INSTRUCTIONAL DESIGN

SAM REDDING

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

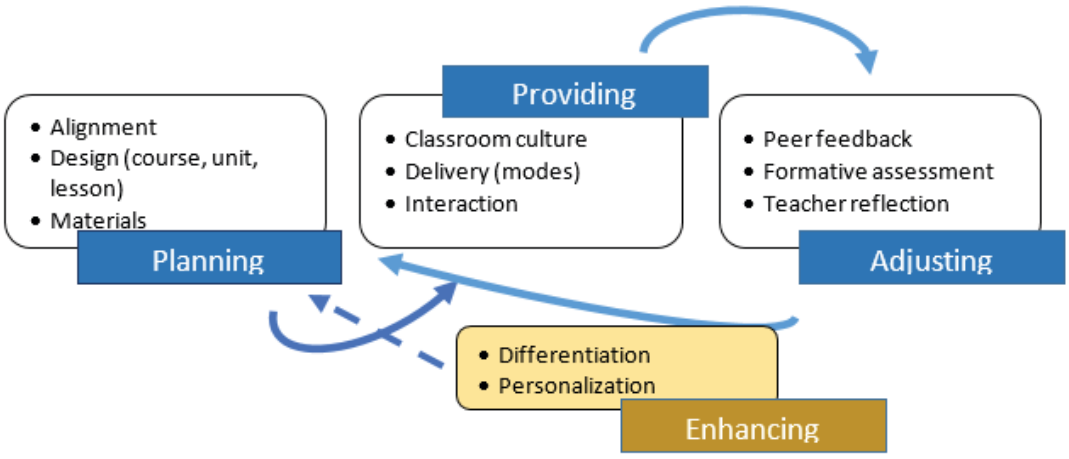
Center on Innovations in Learning

OVERVIEW

On the Center on Innovation in Learning (CIL)'s graphic model of personalized learning, instructional design forms the foundation of a house, and the floors, walls, and roof depict other elements of the CIL's conceptual model. Why is "instructional design" pictured as the foundation of personalization? For this simple reason: Learning cannot be personalized without being explicitly planned by the teacher and thoughtfully integrated into the teacher's instructional scheme. This is not to say that students do not assume an enlarged role in personalized learning. Quite to the contrary, but granting greater autonomy to students in determining the route and destination of their learning necessitates intentional orchestration by a teacher. Student-focused learning takes a lot of teacher planning. The teacher may vary the mode of presentation, offer alternative assignments, incorporate digital tools, and in other ways promote each student's personalization of learning, but in all cases, the methods are coherently positioned within an instructional design.

Figure 1: The instructional system shows design as a part of the planning phase of a cyclical process. Personalization is positioned as an aspect of lesson enhancement, strangely placed outside the regular flow of the system and connected with a dotted line. This separation of personalization from the initial design illustrates the idea that a lesson (or series of lessons or even a unit) is best enhanced with differentiation and personalization after it has been soundly created and even after it has been taught and refined. Within this system, the individual lesson—a teacher's plan for one session of a subject—stands supreme as the prime building block of instruction. That lesson, of course, must be situated vertically and horizontally within the aligned curriculum and structure of the course and unit.

Figure 1: The Instructional System

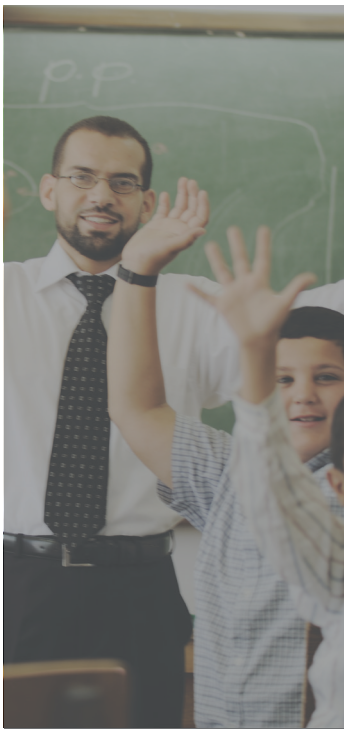


Through instructional design, a single lesson is given substance and its place within a unit and course is defined. Instructional design adds the detail to the instructional system. Instructional design is where enhancements (personalization and differentiation) are infused into the basic lesson structure and made part of it. Instructional design is where digital learning is harnessed, a teacher's relationship with students is materialized, and learner choice, gamification, and project-based learning are given constructive limits. An understandable enthusiasm for personalization is given guard rails to ensure that the intent of the lesson is honored.

