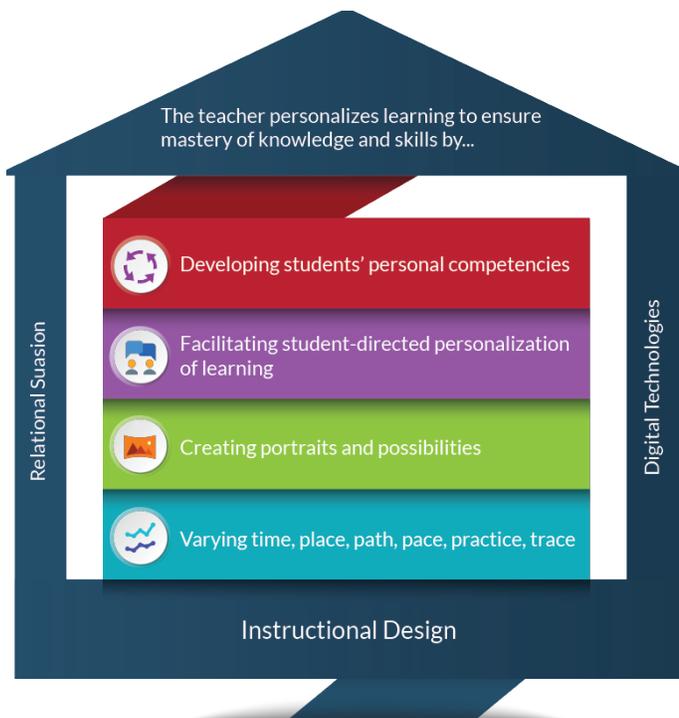# VARIATION: WAYS AND MEANS TO PERSONALIZE LEARNING

JANET S. TWYMAN

This topic brief is one in a series on personalized learning prepared for Conversations with Innovators, 2018.

Center on
Innovations
in Learning

The teacher personalizes learning to ensure mastery of knowledge and skills by...

Developing students' personal competencies

Facilitating student-directed personalization of learning

Creating portraits and possibilities

Varying time, place, path, pace, practice, trace

Relational Suasion

Digital Technologies

Instructional Design

Another floor within CIL's Personalized Learning House represents "variation" or flexibility in critical aspects of how, when, and where individual students learn. Using the definition of variation as both "a change or difference in condition, amount, or level" as well as "a different or distinct form or version of something" (Oxford Living Dictionaries, 2018), we propose that the ability to vary time, place, path, pace, practice, and trace as fundamental to true personalization.

Historically, the configuration of public education has been antithetical to variation for and across learners. The structure and process of today's educational system, having cut its teeth during the industrial revolution, emphasizes mass production. Students are to learn the same curriculum, at the same time, and in the same place, within the same prescribed time period. If some students don't learn, or learn more quickly, various attempts may be made to differentiate or individualize instruction; occasionally, these attempts even occur outside the typical school day. However, the basic premise of public education has remained the same for more than a century: large swatches of students doing specific things at a specific time, in a designated place, along one path, at a prescribed pace.

We know learners are individuals. Each learner comes to school with his or her own unique background, as well as diverse experiences, attitudes, repertoires, interests, and aspirations; all will go on to lead different lives after their school careers. There is no such thing as the average student. As noted by Rose (2016) in *The End of Average*, "Our modern conception of the average person is not a mathematical truth but a human invention" (p. 11). Rose notes that it's impossible to use statistical averages to draw meaningful conclusions about a particular human being, yet our educational system is designed around the notion of the average learner, a mythical notion that dictates instructional pacing, curriculum, grade-level standards and related textbooks, and even the size of desks and chairs in a classroom. As educators, to truly personalize learning, we need to move away from the concept of the average learner.

We propose that the variation of time, place, path, pace, practice, and trace for individual learners is fundamental to true personalization. Our premise expands on the conception of varying time, place, and pace now prevalent within the competency-based education (CBE) movement (Sturgis, 2015; Twyman, 2014; U.S. Department of Education, n.d.). In a CBE system, student advancement is based on a demonstration of mastery, regardless of the time spent acquiring that master. For example, traditionally, time spent in learning is held constant (e.g., the 180-day school calendar or one year of Algebra I), yet how much and how well each student may learn varied drastically (e.g., letter grades A−F or other ratings). CBE inverts the traditional model, striving for learning being held constant, while the time it takes to learn varies (Barr & Tagg, 1995, p. 19). However, more than time (or place or pace) can vary. Under the guidance of a caring, competent teacher assisted with smart technologies, ***true personalized learning varies the time, place, path, pace, practice, and trace of learning for each and every student*** (Twyman, 2015, 2016). We now turn to describing time, place, path, pace, practice, and trace and how they enable truly personalized learning (also found in Twyman, 2016).

