# Advancing Personalized Learning Through the Iterative Application of Innovation Science

by

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### What Is Personalized Learning?

With its promise to "meet each child where she is and help her achieve her potential" (Wolf, 2010, p. 6), K–12 education has embraced the idea of personalized learning (Cavanagh, 2014). The U.S. Department of Education emphasizes personalized learning as fundamental for student-centered, future-ready, 21st-century learning (U.S. Department of Education, 2010). Personalized learning involves "[t]ailoring 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).

The promise of personalized learning excites many educators, and schools are wondering how best to introduce it and how they know when they have achieved it. Rather than thinking of personalized learning as an "it" (i.e., a program that is either present or not), we might think of it as an approach to teaching and learning that has many expressions.  Introducing a process of "personalization" may be more feasible and understandable than a full plunge into "personalized learning," by any definition. The split screen of continuous improvement of the fundamentals and simultaneous introduction of innovations seems right for most schools, with some "science" to reduce the risks of misguided innovation for students while encouraging measured change.

### What Is the Innovation?

> When asked what his rules were for the laboratory and its staff, Edison loved to respond, "Hell, there are no rules here—we're trying to accomplish something." However,...it becomes clear that he did have powerful rules for innovation....Edison was the first person to create a system for innovation...Before Thomas Edison, innovation was viewed as the random product of a lone genius. Edison was, of course, an exceptional genius, but the greatest product of his genius was the establishment of a systematic approach to success that he believed anyone could emulate. (Gelb & Caldicott, 2007, p. 6)

We believe the transformation to personalized learning comes about through innovation, or more specifically a cycle of innovation that is a companion to continuous improvement. We posit that *innovation science* is the mechanism by which planned change occurs.

The term "innovation" often occasions thoughts of spontaneous discovery, aha! moments that come to the creator in a flash and change the world or some part of it. However it is well documented that what many think of as flashes of genius (e.g., the Wright brothers and flight), bursts of creativity (e.g., the music of Mozart), or game changing innovations (e.g., the iPhone) are actually the result of an ongoing process, with sustained effort, frequent missteps, and a slow building upon what's been done. Innovation most often comes about through orchestrated, systematic change, and a willingness and ability to see the effects of those changes and build upon them (Ashton, 2015).

### Innovation Science

The transformation to personalized learning comes about through a cycle of innovation that is a companion to continuous improvement. Innovation science is the mechanism by which planned change occurs.

Those interested in radical change often talk about a "culture of innovation," suggesting an organizational attitude that favors creativity, spontaneity, and "thinking outside the box." This even extends to physical space, with well-known "innovative" companies such as Pixar and Google designing office environments to support their culture of innovation and encourage the creativity of individuals. While we are all for pleasant and engaging work environments, we believe a culture of innovation comes from reinforcing the behaviors that support the process of innovation, of innovation science. Any and all members of an organization can be innovative, and a culture of innovation arises from the behaviors of the individuals within it. When we change those behaviors we also change attitude, outlook, actions (i.e., culture).

Innovation science gives us the tools to orchestrate such a change. Innovation is rarely the result of a chance event; it is more often the result of planning, hypothesizing, repeated trials, even failing and starting again. We learn from our failures, and the more we fail, the closer we are to success. This is the cycle of innovation. As noted by Manzi (2012):

> [I]nnovation appears to be built upon the kind of trial-and-error learning mediated by markets. It requires that we allow people to do things that seem stupid to most informed observers—even though we know that most of these would-be innovators will in fact fail. This is premised on epistemic humility. We should not unduly restrain experimentation, because we are not sure we are right about very much. For such a system to avoid becoming completely undisciplined, however, we must not prop up failed experiments. (p. 224)

The problem in education is that mediating markets are weak and rare. The consequences of fruitless experimentation do not redound to the experimenter (researcher, school, or teacher, for example), but to the students. In education, a culture of innovation is more than an encouragement to tinker and a tolerance for missteps. A culture of innovation is not static but must be positioned within sound and deeply embedded processes for continuous improvement and, because caution is paramount, the safeguards inherent to science are in order. Again, an organization does not set out to create a *culture* of innovation; its culture is the consequence of behaviors, of processes, procedures, and expectations that are embedded in scientific methods.