SUPPORTING RESEARCH

Instructional design as a body of research and practice evolved out of traditional teacher lesson planning under the strong influence of behavioral psychology (Skinner, 1954, 1968) as it was being applied to training programs in business and the military. Benjamin Bloom's (1971) mastery learning varied time toward preset learning objectives. Robert Mager's (1962) writing on performance-based objectives and criterion-referenced instruction objectified school learning, reducing the curriculum to measurable pieces. Robert Gagne (1975, 1977; Gagne & Briggs, 1979) broke the process of learning into segments and named three tasks of the teacher: (1) design instruction, (2) manage instruction, and (3) evaluate instruction. The standards movement of the 1990s resulted in the universal ascendancy of outcome-based education, structuring the organization of lessons to reach predetermined objectives and standards. Margaret C. Wang's book, *Adaptive Education Strategies: Building on Diversity* (1992), and her related research and publications proffered an Adaptive Learning Environments Model (ALEM) with methods for individualizing instruction and managing classrooms that included students with widely divergent abilities and needs.

Carol Ann Tomlinson popularized and provided research substantiation for instructional differentiation, beginning with her 1995 book, *How to Differentiate Instruction in the Mixed Ability Classroom*. Robert Marzano (2007, 2009, 2017 for example) has identified, cataloged, and explained a multitude of essential instructional methods, all of which benefit from careful inclusion in well-designed lessons. Universal design for learning (UDL) (Hall, Strangman, & Meyer, 2011; Hall, Meyer, & Rose, 2012; Cothren Cook, Rao, & Cook, 2016) has merged universal design theory with the need of special education to systematically adapt learning for students with disabilities. Connie Moss and Susan Brookhart (2012) and others have refined the idea of the objective in lesson design with the notion of the lesson's purpose as a "learning target" that teacher and student pursue together, a fitting adjustment for personalization. Melinda Sota (2016) goes one step further in describing how to co-design all of instruction with students. Adaptation, differentiation, and personalization all require meticulous planning, often efficiently aided by technology, in the process of instructional design.



Instructional design has long been at home in training programs in the business sector and the military, easily fits the mechanics of digital programming, and has been professionalized through organizations such as the International Society for Performance Improvement (ISPI), the eLearning Guild, and the American Society for Training and Development. A discussion of instructional design easily takes the color of the tightly prescriptive planning that is a feature of both a strongly behavioristic (programmed) approach to teaching and methods to manage the complexities of differentiation. Instructional design as the foundation of personalized learning carries threads of these two influences but also opens the door to greater variety in learning paths, particularly as chosen by the learner. Even so, the boundaries and supports necessary to high degrees of learner freedom require the considered intent of design.

HOW DOES INSTRUCTIONAL DESIGN RELATE TO PERSONALIZED LEARNING?

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. 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” (Twyman & Redding, 2015, p. 3). This definition certainly calls for intentionality on the part of the teacher, and its intricacies require planning.

How Does Instructional Design Relate to Personalized Learning?

Instructional design is the fine tuning of the aligned curriculum into courses, units, and individual lessons. Each lesson is woven into a fabric of larger learning goals consistent with the aligned curriculum and how it has been structured into courses and units. Each lesson also stands alone, with its objective or target, however much it is also linked to the lessons that precede and follow it. The lesson is enhanced for differentiation and personalization and fit to a schedule in what becomes a teacher's lesson plan.