TIME

Time, or most frequently "seat time," refers to the amount of time students are required to be in a course or grade, and historically, it has been tied to funding (e.g., the Carnegie Unit) and student progression (e.g., grade levels by year). Predominantly, time in instruction is held constant (i.e. class periods, quarters, semesters, grade-level year), but individual student outcomes during that instructional time varies greatly. Personalized learning, especially in a competency-based form, does away with time-based constraints in favor of a shrink- or expand-to-fit model in which individual students advance upon mastery regardless of time.

It also supports the notion of learning occurring "anywhere, any time," including outside the traditional classroom, at any time of the day. The "flipped" model of instruction, in which content delivery occurs outside of the classroom during non-school hours (Brame 2013; see also Sota, 2017), is an increasingly common example of specific instruction during non-typical school hours. The role of the teacher is to provide flexibility in when material is learned and how long it takes each student to learn it.

PLACE

Learning is no longer required to happen inside the classroom or even within the brick-and-mortar confines of a school building. Especially with the advent of the Internet and digital technologies, the *place* of learning can vary widely, within or outside the school building, in students' homes, in the community, in places of business, in the great outdoors; the opportunities are seemingly endless. As part of "anywhere, anytime" learning, the advent of digital technologies makes anyplace learning truly possible.

Supporting variability in "place" also creates a decreased emphasis on class and school attendance (i.e., seat time). It provides students not only greater flexibility in where they complete their work but also increased opportunities to earn credit through site-based projects, online coursework, and internships that occur outside the traditional school setting (Haynes et al, 2016).

PATH

Path refers to the route a student takes to move toward his or her learning objectives. Related to the idea of a trajectory, a learning pathway indicates the specific course of study and experiences a student has on the way toward a specific goal, such as mastering conversational French or graduating from high school. In a personalized learning system, schools offer many pathways, including different courses, programs, and learning opportunities within those programs so that each student may create his or her own route toward a goal. Learning pathways support diverse educational options, both inside and outside of typical school settings (e.g., work-study, community service, internships, online instruction, or even travel), with relevant learning accomplishments recognized and valued regardless of where a student achieved them.

Personalized learning adds further refinement to learning pathways, moving from choices that are designed by or offered by the school to opportunities that are created by the student. This form of student ownership and choice offers greater flexibility and customized learning experiences based on specific interests or needs.

PACE

Related to time, *pace* is the rate at which something progresses. In education, it is referred to as the rate or speed at which the teacher presents a lesson (instructional pace), or more pertinent to this context, the speed at which a student makes progress through a particular curriculum or instructional program (pace of learning, such as the number of days a student takes to master one unit on the impressionist painters). Most scholars advocate a brisk instructional pace to enhance student attention, increase responding, and decrease off-task behavior (Lignugaris-Kraft & Rousseau, 1982); however, the same may not be true for an individual student's pace of learning.

Historically, educational progression through curricula has been lock-stepped, with an entire class moving through a unit in the same amount of time, often dictated by the organization of the textbook or some other structural concern. Within personalized learning, pace is determined by individual progression and is not a reflection of ability (i.e., fast = smart; slow = less smart) but rather a dimension of how a particular student may cover particular material at a particular time. Realistically, students may progress through familiar, simple, or personally interesting material at a much quicker pace than material that is completely new, complex, or of less personal interest. The pace of learning should always be in service of the mastery of learning. Different learners; different pace. Different material; different pace.