The difference between invention and innovation, as explained in a blog by entrepreneur Tom Grasty (2012), is typical of how the terms are understood in our technological age: "In its purest sense, invention can be defined as the creation of a product or introduction of a process for the first time. Innovation, on the other hand, occurs if someone improves on or makes a significant contribution to an existing product, process or service" (para. 5). Grasty calls Steve Jobs the "poster boy for innovation" (para. 7), insisting that Apple did not invent products but found innovative applications of available technology. "Apple invented nothing. Its innovation [an iPod] was creating an easy-to-use ecosystem that unified music discovery, delivery and device. And, in the process, they revolutionized the music industry" (para. 11).

Thomas Edison is credited with inventing the light bulb, and thousands of innovators have found new ways to use electric light in a multitude of contexts. All innovation, of course, does not rise from the application of an invention. Innovation may also be a better way of doing, finding a more productive practice or process. In fact, Edison, according to science writer Steven Johnson (2014), was not the solitary genius who "invented" the light bulb, but one in a long chain of inventors and innovators, before and after Edison, who made minor, but sometimes very consequential, improvements to existing technology. Maybe there are no inventors, just innovators.

### Culture of Innovation

An organization does not set out to create a *culture* of innovation; its culture is the consequence of behaviors, of processes+, procedures, and expectations that are embedded in scientific methods.

Walter Isaacson, the biographer of Steve Jobs and Albert Einstein, also debunks the image of the lone genius as inventor or innovator. The process of innovation is one of "collaborative creativity," according to Isaacson (2014), and "teamwork is important because we don't often focus on how central that skill is to innovation" (p. 1). This sounds like sage advice for school leaders—unleash the power of collaborative creativity in a culture of innovation! But what, exactly, does that look like?

The process of innovation does not look like one more wave of pressure to do things differently just for the sake of change. As Mirabito and Layng (2013) remind us:

> We need to (a) start talking specifically about the role of innovation in the organization and how it connects to very clear goals and priorities; (b) begin eliminating things—programs, practices, processes, and even innovations—that aren't positively impacting teaching and learning; (c) start creating a culture that promotes innovation in both language and action; and (d) begin developing a process to support, manage, and measure innovation. (p. 18)

The interplay between innovation and improvement in organizational culture, the effect of capacity within a culture, and the use of technology and tools to support innovation are topics we turn to next.

**Innovation and Improvement**

> "The dogmas of the quiet past are inadequate to the stormy present. The occasion is piled high with difficulty, and we must rise with the occasion. As our case is new, so we must think anew and act anew." – Abraham Lincoln (Gelb & Caldicott, 2007, p. 24)

A culture of innovation emerges when the organization first establishes operational protocol for continuous improvement—always narrowing the gap between actual practice and best practice. At the same time, protocols are set to methodically seek better practices and better processes, and this is where innovation science comes in. Sustained innovation is the disciplined, systematic pursuit of better practices and better processes by everyone in the organization, looking for ways to more productively achieve the best results. In education, the practices we seek to improve upon are those that contribute to students' learning. Innovation science provides the mechanisms to identify, measure, and adjust our practices and processes.

Ted Kolderie (2015) calls the simultaneous management of improvement and innovation processes "the split screen strategy" in his book of the same name. He advocates a "self-improving system, a successful system that changes gradually but in the fundamentals. That would be innovation-based systemic reform" (p. 13). Like Kolderie, Jal Mehta (2013) is skeptical of the ultimate potency of comprehensive, top-down, system change, motivated by the "allure of order" (p. 1) that has been the siren song of reformers for decades.

Mehta contends that attempts at comprehensive reform of the education system have been long on performance management and accountability but short on three other necessary components of any field: "(1) knowledge: developing the knowledge that will be used in the field; (2) human capital: attracting, selecting, training, and retaining the people who will work in the field; [and] (3) organizational processes at the site of delivery: developing effective processes that govern the work where it is going to be carried out" (p. 271). Taken together, Kolderie and Mehta favor decentralized, incremental reform, a focus on the fundamentals of improved practice, and school-based processes that foster collaborative pursuit of the most effective ways to achieve results for students. Of particular interest is the fact that innovation in this scheme is not a revolutionary departure from the norm, but a steady journey in getting the fundamentals right while selectively introducing new elements that prove to be more effective.

