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# Personalized Learning: A Theoretical Review and Implications for Assessing kid-FRIENDLy Student Outcomes

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Abstract

This paper discusses efforts to articulate a theoretical framework for assessing personalized learning in K-12 schools. The authors serve on the external evaluation team for the $41 million federal Race to the Top grant awarded to the Green River Regional Educational Cooperative (GRREC) and Ohio Valley Educational Cooperative (OVEC) in Kentucky. A key component of this four-year grant, operated by GRREC and OVEC as the kid-FRIENDLy initiative (explain acronym) is implementation of personalized learning in 112 schools representing 22 school districts. The paper describes kid-FRIENDLy activities to date related to personalized learning and describes existing literature to articulate a theoretical framework and assessment rubric to evaluate schools' implementation.

In 2012 the United States Department of Education (USDOE) awarded a four-year, $41 million Race to the Top grant to the Green River Regional Educational cooperative (GRREC) and the Ohio Valley Educational Cooperative (OVEC) in Kentucky, the single-largest such grant awarded to a local educational agency (LEA) to date. The grant, which serves 112 schools in 22 school districts, included a commitment to transform educational programs at schools into competency-based, kid-friendly hubs of learning (Sells, 2013).

The GRREC/OVEC initiative, known as kid-FRIENDLy (kid-focused, responsible, imaginative, engaged, and determined to learn), has been divided into five focus areas, one of which is personalized learning. The goals for the personalized learning component are: (a) to improve the academic and non-cognitive outcomes for students, (b) ensure all students are on track to be college-and career-ready, and (c) ensure all students are capable and prepared for postsecondary careers, college or technical training (Green River Region Educational Cooperative, 2012). To achieve these goals kid-FRIENDLy has initiated professional development and school supports involving extensive collaboration among school leaders, teachers, students, parents, and community members.

According to materials used by kid-FRIENDLy to introduce the concept, personalized learning takes into consideration students' personal and academic interests. Modes of learning should be adapted to the needs of each child, rather than attempting to adapt each child to the same instructional methodology (Knowledge Works, n.d.). In coaching schools to implement personalized learning, kid-FRIENDLy highlights the importance of *flexibility*, encouraging schools to embrace the notion that learning can occur at anytime, anywhere, and in any form.

The stated goal of kid-FRIENDLy's personalized learning project is for students to take initiative and be active participants in their own learning. The project aims to establish a learning environment that is tailored to the needs and interests of students. In this environment, students receive guidance from teachers who use data-based teaching methods. Several resources should be available from which learners or teachers can choose.

To date, kid-FRIENDLy personalized learning activities have included the following:

- In Fall 2013, kid-FRIENDLy staff provided training for school-based teams on principles of personalized learning.
- Also in Fall 2013, schools development of school personalized learning plans describing their overall efforts to individualize learning for their students.
- In Fall 2014, additional training on using design thinking to further clarify school-level personalization needs was offered to schools.
- By January 2015, all participating schools will narrow the focus of their efforts to identify one "Innovation" representing their key personalized learning goal.
- Implementation of innovation will begin August 2015.

The authors of this paper serve on the external evaluation team (known as Rock Solid, and associated with Western Kentucky University) and are charged with assessing kid-FRIENDLy's implementation of its Scope of Work (SOW) reported to the USDOE. This paper describes kid-FRIENDLy's personalized learning activities to date, and the evaluation team's efforts to articulate an empirically-based conceptual framework for understanding personalized learning and the depth of its implementation in schools targeted by the grant.

## Theoretical Background

As a pedagogical philosophy, personalized learning emerges from several psychological constructs and theoretical frameworks, including goal orientation theory, self-determination theory, self-regulation, the theory of flow, and constructivism. These theories provide an underpinning for learning approaches that emphasize personalization.