Contrary to popular belief, this does not always mean that learners should "go at their own pace." Sometimes learners may progress at a slow pace not because of the instructional material but other constraints (e.g., distractions, lack of interest, limited time to study, decreased access to supporting materials or resources). In these instances, teachers can apply some "relational suasion," using their knowledge of their students, including their individual learning habits, interests, and aspirations, to help ensure students are moving at their own *optimal* pace.
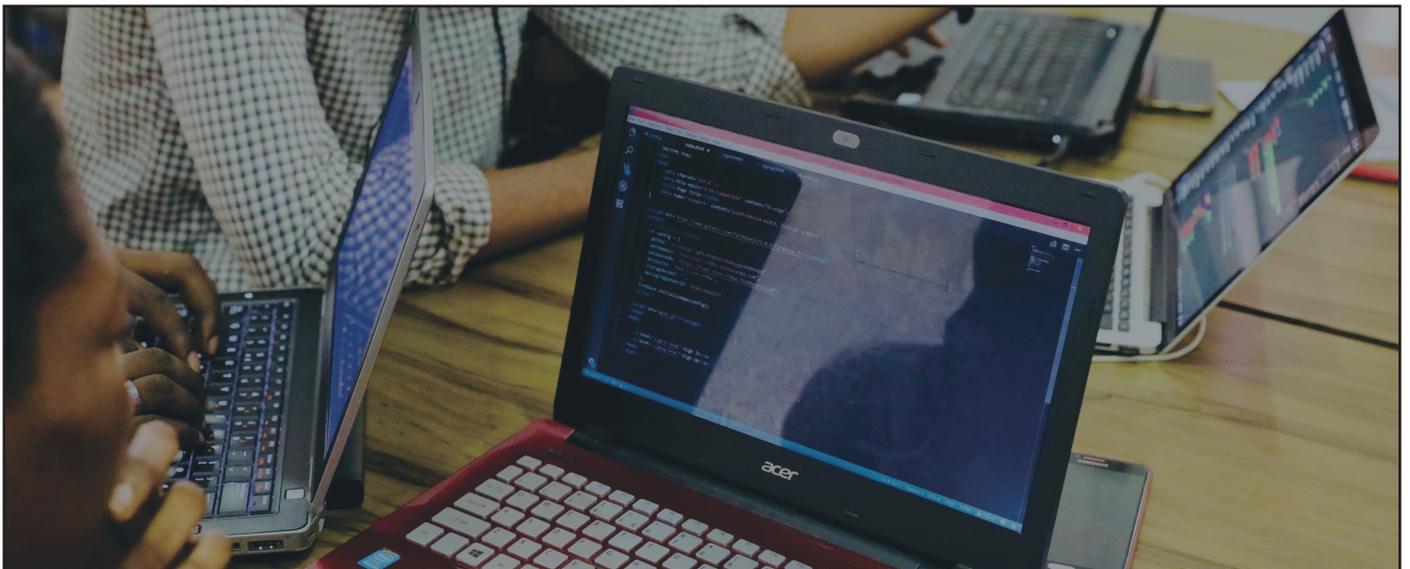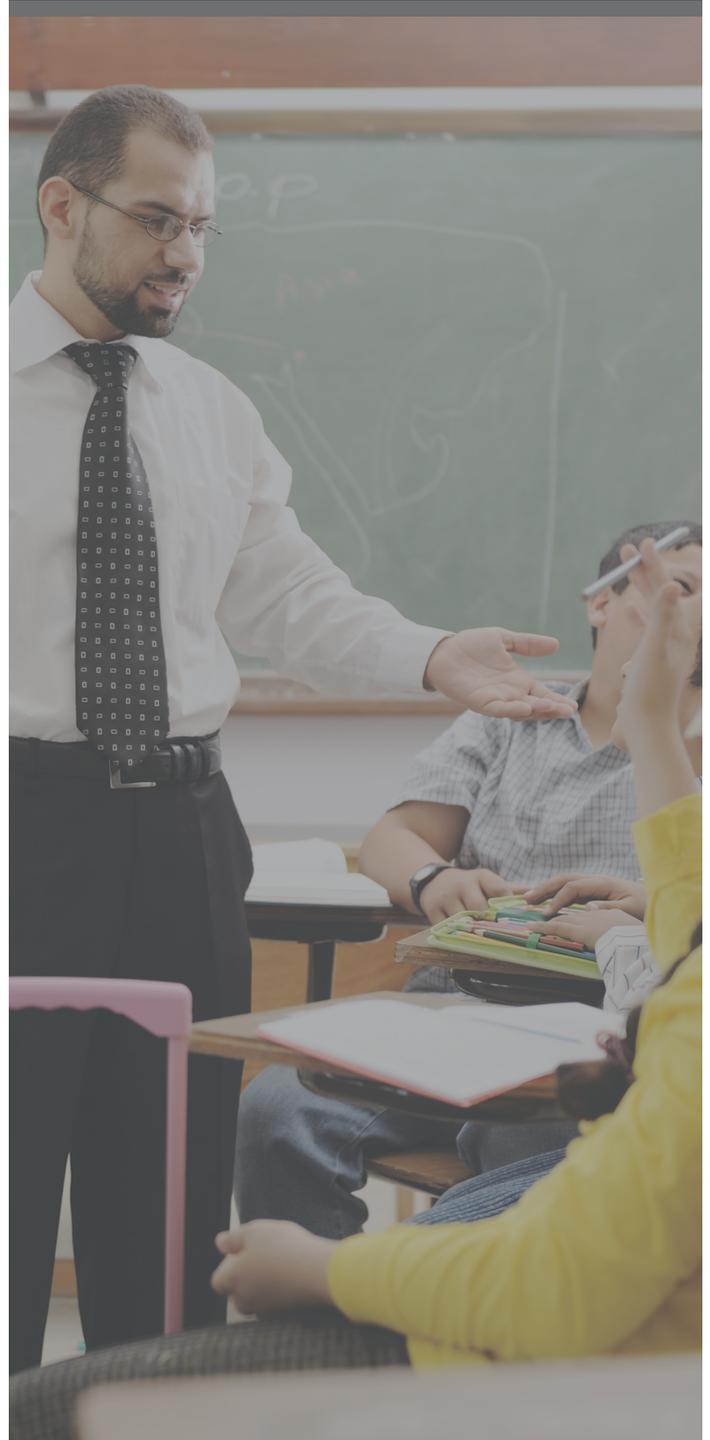
PRACTICE