Redding, Twyman, and Murphy (2013) endorse the continuous processes of systematic improvement and innovation, heralding a science of innovation. They offer a narrative framework for stimulating and identifying innovations in learning. "The framework is organized around three domains: content, instruction, and personalization. Within each domain, principles of learning establish a psychological foundation for the standard practices. The standard practices provide a basis for comparison in assessing a new practice's effectiveness and determining its status as an innovation in learning" (pp. 8–9).

Innovation is more of a meticulous striving for better results using the tools of science than a thrashing about in hopes of a Eureka! moment. As Mirabito and Layng (2013) put it: "Innovation is planned change" (p. 15). The change is intentional, its implementation planned, and its results reasonably predictable. See Figure 1.

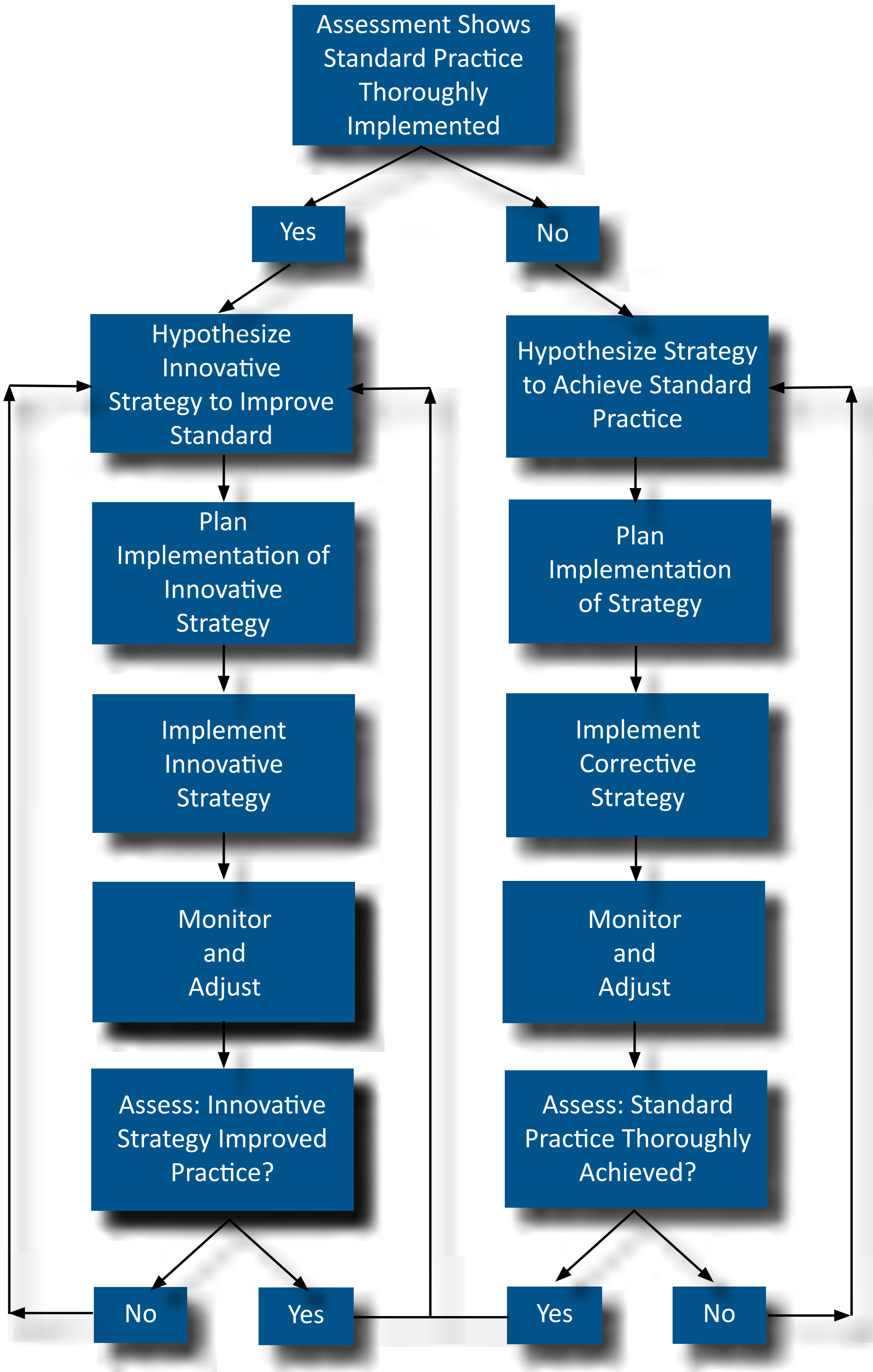
By setting up expectations and contingencies for the behavior of individuals in the organization, the organization fosters a culture of innovation. It does this by: (1) establishing operational protocol for continuous improvement (narrowing the gap between actual and best practices) and innovation (creating and validating better practices and processes); and (2) building the capacity of its personnel to manage change and enhance performance.