**Goal Orientation Theory**

Personalized learning is based, in part, on the notion that students have – or *should* have – their own goals for the learning process. Goal Orientation Theory provides teachers with an idea of how this should function in the classroom. Students' motivation to achieve in school has been conceptualized in terms of two kinds of goals: mastery and performance goals (Ames & Archer, 1988). A mastery goal represents the desire to attain knowledge and understanding or develop a new skill (Ames & Archer, 1988). A performance goal stems from a desire to appear competent when compared with peers (Ames & Archer, 1988). Mastery goals are hinged on the notion that through effort a student can achieve a sense of mastery and success. Performance goals, on the other hand, are closely tied with a norm—a student tries to outperform his or her peers. Researchers on Goal Orientation Theory suggest that teachers should tap into students' mastery goals to enhance academic outcomes since performance goals often contribute to students feeling an inadequate level of *ability* to compete with their peers. Instead of focusing on being on par with or even surpassing peers, students who aim to enhance their understanding of the subject matter have reported employing self-regulated and self-directed learning strategies (Ames, as cited in Ames & Archer 1988).

> In experimental studies, when students perceived their class as emphasizing a mastery goal, they were more likely to report using effective learning strategies, prefer tasks that offer challenge, like their class more, and believe that effort and success covary. These

> relations were maintained and remained strong when the effects of perceived ability were partialed out. (Ames & Archer, 1988, p. 264)

Thus, Goal Orientation Theory suggests that teachers should emphasize the specific goals of learning and students' individual progress toward those goals, rather than their progress relative to other students. While students have reported higher levels of intrinsic motivation and class satisfaction with the use of goal orientation theory, it has not been shown to have significant impact on student achievement. Meece, Anderman, and Anderman (2006) caution that this absence of a correlation between a mastery-orientation and achievement may be due in part to the failure of achievement tests to appropriately assess mastery.

**Self-Determination Theory**

Self-Determination Theory describes the effect of the nature of a goal on the overall process toward its fulfillment. Giving an individual control over determining the goal as well as defining how he or she pursues said goal increases the likelihood of goal attainment. Ultimately, since an individual has a psychological need for competence and autonomy, allowing for independent determination of these goals creates an intrinsic motivation toward goal attainment (Deci, Ryan, & Williams, 1996). Deci (as cited in Deci & Ryan, 2000, p.234) defined intrinsically motivated behaviors as "activities that people do naturally and spontaneously when they feel free to follow their inner interests." Conversely, extrinsically motivated behaviors are those activities that are performed in order to obtain a "separable consequence such as receiving a reward, avoiding guilt, or gaining approval" (Deci, Ryan, & Williams, 1996). It is this distinction between intrinsic and extrinsic motivation that serves as the hallmark of self-determination theory. Many studies have demonstrated that the sense of autonomy gained through intrinsically motivated behaviors leads to improved student achievement (Deci, Ryan, &

Williams, 1996). Adopting a student-centered approach that supports a student's sense of autonomy also enhances learning, increases levels of engagement, and improves students' psychological well-being (Reeve & Halusic, 2009). Personalized learning, which emphasizes student choice, enhances autonomy.

Peer assessment is one way to achieve this autonomy. In a study conducted by Ljungman and Silén in 2008, medical students were invited to serve, along with a faculty member, on the committee which evaluated students' mastery of concepts studied and the ability to apply that knowledge to problem solving. Students who volunteered to participate were one semester ahead of those being evaluated. Researchers demonstrated that involving students in the assessment process prompted them to reflect on their own knowledge, enhanced the level of trust between professors and students, as well as developed students' self-confidence (Ljungman & Silén, 2008).

**Self-Regulated Learning**

Self-regulation can be thought of as a three phase process involving forethought, performance, and self-reflection (Zimmerman, 2000). Self-regulated learners use metacognitive skills to plan the path they will take to achieving a personal goal, determine the strategies they will use, execute the plan devised, and later evaluate their progress towards attainment of the goal (Zimmerman, 2000). Students who are self-regulated learners are equipped with the tools needed to make appropriate choices regarding their learning. Self-regulation suggests that students should have great autonomy in the goals, activities, and assessment of their learning.

**Theory of Flow (Engagement)**

Furrer and Skinner (as cited in Shernoff, 2013) defined engagement as “active, goal-directed, flexible, constructive, persistent, focused interactions with the social and physical environments” (p. 48). Student engagement in school involves participation in academic activities as well as extra-curricular activities, and students are committed to their learning goals (Christenson, Reschly, & Wylie, as cited in Shernoff, 2013). Shernoff (2013) asserts that the extent to which a student is engaged with school impacts achievement. In fact, student drop out has been attributed to emotional disengagement (Voekl, as cited in Shernoff, 2013). When students are engaged with school in multiple ways both inside and outside the school walls they are more likely to experience school success (Shernoff, 2013).

