by the schools. All 111 schools completed the self-assessment. The PL Map helped the evaluation team to effectively discriminate between levels of school implementation (i.e., not all schools scored high; not all scored low). The distribution of schools' level of adoption is consistent with Everett Rogers' (1995) work in the *Diffusion of Innovations*: "The adoption of an innovation usually follows a normal, bell-shaped curve when plotted over time on a frequency basis" (p. 257). Using the mean and standard deviation of this curve, adopters of an innovation can be categorized into one of five groups: innovators, early adopters, early majority adopters, late majority adopters, and laggards. This was true for this data set.

Figure 3. Percentage of school participating in personalized learning strategies at each level of implementation in year three



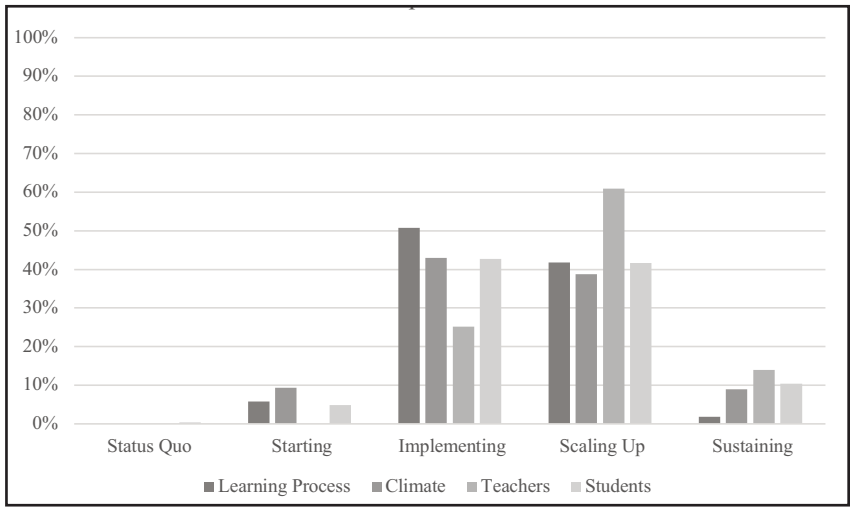
During year three, most schools were performing at the implementing level from the PL Map or could be considered the early majority adopters (see Figure 3). It appears that climate and the learning process were the most difficult standards for some schools to fully implement; the teachers standard showed the highest level of personalized learning implementation, with many schools assessing themselves as "scaling up."

Once the schools submitted their ratings, the evaluation team reviewed them and identified the six schools with the highest PL Map ratings. The evaluation team then contacted each of these schools and asked to observe how they implemented personalized learning strategies. The evaluation team concluded classroom observations, as well as interviews with faculty, staff, and students. The evaluation team then used the PL Map to conduct an external evaluation of these six schools to compare the relationship of the schools' self-assessment ratings to those of external evaluators. Similar to the protocol followed by the self-assessment teams, the evaluation team individually scored each of the six schools using the DI and PL maps, then discussed their scores as a team until consensus was reached.

The evaluation team determined that their scoring aligned closely with the self-assessment conducted by each of the six schools, further validating the instrument. The few areas of misalignment were determined by the evaluation team to be caused by the wording of particular indicators on the PL Map. Therefore, after the first year of PL Map implementation, the evaluation team refined the language of some indicators to provide clarity and reduce variance in how that indicator was scored.

During year four of the grant, the schools were asked to revisit the PL Map and conduct another self-assessment. Figure 4 shows the distribution of personalized learning during year four, as determined by how schools self-assessed on the PL Map.

Figure 4. Percentage of schools participating in personalized learning strategies at each level of implementation in year four



Year three to year four self-assessment results seemed to indicate that schools were able to self-identify their improvement (or lack thereof) from year to year. Consistent with previous findings on the diffusion of innovation (Rogers, 1995) and the benefits of the IC Map approach (Donovan et al., 2014; Hall & Hord, 2006), this indicates the PL Map was not only used as an evaluation toolbut also as a tool for reflection, allowing schools to plan and make efforts to improve in specific personalized learning areas.