Organizational capacity resides in personnel and the manner in which they are equipped to perform the organization's functions in order to add value for its clients. "In fact, there is a science to bringing the best from people, building their capacity for change, providing incentives for them to change, and opening avenues of opportunity that engage them in the work" (Redding, 2012, p. 3). Redding outlines the following four kinds of organizational capacity as embodied in its personnel and the way they work:

1. **Functional capacity**—Functional capacity is the collective skills and knowledge of personnel working in the organization. Functional capacity is increased by improving the skills and knowledge of current personnel, which means improving their practice. In some cases, functional capacity is built by adding or replacing personnel to bring new skill sets into the organization. In other cases, people are reassigned to add their personal skills and knowledge to areas where they are most needed.
2. **Motivational capacity**—The catalyst for a successful innovation is motivation (Christensen, Horn, & Johnson, 2008). Even when personnel possess the skills and knowledge that an innovation requires, their best performance depends upon their motivation to adopt the new practice and persevere. The strength of motivation can be measured by a person's willingness to engage in an activity and to persist in it.
3. **Social capacity**—Social capacity (or social capital) is captured in the trust, communication, cooperation, coordination, and collaboration among personnel working to accomplish a shared mission. A highly functioning organization depends upon the requisite level and kind of human capital, but more is necessary than the accumulation of individual capacities. People must work together, inspired to achieve common goals. Social capacity is affected by the structures within which people work.
4. **Technical capacity**—Technical capacity includes tools (e.g., electronic devices), systems, processes, and protocols that guide and facilitate work. The organization's capacity to improve depends upon the quality and appropriateness of its technology and the proficiency of personnel in using it. (p. 16)

Intentionally enhancing the capacity of personnel contributes to a culture of innovation. Enhanced capacity supports the processes of improvement and innovation. With greater capacity, organizations can better apply innovation science, including implementing and evaluating innovations once they are identified and validated.

**Figure 1: Innovation within the Cycle of Continuous Improvement Innovation and Capacity**



**Innovation and Technology**

Layng and Twyman (2013) define technology as "the use and knowledge of tools, techniques, systems, or methods in order to solve a problem or serve some purpose" (p. 133). In education, innovation takes the form of advancement upon (or replacement of) techniques, systems, and methods for teaching and learning. The innovation may incorporate new tools (iPad, for example), which may or may not also be inventions.

Layng and Twyman describe two types of technology—tools (hardware and software) and processes (practices and the ways they are ordered and employed). They advocate the use of analytic data and scientific research to guide the development of tools and processes and to validate their effectiveness. Thus, learning science establishes a foundation of effective practice and process, and innovation science gives us traction in identifying and implementing practices and processes that are truly better.

## Where's the Science?

Innovation science offers an approach to understanding, analyzing, managing, and influencing innovation processes at both a direct and a strategic level. Innovation can proceed at several levels in education, with some form of scientific methodology at play at each level. The experimental bar of "gold standard research" is conducted in universities and education laboratories where expertise and budgets are sufficient to administer randomized controlled trials (RCTs). RCTs are more likely to validate an established practice than to foster innovation. Commercial enterprises are keen on innovation and bring many new products (and their associated practices) to the education market; some may carry with them independent validation and many do not. Within the public education system—state education agency, local education agencies, charter organizations, and individual schools—intentional protocols to encourage innovation are rare. Instead, educators rely upon universities, laboratories, and commercial enterprises to test and to confirm innovations.