Csikszentmihalyi (as cited in Shernoff, Csikszentmihalyi, Schneider, & Shernoff, 2003) described a deeper level of engagement characterized by “concentration, interest and enjoyment in an activity” occurring simultaneously (p. 161). It is this intense level of engagement that has led to the painting of masterpieces or the development of inventions (Csikszentmihalyi, as cited in Shernoff, 2013). According to Flow Theory, flow occurs when individuals are challenged by an activity, but they have the necessary skills to accomplish the task (Shernoff et al., 2003). This interplay between challenge and skills is an important aspect of flow. Providing appropriate challenges and facilitating the development of skills needed to meet these challenges will result in student engagement.

Shernoff, Csikszentmihalyi, Schneider, and Shernoff (2003) conducted a study to explore the levels of engagement high school students reported experiencing at various times during the school day and on weekends. Students reported experiencing higher levels of engagement and interest while doing group or individual work as opposed to when they were involved in a more passive activity such as a lecture or video presentation. Interestingly, students reported spending

most of their time doing individual work and listening to lectures (23% and 21% respectively) while not much time was spent in discussion or group work (approximately 15% combined). Researchers also found that when students were involved in challenging activities that required high skill they were more interested in the activity and also reported higher levels of concentration as well as enjoyment upon completing the task (Shernoff et al., 2003). To engage students teachers will need to consider their individual interests as well as their respective skill levels in order to develop activities that challenge each student appropriately, that is, personalize the learning process.

### Zone of Proximal Development

Vygotsky (1978/1997) asserted that learning and development are intricately intertwined phenomena that occur in tandem. He characterized concepts students have mastered that denote a child's actual development. A child's potential development is described as those concepts that a child is ready to learn or can articulate with scaffolding techniques such as teacher prompting, or modeling or assistance from peers. The distance between these two levels was termed the zone of proximal development (Vygotsky, 1978/1997). He reasoned that teaching should not only be restricted to a child's actual developmental level, but that students should also be able to explore beyond that venturing into their zone of proximal development. By personalizing the learning experience, teachers can ensure activities tap into this emergent zone.

## Personalized Learning: Classical Models and Practices

Inspired, at least in part, by psychological theories suggesting that learners can and should play an active role in selecting the direction, nature, and goals of their own learning, various researchers and practitioners have developed models of personalized learning. Classic

examples include Keller's (1968) personalized systems of instruction, Maria Montessori's system of child-centered learning, and various approaches to problem-based learning, while more contemporary models include the Sudbury Valley School (Gray and Chanoff, 1986) and the Sugata Mitra's "hole-in-the-wall" experiments (Mitra & Rana, 2001).

**Keller's Personalized System of Learning**

Keller (1968) devised a means for personalizing college students' learning. There are five essential components in Keller's system of personalization: courses are self-paced; learners must demonstrate mastery at a level of 100% before advancing to the next unit; formal instructional methods, for example lectures and demonstration, are used only to provide motivation not to impart important information; there is an emphasis on concepts expressed by writing; and proctors as part of large teaching teams are used to allow for multiple testing opportunities for students on an individual basis.

Kulik, Kulik and Cohen (1979) performed a meta- analysis of the research that had been conducted on Keller's personalized system of instruction (PSI) around the time it was first introduced in 1968. They examined the results of 72 different research projects, which studied 75 different courses taught using the PSI model and the conventional model respectively. The analysis was performed taking into consideration and compensating for the methodological differences among the studies examined, which would have affected the ability to make sound comparisons.

In studies that examined students' satisfaction, students reported that PSI courses were more rigorous, yet they enjoyed the classes more and the workload was more manageable. A few of the studies examined also considered students' performance on a follow-up exam administered sometime after course completion. Students who had used the PSI model

performed significantly better on these retention tests than others who used the conventional method. Kulik, Kulik and Cohen (1979) also considered differences in course difficulty (introductory and upper level courses), course discipline (humanities, social sciences, physical sciences, and life sciences), as well as institution type (major research universities, doctorate-granting institutions, liberal arts colleges, and community colleges) that existed among the studies examined. In light of these differences, PSI still offered superior results to conventional teaching methods. The researchers also accounted for the possibility of instructor effects when assessing the data.