What is unique about instructional design in personalized learning? Melinda Sota (2016) cites learner choice as the component of personalized learning that distinguishes it from individualized and differentiated learning. How does learner choice, then, fit within the teacher centeredness of instructional design? What else within instructional design facilitates personalization? Variation and learner choice are two means for personalization, as is the intentional embedding of learning activities within the lesson to build the students' personal competencies (cognitive, metacognitive, motivational, and social/emotional). The structure of a basic lesson design may be personalized, then, by:

1. Variation in instructional mode
    a. Teacher directed, whole class
    b. Teacher-directed group(s)
    c. Student-directed group(s)
    d. Guided practice
    e. Independent practice (including digital learning)
    f. Homework (also variation in place of learning; flipped classroom)
2. Learner options among differentiated or leveled activities, especially in independent practice and homework
3. Accommodations to increase accessibility for individual students
4. Modifications (variation in skills or content based on student need)
5. Inclusion of teaching techniques to build students' personal competencies (see especially the Big strategies)

The lesson design template that appears later illustrates how a basic lesson design is enhanced to achieve differentiation and personalization in the structure of a lesson. The particular learning activities within this varied structure also offers opportunity for personalization.

Beyond the personalization of the basic lesson as it is positioned within the unit and course in the curriculum, the instructional system itself can be personalized. "A fully personalized instructional system with a focus on continuous formative assessment and learner choice with teacher support in which students move at their own pace in meeting their selected goals is a type of mastery-based learning system" (Sota, 2016, p. 67).

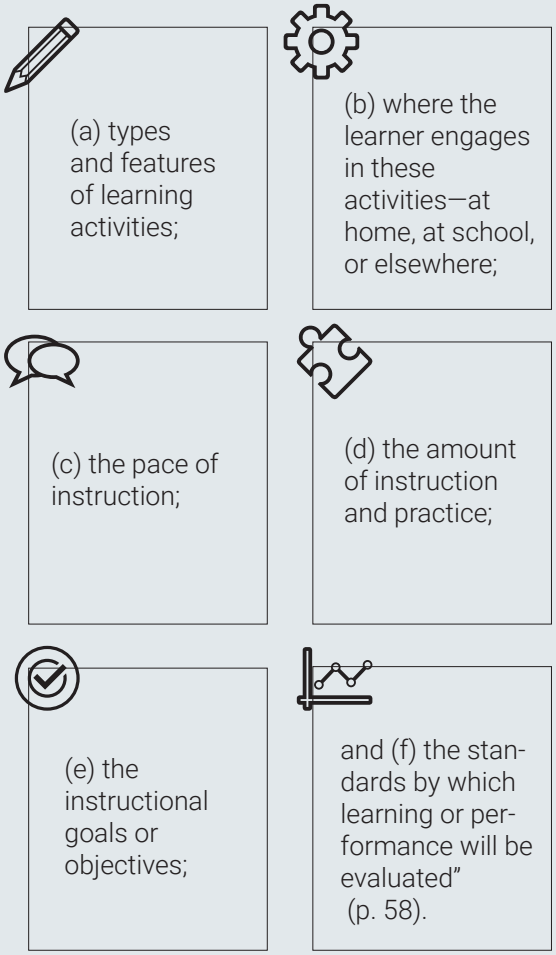
WHAT IS THE RATIONALE FOR INCLUDING INSTRUCTIONAL DESIGN IN YOUR EFFORTS TO PERSONALIZE?

Self-directed learning is the extreme of learner choice, in which "the learner may set her own learning goals and her own criteria for meeting them. She may select her own preferred method to reach them and move at her own pace at home or at school, with an amount of instruction and practice that she deems necessary to meet her goal" (Sota, 2016, p. 58). The greater the learner choice and the more the personalization, the more careful must be the design of the instructional system as well as the lesson. This caution regarding self-directed learning is raised by Karen Mahon (2016). The antidote to unrestrained self-direction is found in the discipline of instructional design and the CIL emphasis on building students' capabilities as learners by embedding techniques to build personal competencies in instruction.

The discipline of design both encourages systematic personalization and guards against its potential abuses. Learner choice, digital learning, self-directed learning, project-based learning, and gamification all hold promise as vehicles to personalization that engage learners and improve their learning outcomes. The same methods, however, are strewn with minefields of misapplication that produce the opposite of their intended effects. Through the discipline of instructional design, personalization's potential is optimized.

How is Instructional Design Used to Personalize Learning?

Melinda Sota (2016) succinctly specifies the aspects of instruction that lend themselves to personalization. "Any instructional episode [such as a lesson] involves key parts and aspects, including



These same "parts and aspects" are where individualization and differentiation are also possible, and, in Sota's view, what moves the definition into the turf of personalization is learner choice. The CIL definition of personalization would add the deliberate inclusion of activities to build the student's personal competencies, augmenting the student's capabilities for self-direction to achieve the optimal benefit from the freedom of choice.