Universities, education laboratories, and credible commercial enterprises rely upon scientific methods to identify and validate innovations. They either design and test variations from, or eliminate from consideration, ideas that fail to prove out. It is ideal when the education system, for the most part, adopts the practices proved effective by the research entities. Continuous improvement processes hold current practice up to the standard of effective practice validated by research and strive to close the gap between the two. When the education system does things systematically or empirically (instead of willy-nilly, based on preferences and opinions), most often it is to close the gap between current and best practice. Closing that gap, while important, is not innovation. Innovation requires systematic testing and analysis of practice (and process) beyond best practice, finding practices that are better (more effective in achieving results in learning) and not merely different. In other words, the public education system does not innovate. But it could. Cautiously.

In establishing protocol for innovation within a continuous improvement regime, an organization must decide how aggressively innovative it chooses to be and, quite importantly, what level of evidence it requires to validate a proposed innovation. In other words, as Table 1 suggests, the organization determines its own sweet spot, the right balance in replacing what is considered "best practice" with one still better. Some organizations will choose to stick close to a continuous improvement process, seeing that its best interests lie in getting the fundamentals right while introducing occasional innovations that have passed muster with strong evidence. Other organizations will put more emphasis on innovation as necessary to their success, more aggressively seeking alternatives to

**Table 1: Striking the Balance in Innovation—Finding the Organization's Sweet Spot**

| | | Encouragement to Innovate | | |
|---|---|---|---|---|
| | | Low | Moderate | Strong |
| Level of Excellence | Low | | | |
| | Moderate | | | |
| | Strong | | | |

currently accepted best practice and relying on a lower level of evidence to confirm an innovation and move it into implementation.

**How Do We Apply Innovation Science to Personalized Learning?**

Periodic feedback, analysis, and adjustment are fundamental to any improvement process. In introducing an innovation, great care is particularly critical in tracking the fidelity of the implementation, the results achieved, and a comparison of productivity with the practice or process the innovation replaced. Redding, Twyman, and Murphy (2013) introduce a key component in the science of innovation—iterative evaluations of the innovation, throughout and after its full implementation.

> To identify an innovation in learning, we must define the standard practice as well as the new way and determine that the new way is better. That is a high bar to clear. Validating the comparative advantage of a new practice with gold standard research is a desirable goal but one that lays a cold hand on the experimentation that fosters innovation. However, chasing after the next new thing with little evidence of its efficacy wastes valuable time and money and puts students at risk of missed opportunity to learn. A balance must be struck in highlighting the emerging practices that show promise as true innovation. A proposed innovation can be tested via formative, iterative evaluations prior to the needed validation with randomized, controlled trials (Layng, Stikeleather, & Twyman, 2006). (p. 4)

**The Scientific Method**

The process by which innovations are identified and validated is very similar to the scientific method. The scientific method involves the formulation, testing, and modification of hypotheses using systematic observation, measurement, and experimentation. Science Buddies (n.d.) offers a simplified model of the steps in the scientific method:

1. Ask a Question
2. Do Background Research
3. Construct a Hypothesis
4. Test Your Hypothesis by Doing an Experiment
5. Analyze Your Data and Draw a Conclusion
6. Communicate Your Results

These simple steps can be used to support productive change in schools, or more specifically to support innovative practices in the personalization of learning. With a bit of attention and work, SEAs (or districts, schools, and even individual teachers) can apply this process to conceive of an innovation, apply and test it in context, determine the effects, and, if effective, move towards scale.

We believe there is much to be gained by more closely approximating best practice in schools through incremental, continuous improvement processes. The split screen of continuous improvement of the fundamentals and simultaneous introduction of innovations seems appropriate for most schools, allowing some science to reduce the risks of misguided innovation while encouraging measured change. We believe applying innovation science to education will contribute to the development and implementation of transformative policies and practices that go beyond striving to meet best practice. Innovation science can help SEAs, districts, and schools catalyze innovation, identify or create tools for change, conduct transition "experiments," and enable educators to develop competences in innovation.