Overall, researchers found that PSI enhanced student achievement and satisfaction. However, it should be noted that the study time invested by students was the same for PSI as for conventional methods. Similarly, completion rates were the same for both methods.

In recent times, enthusiasm towards Keller's PSI (1968) has waned and there is little current research on the method. This has been due to the inherent difficulties with implementing the model in its purest sense adhering to the five components as set out by Keller. In spite of this, Eyrie (2007) conducted a review of the current state of research into the Keller model. Eyrie concluded that with the innovation surrounding educational technology there is a new shift in application of the model to web-based courses, which could prompt renewed focus on PSI.

**Montessori Education**

In schools inspired by Maria Montessori's work with at-risk children (Shernoff, 2013), emphasis is placed on allowing students to independently explore the world around them embodied in the classroom. Activities are designed to allow for independence and autonomy, and also to appeal to students' interests to thereby produce intense levels of concentration. The ideas of Montessori are similar to Csikszentmihalyi's flow (Shernoff, Csikszentmihalyi, Schneider, &

Shernoff, 2003) which, as previously described, is characterized by concentration, interest, and enjoyment. Montessori emphasizes student interest and enjoyment. The intense concentration that characterizes flow is facilitated by allowing students to remain engaged in an activity for as long as their interests will facilitate, regardless of whether or not it is time for a designated break as would be stipulated by the traditional school schedule.

In addition to promoting concentration, a typical Montessori classroom is designed to allow movement, collaboration, and a sense of order. Within it, students are encouraged to move around selecting activities of interest. The materials that students manipulate as part of a lesson are all carefully designed to not only spark interest but to also facilitate learning and most importantly produce enjoyment. The Montessori model also emphasizes the incorporation of movement into learning activities. The theoretical basis for this practice is the notion that "the body is an active entity that moves in concert with the mind" (Shernoff, 2013, p. 221). Additionally, classes are multi-age and there are no grades or tests (Lillard & Else-Quest, 2006).

The goal of Montessori is to foster a child's natural inclination to learn. Children if given the autonomy to select their own activities will seek out tasks that are within the zone of proximal development (Vygotsky, 1978) as these tasks will provide them with just enough challenge to create flow. Montessori teachers guide rather than instruct, providing each student with options for activities that meet his or her unique interests, needs, and developmental level (Shernoff, 2013). Since children are encouraged to pursue activities that interest them, they are more likely to develop a mastery-oriented approach to learning rather than a performance-oriented approach. This focus on mastery instead of performance is also facilitated by restricting the role of the teacher to casual observer instead of official evaluator.

Much of the research on the effectiveness of the Montessori model has been focused on social development and school experience. Rathunde and Csikszentmihalyi (2005) reported that middle school students in a Montessori program felt more enthusiasm towards their academic work than did their counterparts in traditional schools. They also perceived the work they were doing as more important. Montessori students were more intrinsically motivated than traditional students and reported experiencing flow more frequently. Students enrolled in Montessori schools were more likely to regard their classmates as friends rather than associates.

While the research connecting Montessori style education to academic outcomes such as achievement is somewhat inconclusive, several connections can be made between Montessori and improved performance in specific subject areas. Dohrmann, Nishida, Gartner, Lipsky, and Grimm (2007) reported on a study they conducted in which they aimed to identify academic outcomes of high school students enrolled in a Montessori program at the elementary school level. The authors sampled a group of 144 students who had all attended one of two Montessori elementary schools in Milwaukee and then gone on to attend various traditional public high schools in the state. The researchers used a matched control group of demographically-similar students at the same high school who had attended non-Montessori elementary schools.

Dohrmann, Nishida, Gartner, Lipsky, and Grimm (2007) observed that students who had attended a Montessori program performed better in the areas of math and science when compared to their peers. It should be noted that the students' performance in English and social studies was comparable to that of their matched peers who had attended traditional elementary schools. Dohrmann et al. suggested possible reasons for these results could be the differences in the amount of time allocated for studying English as compared with math at the elementary level. Researchers argued that 50 percent of instruction at the 1st and 3rd grade levels was in literacy.

Whereas, in the Montessori school model students are expected to allot equal amounts of time for mathematics as they do for language. Researchers also speculated that students tend to be more exposed to language development opportunities at home. These parental behaviors can enhance students' performance in the language arts. It should be noted that, the researchers identified several limitations to the study including failure to control variables such as parental motivation, involvement, and attitude towards education. They were also unable to gather information about the elementary school experiences of the members of the control group. These limitations could potentially have a profound impact on the results.