Practice refers to what educators do to facilitate learning (i.e., the actual application or execution of teaching). On a larger scale, it may refer to the implementation of policies at the school, district, or state level and the tools and systems to support them (e.g., school wide data systems or a state waiver of the Carnegie Unit). However, in the classroom, it refers to what teachers do.

For better or worse, there is a myriad of educational interventions—practices—to be implemented by K–12 educators. Yet educators are given little specific guidance on what practices to use, when, with whom, under what conditions. The growing field of educational data mining and predictive analytics (see Baker, 2013) seems poised to change that; however, educators should always have an array of evidence-based strategies and tactics (practices) at the ready to use with each of their unique and diverse students.

In personalized learning, teachers vary their practice based on the needs, interests, performance, and goals of each of their students. The interactions between teacher and student are some of the ultimate and fulfilling ways to personalize learning. The practices embedded in personalizing learning can be complex, ideally with the responsibility falling on both the teacher and the student. For example, initially the student may help inform which best teaching practices might be needed based on his or her current level, goals, and interests. After the practice is implemented (the act of teaching), the student provides information on the effects of that practice based on his or her learning gains and motivation.

TRACE

The effects of practice bring us to *trace*, or what remains after teaching or learning occurs. Trace helps us answer the questions: How do we know when a student has learned something, or perhaps more important, if a student is learning? As evidence of learning, trace is a detectable, objective change. Detection may be in the form of direct or indirect observation, formative assessment, student portfolios, alternative assessments, learning pictures, or in the multitude of ways learning can be validated in CBE (see McClarty & Gaertner, 2015).

Trace may be uniformly measured within or across students (as in standardized assessments); however, its measures are probably best determined by individual context. Traces of learning should be observed frequently and in real time (as in formative assessments). They may be represented as a permanent product (as found in student portfolios or project-based learning), recorded automatically (as found in some computer-based instruction), represented by symbols or other means (e.g., grades or badges), and detected by either the teacher or student (preferably both) using some meaningful form of measurement. For educators, trace should not one be a single thing but represents the numerous empirical, actionable methods to indicate a learner's current status and progression, in context (see Twyman, 2018).

SUMMARY

Variation is critical to the cause and effect of personalized learning. Variation in time, place, path, pace, practice, and trace offers a mechanism to personalize learning for all students. Although not all educators may be able to support all forms of variation in all contexts, perhaps the most important takeaway is to actively consider and attempt variation in some form. Having a clear goal for at least one aspect of variation and then measuring and adjusting iterations of that variation is a way or means toward personalization and only strengthens one's personalized learning house.

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