This process blends well with the perspective that a process of "personalization" may be more realistic and feasible than a full plunge into "personalized learning". Personalized learning continues to be a hot topic among teachers, administrators, and educational policy makers, with its advocates contend that it promises to achieve greater results in student learning than more standard instructional practices. Early in its work, the Center on Innovations in Learning (CIL) defined personalization:

> Personalization refers to a teacher's relationships with students and their families and the use of multiple instructional modes to scaffold each student's learning and enhance the student's personal competencies [cognitive, metacognitive, motivational, social/emotional]. Personalized learning varies the time, place, and pace of learning for each student, enlists the student in the creation of learning pathways, and utilizes technology to manage and document the learning process and access rich sources of information. (para. 2)

While possibly innovative, the definition above contains a large number of variables, too many to implement at once or to subject to a single test of effectiveness. However, certain practices might be deduced from this definition that would merit determination if they are, in fact, more effective in achieving some aspect of student learning than standard instructional practices. These practices might include:

- Using appropriate technological tools and instructional programs to enhance student learning.
- Using data to adapt instruction as needed and as close to instructional moment as possible.
- Mixing traditional classroom instruction with online delivery of instruction and content, including learning activities outside the school.
- Granting the student a degree of control over time, place, pace, and/or path of learning, and rcognizing student influence in the practice and trace of learning.
- Intentionally addressing students' accessible background knowledge to facilitate new learning.
- Providing instruction and modeling of metacognitive processes and strategies to enhance student self-management of learning.
- Promoting a growth mindset, stretching students' interests, connecting learning to student aspirations, and differentiating instruction to enhance students' engagement and persistence with learning.
- Providing instruction, modeling, classroom norms, and caring attention that promotes students' self-respect, management of emotions, concern for others, and responsibility.

Such practices are often made up of smaller components or steps, some of which may have already been tested in their own right (see Embry & Biglan, 2008, for examples). Given that these practices are of a grain-size that warrants further specification, itemizing implementation indicators for the practices is useful. Let's consider the practice of "Providing instruction and modeling of metacognitive processes and strategies to enhance student self-management of learning." What more specific indicators of the practice might a school team select to test effectiveness using innovation science? The following examples of indicators[1] take one element of personalized learning—building students' metacognitive skills—and break it into smaller parts:

Teach and model the metacognitive process (goals, strategies, monitoring, and modification) and specific learning strategies and techniques.

- Include self-checks, peer-checks, and documentation of learning strategies as part of assignment completion.
- Teach methods of logic, synthesis, evaluation, and divergent thinking.
- Build students' metacognitive skills by teaching learning strategies and their appropriate application.

[1] The term indicator is used to denote evidence-based practices at the district, school, and classroom levels to improve student learning. A listing of Personalized Learning Indicators may be found at http://www.indistar.org/gettingstarted/resources/2014_08.27_PersonalizedLearningIndicators.pdf

- Build students' metacognitive skills by providing students with processes for determining their own mastery of learning tasks.
- Build students' ability to use a variety of learning tools.

Applying basic scientific methods to test the effectiveness of one indicator of one element of the entire definition of personalized learning may appear much ado about little, but, in fact, this is the process of innovation—replacing best practice with better practice, little by little. Managing change in increments of this size is feasible at the school level. In fact, evidence-based indicators offer a menu of practices or incremental steps that can be taken to innovate within personalized learning. The steps on how and whether to introduce an element of personalized learning into routine instructional planning are listed below. Appendix A provides an example mini-study illustrating our innovation science approach. Appendix B provides a worksheet for independent application of the method.

1. Select a key practice of personalized learning.
2. Select a more specific indicator of the practice.
3. Ask a question.
4. Summarize background research.[2]
5. Hypothesize a solution/change in practice.[3]
6. Infer an outcome.
7. Incorporate the new practice.
8. Test the hypothesis.
9. Analyze data and draw a conclusion.
10. Communicate the results and plan for next steps.

## Conclusion

The transformation to personalized learning will come about through innovation; innovation science is the mechanism by which planned change best occurs. We have described how innovation science can be applied at a small-grain level in a school to advance an element of personalized learning. The whole of personalized learning is a large, ungainly, and minimally tested concept, so it makes sense to introduce it through an iterative process of testing and refining its parts. Personalized learning can be taken to scale—schoolwide, districtwide, or statewide—in this same manner, by first defining the scope and components of personalized learning, then aligning practices, and then setting in motion the experimentation and validation through many small studies. This approach accomplishes both an orderly institution of personalized learning and the behaviors that, when routinized, bloom as a culture of innovation.

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[2] Indistar's "Wise Ways"® are research and practice briefs that support its indicators of effective practice.