In another study conducted by Lillard and Else-Quest (2006) Montessori students who had completed kindergarten and elementary school respectively were compared to students enrolled in traditional schools. Groups of 5- and 12- year old children were randomly assigned to treatment and control groups. The treatment group consisted of students who had won the lottery to gain admission to the school, while students in the control group were those who had not been fortunate in the admissions lottery. By sampling in this way, researchers avoided ethical issues typically associated with experimental research in the social sciences. They also ensured there were no inherent differences in the parents of these students since both sets were parents seeking to have their children access Montessori style education.

Lillard and Else-Quest (2006) observed cognitive differences in students in specific subject areas. At the end of kindergarten, Montessori students in the study performed better on standardized tests in the areas of mathematics and reading. At the end of elementary school, Montessori students composed essays more creatively employing complex sentences structure in their writing when compared with students in traditional schools. Both groups of students also

exhibited more advanced social development for their respective ages when compared with peers in traditional schools.

**Problem-Based Learning**

Problem-based learning is an instructional strategy that was developed in medical education in the mid-1960s as a useful alternative to conventional teaching (Loyens, Magda, & Rikers, 2008). In this strategy, groups of students are presented with a real-world problem that they must work together to solve. There is a brief initial discussion of the problem, which has been shown to activate students' prior learning (Schmidt, Rotgans, & Yew, 2011). Following this discussion, students conduct research in areas related to the problem about which they would like to know more in order to better understand the issue and thereby resolve it. With problem-based learning, in addition to developing effective problem solving skills, students are better able to collaborate with others and their intrinsic motivation to learn is enhanced. Students also engage in self-directed learning as they determine what to research.

Schmidt, Rotgans, and Yew (2011) compared the results of various studies on the outcomes of problem-based learning. They observed a difference in learner interest when problem-based learning was compared with direct instruction. When first informed of the topic, students in both groups were not interested in the topic. Being presented with the problem to be solved piqued students' interest in the problem solving group, while during the course of instruction the interest of the students in the direct instruction group remained unchanged. The research examined by Schmidt et al. also demonstrated that students in the problem-solving group conducted research to a greater and broader extent than the direct instruction group and

that small group problem-solving discussions contributed to students' social and academic sense of well-being and achievement.

**The Sudbury Valley School**

A few schools based entirely on a personalized learning model have been established. The Sudbury Valley School in Framingham, Massachusetts is one such example. Adopting a completely democratic approach, students at the Sudbury Valley School have complete autonomy over their learning. Students are able to pave their own way, define their own learning outcomes, and self-assess because a school curriculum, specified learning objectives, formal evaluations, grades, and report cards are all in absentia. Staff at the institution serve entirely as facilitators responding to questions students may pose and participating in student discussion. There is some formal learning in the form of workshops or seminars organized by staff upon student request. The program emphasizes flexibility in the location of learning by encouraging students to explore learning opportunities outside of the school by becoming involved in community-based apprenticeships. The only institutional requirement is that, in order to graduate, students must write and successfully defend a thesis. The school does not produce a high school transcript to accompany the diploma earned upon successful completion of the thesis.

Gray and Chanoff (1986) investigated the effect this type of education system had on students in terms of their ability to continue on in a post-secondary education setting with a traditional approach. They also sought to describe the effect on students' long term career path. In reviewing the survey and interview data collected, Gray and Chanoff found that the majority

of students who graduated from the institution during the period under study had gone on to earn college degrees and were successful in their careers. Students expressed that, in spite of being initially apprehensive about enrolling in college without a high school transcript, they were able to gain admission through transfer from community college or directly by way of admissions exams. It was also reported that students observed deficiencies in their learning, especially in the area of mathematics, but they were able to quickly address these gaps through independent study. Gray and Chanoff also found that students who went to college had a positive attitude toward the experience citing their curiosity to discover what traditional schooling was like as a main motivator. It should be noted that there are several limitations to this study. The researchers both had close ties with the school; the data collected were self-reported as such there may be a gap between student perception and actual occurrences; and the sample of students interviewed was quite small. Despite these limitations, the study does provide some support for the outcomes that can be anticipated with personalized learning as previously described. These outcomes include self-regulation, mastery-goal orientation, and achievement. The study also demonstrates that while personalized learning is similar to traditional learning in that it may lead to gaps in student knowledge, these gaps can be quickly overcome through self-directed independent study.