Implications and conclusion

This article describes a challenging innovation evaluation process focused on operationalizing and implementing personalized learning in a grant-funded project involving 111 schools. The process demonstrated the importance of having a common school-wide and district-wide definition and expectation of the innovation prior to implementation. Without it, measurement is extremely difficult. In the end, the PL Map (and associated DI Map) helped the practitioners and evaluators develop a common understanding of the goals and associated drivers of the grant and, more importantly, of the definition for personalized learning for this project. This working

definition included many aspects of teaching, learning, and grading that, when implemented together, embody personalized learning. Indeed, it included so many aspects that schools could not and were not expected to implement each indicator of the PL Map.

In addition to the difficulty encountered by the lack of a shared definition of personalized learning, not all schools implemented the same innovation as a means to achieving personalized learning. Strategies for implementation were school- and, at times, teacher-specific. Although the common goal of implementing personalized learning strategies was to increase student engagement and decrease the drop-out rates among this demographic of largely rural youth, such variety in implementation made it unfeasible to measure the fidelity of implementation. Hall and George (2000) acknowledge that when using an IC Map:

> There is likely to be a range of applications and that everyone will not be doing the same thing … . But without direct assessment of practice for each individual there is little chance oof knowing that all of the "its" [implementation of the innovation] are the same in practice, nor will each likely result in the same effects. (p. 10)

Preliminary results from using the PL Map were promising. In particular, the map helped establish that by year three of the grant, schools were generally in the implementing phase, the mid-point of Hall and Hord's IC Map framework (Hall & Hord, 2006), which is where grant administrators had hoped they would be after two years of planning and training. By year four, substantial numbers of schools had moved into the scaling up phase of implementation, and some were even showing signs of being in the sustaining phase, meaning that the work of personalized learning had become an accepted part of the school's culture.

The largest shift in implementation occurred in the teachers standard of the map, suggesting that teachers were embracing the changes in their role and in the structure of learning, even if student attitudes and behaviors, the climate, and learning processes were still in the starting phase. Further research with the PL Map should explore whether this is a typical pattern for the implementation of personalized learning, whether certain components of personalized learning, such as teacher attitudes and behaviors, actually function as a pre-requisite for broader changes in student behavior, the school climate, and the learning process, and how each of the four components interacts with the others during implementation.

A key limitation in the development of the PL Map was the inability, due to lack of time and resources, to independently assess schools' implementation levels to better establish the validity and reliability of the instrument. Although site visits to six of the schools indicating high levels of implementation of personalized learning did validate the accuracy of the schools' self-assessments using the map, future research should seek to further establish the validity of the PL Map and its individual components.

Although the evaluation team garnered some informal feedback from practitioners about the PL Map during the self-assessment phase of the grant, another key limitation is that the PL Map has yet to be thoroughly vetted by practitioners for construct validity based on their everyday efforts to implement personalized

learning. Future research should more intentionally engage teachers and school leaders in reflecting on the use and validity of the instrument for describing the work they are actually doing, or aspire to do.

Finally, future use and research with the PL Map should be carried out in a wider variety of school settings to investigate whether the implementation of personalized learning follows different patterns or faces different challenges in contexts such as high- or low-poverty student backgrounds. Practitioners and researchers alike will be interested in the practical and theoretical implications of such inquiries.

Much work remains to be done in further establishing the PL Map described in this article as a useful tool for educators, but its initial implementation offers reason for optimism. To the knowledge of the evaluation team, this is the first comprehensive framework for personalized learning using the IC Map design. It is based on the experiences of 111 schools, hundreds of administrators, and thousands of teachers. Through the development of the PL Map, an operational definition of personalized learning was created and specific strategies, grounded in the research literature, were created that led to a more personalized experience for students. There is reason to hope that the PL Map and accompanying manual will benefit educators and evaluators in their future personalized learning efforts.

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