[3] One way to move into the realm of personalized learning in a cautious and incremental (but nonetheless innovative) way is through Enhanced Lesson Design (ELD). ELD enables practitioners to test the effectiveness of alterations to a good lesson design by adding and determining the effects of an instructional element. For our discussion, the element would be a method of personalization. Thus, teachers can move in the direction of personalization by testing the effects of specific pieces of personalized learning. ELD assumes that the current lesson plan is solid and well designed. Enhanced Lesson Design provides a vehicle for studying instructional elements on a small scale, and is also a method for scaling the elements that prove beneficial. Enhanced Lesson Design begins with the premise that the current lesson plan is sufficiently aligned with standard best practice. Rather than creating an alternative lesson, the current lesson plan becomes the basis for the addition of a testable instructional element, such as one of the indicators listed above.

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## Appendix A: Applying Innovation Science – An Example

A Plan for Applying Innovation Science to Personalized Learning

- **Select a key practice of personalized learning (based on a current problem or goal):**
  *Providing instruction and modeling of metacognitive processes and strategies to enhance student self-management of learning.*
- **Select a more specific indicator of the practice:**
  *Include self-checks, peer-checks, and documentation of learning strategies as part of assignment completion.*
- **Formulate a question:**
  *Many learners need assistance self-managing their learning plans/paths; would providing instruction and modeling of metacognitive processes and strategies enhance student self-management of learning?*
- **Summarize background research (i.e., what we already know based on observations, facts):**
  *Reflection on the process of learning is believed to be an essential ingredient in the development of expert learners. Less successful learners are not as likely to monitor their own learning and often do not have a very good idea about whether they have comprehended and mastered the information presented.*
- **Hypothesize a solution/change in practice (testable explanation):**
  *Incorporating student self-checks, peer-checks, and documentation of learning strategies into lesson plans will teach students to self-manage their learning plans/paths, resulting in more objectives met with greater frequency.*
- **Infer an outcome (conclusion about the observations/effects):**
  *Specifically teaching students self-checks, peer-checks, and documentation of learning strategies, as part of assignment completion, will lead to greater self-management of learning plans, which in turn should lead to improved assignment completion and higher assignment scores.*
- **Incorporate the new practice (add to, change, or replace current activity, modifying as necessary):**
  *Use enhanced Lesson Design to create new lessons that incorporate specific self-management elements into the design.*
- **Test the hypothesis (run an experiment to compare results):**
  *Test the hypothesis with one teacher and two groups of students—control (old lesson design) and experimental (new lesson design).*
- **Analyze the data and draw a conclusion:**
  *Students taught with the new lesson plans met more objectives more quickly than the control group. In addition were more likely to participate in class discussions, include additional information into the learning, and reported greater enjoyment of the class.*
- **Communicate the results/plan for next steps:**
  *Share results with leadership team. Plan for replicating the experiment across 3 additional teachers (same subject matter), each with a test and control group.*

## Appendix B: Applying Innovation Science

A Plan for Applying Innovation Science to Personalized Learning

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|---|
| • **Select a key practice of personalized learning (based on a current problem or goal):** |
| • **Select a more specific indicator of the practice:** |
| • **Formulate a question:** |
| • **Summarize background research (i.e., what we already know based on observations, facts):** |
| • **Hypothesize a solution/change in practice (testable explanation):** |
| • **Infer an outcome (conclusion about the observations/effects):** |
| • **Incorporate the new practice (add to, change, or replace current activity, modifying as necessary):** |
| • **Test the hypothesis (run an experiment to compare results):** |
| • **Analyze the data and draw a conclusion:** |
| • **Communicate the results/Plan for next steps:** |

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The Center on Innovations in Learning (CIL) is a national content center established to work with regional comprehensive centers and state education agencies (SEA) to build SEAs' capacity to stimulate, select, implement, and scale up innovations in learning.

Learning innovations replace currently accepted standards of curricular and instructional practice with new practices demonstrated to be more effective or more efficient in the context in which they are applied.

The Center on Innovations in Learning is located at Temple University, Philadelphia, Pennsylvania, in partnership with the Academic Development Institute (ADI), Lincoln, Illinois.

The Center is funded by the U.S. Department of Education, Office of Elementary and Secondary Education (OESE), under the comprehensive centers program, Award # S283B120052-12A.