**Sugata Mitra's "Hole in the Wall" Experiment**

Mitra and Rana (2001) also implemented personalized learning strategies albeit in a completely different setting that was entirely informal. They placed a kiosk with a computer system that had internet connection in a hole in a wall on the street of a low income neighborhood in New Delhi, India and observed how children interacted with the device. All community members had access to the computer, however most had never before seen one. They were not given any instruction on how to use it, and they were only given access to the monitor

and a touchpad as there was no keyboard placed at the kiosk. It should also be noted that the operating system loaded onto the computer was an English version. Mitra and Rana observed that after just three weeks children in the community had acquired basic computer literacy even though they had limited grasp of the English language. They defined basic computer literacy as being able to switch on the computer, draw pictures using MS paint, navigate the web, use email, and move objects around on the screen (Mitra & Rana, 2001). There was one teenager within the community who had prior experience with the computer and he was able to demonstrate for some children how to use it. However, for the most part children learned these basic skills on their own. Once one function was discovered children excitedly taught others how to do it and themselves practiced it repeatedly. It should be noted that none of the adults within the community bothered to explore the computer. Mitra and Rana's work provides a rudimentary demonstration of children's innate sense of curiosity which drives them to explore and learn independently. It is this curiosity that teachers should tap into at school; they can do this by first allowing it to flourish. Based on the results of their study, Mitra and Rana proposed a minimally invasive education model wherein self-directed children are placed in charge of their own learning. Mitra advocates "self-organized learning environments," or SOLEs, as a method of promoting student-driven learning in both formal and informal school settings (School in the Cloud, 2014).

## Outcomes of Personalized Learning

While personalized learning is based on a rich body of psychological literature, relatively few empirical studies have explored the effects of using a personalized approach on student outcomes, and the results of those studies have been mixed.

Burns (1987) conducted a study in which he compared two different approaches to instruction in mathematics. In one approach learning was personalized by allowing students to progress through a math course at their own pace. The other approach was more traditional in that the class as a whole progressed through the math curriculum at a pace determined by the teacher. It should be noted that both groups consisted of eighth grade students at the same school studying the same curriculum. Burns learned that students who were part of the student-paced group completed more assignments during the course of the year than those that were part of the teacher-paced group. In fact, when the groups were organized by pace rates, classes in the teacher-paced group progressed at a rate similar to the pace maintained by students in the lower third of the student-paced classes. Burns also observed that in the teacher-paced group high ability students did not demonstrate any achievement gains in the area of computation during the one year period of the study. As such, where instruction pace was determined by the teacher some subgroups of students did not achieve to their full potential.

In an experimental study, Tullis and Benjamin (2011) investigated the effect of self-pacing on word recall. First year psychology students were placed into two groups and were allowed to study a list of 160 words using computer software. In the treatment group, students could determine the length of time spent studying each word, whereas in the control group students simply viewed each word on the screen for a pre-determined length of time. The results of a word recognition test indicated that students who were self-paced had significantly better recall of the words on the list. As a follow-up aimed at determining whether improved recall in self-pacers occurred simply as a result of greater time spent with more difficult words, Tullis and Benjamin studied the effect of setting a predetermined time span based on word difficulty. This second study involved a treatment group of self-paced students and a control group with a set

study time as before. However, a third group was introduced in which, although the study time was pre-determined, students were given a longer time to study the more difficult words of the set. Although, having a longer time with difficult words improved the recall of the group, researchers found that the self-paced group had the most accurate recall of the three groups. They concluded that "trusting learners with their own learning has the potential to improve their learning" (Tullis & Benjamin, p. 117).

Burns (1987) and Tullis and Benjamin (2011) represent two attempts at gauging the impact of personalized learning on student outcomes. However, it should probably be noted that many experiments in personalized learning occur within a structure in which traditional models of learning prevail. The dearth of empirical literature demonstrating personalized learning's impact on achievement may be explained by the very limited nature of such initiatives, and the reluctance of educators using advanced models of personalized learning (like Montessori or Sudbury Valley schools) to use standardized testing as an outcome measure further limits data showing their effects. Initiatives like kid-FRIENDLy's multi-school personalized learning project present a unique opportunity to examine the impact of multiple personalized learning models nested within traditional school settings and using conventional measures of student performance outcomes.