The lesson design template shown later demonstrates how differentiation, learner choice, and techniques to build personal competencies are used to "enhance" a basic lesson design. Part A: Lesson Definition places the lesson within the context of the course and unit, aligns it to a primary standard, and names its objective or target. Part B: Lesson Detail fills in what the teacher and students do, the learning activities. In Part C: Enhanced Lesson Detail, the basic lesson detail is "enhanced" with greater differentiation, learner choice, and attention to personal competencies. Any single lesson would be enhanced in only one or a few of these ways, but the template shows the many possibilities for greater personalization.

Template for Basic Lesson Design (example)

A. Lesson Definition

Course	Class/Subject/Course Title	**Grade Level**	Period # or Grade Level	**Unit**	Name of Unit the lesson is a part of
Lesson Name	Name of the Lesson	**Day**	Date	**Time**	Total Time of Lesson
Standard(s)	List the **main standard** for which the lesson connects here. Enter the full text of the standard and the numerical representation for the standard.				

Learning Target(s)		**Expectation(s) of Mastery of Learning Targets**	
		Conditions	**Criteria (Formative Assessment)**
1	"Students will be able to . . ." or "I can . . ." Include what knowledge and/or skill the students will demonstrate within this learning target by the end of the lesson.	List under what conditions will students be asked to demonstrate their mastery of the lesson's learning target. For example, "On a worksheet with fraction problems," or "In a 3-minute presentation to the class."	By what criteria will the teacher and student know that the student has mastered the lesson's objective? For example, 80% is used in this example: "On a worksheet with fraction problems, the student will correctly answer 80%." In this example, the criteria is the number of components: "In a 3-minute presentation to the class, the student will use all four components of an expository presentation."
2			

B. Lesson Detail

Time	**Instructional Mode**	**Instructional Activities**	**Resources Materials Technology**
List the time allotted for the specific mode of instruction.	List/Check the Type of Instructional Mode: ☐ Teacher-directed, whole class o Behavior check, think, know, show ☐ Teacher-directed group(s) ☐ Student-directed group(s) ☐ Guided practice	Explain the activities that will occur during each instructional mode. Provide enough detail to guide the teacher through the lesson and explain to a colleague what occurs during the mode.	List the various resources or materials needed to complete this portion of the lesson and any technology that will be used.
	☐ Independent practice ☐ Homework		

Big 4 Strategies (check if included in this lesson): Active response Learning pictures Close reading Norming

Accommodations	List any accommodations for the lesson that do not change content or skills, only accessibility.	**Modifications**	List changes to skills or content based on student needs.

C. Enhanced Lesson Detail

Time	Instructional Mode	Enhanced Instructional Activities	Personal Competencies				Resources/ Materials/ Technology
			Cognitive	Metacognitive	Motivational	Social/ Emotional	
List the time allotted for the specific mode of instruction.	Teacher directed, whole class	Behavior Check - Think - Know - Show -	□ Connects to prior learning □ Reinforces memorization □ Builds vocabulary □ Enhances core knowledge (e.g., common facts, ideas, phrases, or quotations) □ Includes rich reading, writing □ Amplifies curiosity—exploration or discovery	□ Models thinking strategies □ Requires logic □ Enhances creativity (divergent thinking) □ Includes problem-solving □ Builds self-regulatory abilities □ Goal setting □ Self-monitoring □ Self-appraisal □ Self-efficacy □ Self-management □ Seeking help □ Includes student tracking of mastery	□ Promotes a growth mindset □ Stimulates interest in topic □ Includes student choice □ Connects with students' aspirations □ Differentiated □ Celebrates accomplishments □ Provides high levels of engagement □ Includes clear indicators of progress	Includes enhancement of: □ Self-awareness □ Self-management □ Social awareness □ Relationship skills □ Responsible decision making	List the various resources or materials needed to complete this portion of the lesson and any technology that will be used.
	Teacher-directed group(s)	Group 1 / Group 2 / Group 3 / Group 4					
	Student-directed group(s)	Group 1 / Group 2 / Group 3 / Group 4					
	Guided or Independent Practice	Prerequisite / Target / Accelerated					
	Homework	Prerequisite / Target / Accelerated					