## Indicators of Personalized Learning

It is quite easy to confuse personalized learning with other leading novel approaches in educational research. Unique to personalized learning however, is the focus on meeting the needs of the students by emphasizing student voice and choice, as well as flexibility in the pace and location of learning (Burns, 1987; Deci et al, 1996; Gray & Chanoff, 1986; Keller, 1968; Loyens et al., 2008; Mitra & Rana, 2001; Reeve & Halusic, 2009; Shernoff, 2013; Zimmerman, 2002).

There are many ways in which the outcomes of personalized learning can be manifested. The following is a list of teacher and *classroom environments descriptions*, based on literature, that when present indicate that learning has been personalized to some extent.

- Emphasis on development of mastery-goal oriented learners
- Learner driven and learner centered
- Collaborative effort
- Engaging
- Shift in education roles
- Deliberate
- Ample opportunities for application of concepts are provided
- Flexibility
- Teacher is sensitive to passions and interests of students
- Teacher is sensitive to individual learning modalities
- Embedded across the curriculum throughout the day and aligned with the teacher effectiveness rubric

The following, then, are characteristics that can be anticipated in *students* where a personalized approach has been adopted.

- Increases in achievement
- Self-paced
- Self-directed
- Autonomous
- Display mastery-oriented goal setting habits

- Demonstrate intense concentration
- Experience enjoyment
- Pursue own interests
- Autonomous
- Intrinsically motivated

These lists of indicators are by no means exhaustive. Additionally, the absence of multiple indicators from the list does not signify that a personalized approach is not employed in the classroom.

## Assessing Personalized Learning Implementation

Based on these classroom and student-level indicators that emerge from theoretical and empirical literature, the Rock Solid evaluation team developed a draft implementation rubric to assess the progress of kid-FRIENDLy schools' personalized learning efforts. *A Configuration Map to Assess Personalized Learning and Competency-Based Instruction (PL/CBI)* will be completed at various intervals throughout the project by evaluation team members based on a review of the school's Personalized Learning Plan (PLP), classroom observations, teacher and student interviews, and a review of other artifacts. Schools may also use the PL/CBI map for their own self-assessment purposes. The PL/CBI map is based on the following four standards that integrate kid-FRIENDLy's personalized learning goals and key indicators of personalized learning that have emerged from the literature:

- Standard 1 (School Personalized Learning Plan): Using a representative school-based planning team of leaders, teachers, and other school personnel, the school has developed

and implemented a School-wide Personalized Learning Plan that is in alignment with kid•FRIENDLy guidelines and core principals of personalized learning.

- Standard 2 (General Personalized Learning/Competency-Based Instruction Characteristics): A school-wide understanding of and commitment to PL/CBI prevails as the opportunity for students to demonstrate individually and authentically their progress toward clear, meaningful, and measurable learning targets.
- Standard 3 (Student PL/CBI Characteristics): Students understand PL/CBI concepts/activities as their opportunity to demonstrate individually and authentically their progress toward clear, meaningful, and measurable learning targets.
- Standard 4 (Teacher PL/CBI Characteristics): Teachers understand and are committed to PL/CBI practices as the opportunity for students to demonstrate individually and authentically their progress toward clear, meaningful, and measurable learning targets.
- Standard 5 (School Leader PL/CBI Characteristics): School leaders promote PL/CBI practices and develop policies to provide opportunities for students to demonstrate individually and authentically their progress toward clear, meaningful, and measurable learning targets.

Each standard is further divided into five indicators:

- Assessment – the extent to which students are assessed based strictly on their mastery of explicit skills and learning objectives, that assessments are performance-based measures of applied learning, and that students play an active role in the assessment process themselves.
- Flexibility of Pacing – the extent to which students may move their curricular material at a flexible pace that meets their own individualized needs.

- Flexibility of Location – the extent to which school schedules support seamless student learning across a variety of school-based, home, and community-locations.
- Student Choice – the extent to which students demonstrate evidence of extensive choice in their learning goals, pace of learning, location of learning, and method of assessment.

Each indicator will be evaluated on a 4-point scale with the lowest rating (1) representing traditional classroom structures and the highest rating (4) representing an idealized personalized learning environment based on relevant literature. See Appendix A for an example of a single page from the *Configuration Map for Personalized Learning/Competency-Based Instruction*.

## Implications

As noted previously, empirical literature on the effects of personalized learning models on student achievement are limited. The scope of kid-FRIENDLy's personalized learning efforts, and the number of schools in which the project is being implemented, pose an opportunity to assess how a variety of personalized learning models may impact student achievement. As a quantitative measure of various personalized learning components, the Rock Solid evaluation team's PL/CBI Map may help delineate the connection between various aspects of personalized learning (e.g. flexibility of pacing) and their relationship with student outcomes. The PL/CBI Map may also reveal how fidelity of implementation shapes the impact of various personalized learning approaches. Taking these data into account with other variables and qualitative information about school contexts may shine new light on methods of personalized learning that have the highest likelihood of success.

While promising, there are limitations to using such an approach. Rich, qualitative, contextual data will also be required to explain differences in how schools are rated using the

PL/CBI Map, and even differences among schools with similar ratings. The kid-FRIENDLy project suggests a variety of personalized learning models that schools may choose from, or schools may innovate their own, but none of the proposed models would represent a Level 4 implementation in all indicators from the PL/CBI Map. In this sense, the expectation of kid-FRIENDLy is that schools would work toward the deepest manifestation of personalized learning they can achieve given the constraints of time and the traditional structures of schooling that remain in place, but there is little possibility the evaluation team may have data demonstrating linkages between a high level of personalized learning implementation on all indicators of the PL/CBI Map and specific student learning outcomes. Nevertheless, the 4-point scale may reveal how gradations of personalized learning implementation overall and at the specific indicator level may relate to student achievement.

Results of this future research will be of interest to policymakers assessing the impact of grant-funded projects like Race to the Top, but also researchers and practitioners interested in expanding personalized learning models in a variety of school settings.

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Appendix A

| Indicator | Performance Levels<br>***Note:*** Each component of PL/CBI should be evaluated holistically. The indicators in each column are *examples* of activities that demonstrate the corresponding level of progress; all indicators are not required in order to receive the corresponding score. | | | | Rating |
|---|---|---|---|---|---|
| | **4**<br>**Getting Results** | **3**<br>**Making Progress** | **2**<br>**Beginning Stages** | **1**<br>**Traditional Classroom/School** | |
| **3.2: PACING**<br><br>**<u>Possible sources of evidence:</u>**<br><br>• School PLP<br>• PLP Checklist<br>• Personnel interviews<br>• Student and parent interviews<br>• Sample classroom assessments<br>• Documentation of completed student pre- and post-assessment tasks<br>• Course syllabi<br>• Student and Faculty Handbooks<br>• SBDM policies<br>• School bell schedule and Master Schedule<br>• RtI documentation<br>• Student work samples<br>• Classroom observations | • Students engage in on-going self-assessment of their progress toward learning targets and adjust their work accordingly, making revisions and taking as much – or as little – time as needed to demonstrate mastery.<br>• Students accept the responsibility for designing the own learning tasks and performance assessments, seeking help, resources, and other assistance as needed.<br>• Students are responsible stewards of their own time, learning how to manage tasks efficiently and effectively. | • Students play a significant role in collaborating with teachers to set the pace of their own learning, taking advantage of flexible school-wide structures permitting students to spend much of the school day working at their own pace of work of their own choosing.<br>• Students work collaboratively with teachers to suggest ideas and help shape their own learning tasks and performance assessments.<br>• Students demonstrate increasing levels of responsibility and ownership of their learning. | • Students mostly rely on teachers to set the pace of their learning, but take advantage of classrooms structures of remediation and enrichment to accelerate their progress toward specific learning targets.<br>• Students mostly complete assignments based on timetables establish by the teacher, but have opportunities to revise and resubmit their work, or extend their learning, based on progress toward learning targets.<br>• Students learn to be compliant with adult directives, but show signs of increasing responsibility and ownership of learning. | • Students rely on teachers to set the pace of their learning.<br>• Students complete assignments based on timetables established by the teacher.<br>• Students learn to be compliant with adult directives on where, when, and how to learn. | **4**<br><br>**3**<br><br>**2**<br><br>**1** |
| **COMMENTS/NOTES:** | | | | | |