Accommodations	List accommodations for the lesson that do not change content or skills, only accessibility.	Modifications	List changes to skills or content based on student needs.
		Accelerated	The modified content and assignments to accelerate learning and keep students who have already demonstrated mastery of the learning objective engaged should be specified.
		Prerequisite	The modified content and assignments that support students who have not yet mastered the prerequisite skills or content needed for the new lesson objective, assignments, or homework to provide them the building block skill and knowledge development that will enable them to ultimately meet the objective should be specified. How can their assignments be modified to provide them with the building-block skill and knowledge development that will enable them to ultimately meet the objective?

Summary

Each lesson can be personalized, as can the units that contain the lessons. Learning is personalized when teachers, individually and in teams, infuse personalization strategies in their instructional designs. Learner choice, emphasis on personal competencies (including "Big 4" strategies), and differentiation are ways in which the instructional design is personalized. Digital learning is an apt aid in personalization, opening multiple paths in learning and access to varied content as well as managing the content, activities, feedback, and assessment for each student.

To advance the effectiveness of instructional design as a means for personalization, the following questions informationabout a school's level of application of design methods to personalize learning:

1. **What is the standard template used by all teachers for their lesson designs?**
2. **Are lesson designs created by individual teachers or teacher teams?**
3. **Are lesson designs shared with all teachers so that good ideas spread?**
4. **Do teachers receive feedback from other teachers on their lesson designs? From administrators?**
5. **How is each lesson design assigned to a schedule? How is this plan made available for administration to review?**
6. **How is student learning data consulted in creating lessons?**
7. **How are students' personal competencies (cognitive, metacognitive, motivational, and social/emotional) intentionally addressed in lesson designs?**
8. **How are lessons enhanced to personalize? By individual teachers? By teams?**
9. **Are lessons typically enhanced to personalize when created or later?**
10. **How are student learning data consulted in planning personalization?**

GLOSSARY

1 Learning objective (or target):

The learning objective specifies the learner, the behavior, and the conditions and criteria for determining when the objective has been mastered. The objective includes three parts:

Learner/behavior: Typically stated as: "Student will be able to . . ." this indicates the knowledge or skill the students will demonstrate.

Condition: This part of the learning objective identifies under what conditions students will demonstrate their mastery of the lesson's objective (e.g., "On a worksheet with fraction problems" or "In a 3- minute presentation to the class").

Criteria (formative): This section identifies the criteria for demonstration of mastery (e.g., "On a worksheet with 20 fraction problems, the student will correctly answer 80%" or "In a 3-minute presentation to the class, the student will use all four components of an expository presentation").

2 Instructional modes:

The lesson should use at least one mode (and often two or more). The description of each instructional mode should provide enough information to guide the teacher in conducting the lesson in the classroom and to explain to a colleague what the teacher is doing. The instructional modes are:

A) Whole class: In whole-class instruction, the teacher begins the lesson with a behavior check to be sure all students are attentive and ready. The teacher then reviews the previous lesson and connects it to the current one. In creating the lesson, the teacher adds information to explain the main steps in whole-class instruction that follow the behavior check and review.

- **Behavior check:** The teacher calls the class to attention and reinforces learning postures and handling of material.
- **Think:** Think activities stimulate student thinking and spark student interest in the topic by making connections to what students already know or think (examples include "hooks," advance organizers, and brief stories).
- **Know:** The purpose is to introduce new learning through teacher instruction interspersed with questioning while maintaining a lively pace.
- **Show:** The teacher checks for student understanding to both gauge mastery and identify students who may need other instructional modes (e.g., a teacher group) or lesson modifications. The teacher could use questioning, choral response, recitation, or other means for students to demonstrate understanding during Show.

B) Teacher-directed group(s): These activities usually focus on homogeneous groups of students based on a similar instructional need. These groups are fluid and formed as needed to directly teach, reteach, or reinforce pre-requisite skills by providing more instruction. The description includes the topic and activity instructions.

C) Student-directed group(s): These are heterogeneous student group activities in which students work together to practice or apply learning, often using cooperative learning techniques. The description should include instructions and the end goal or work product expected.

(Continued)

Instructional modes (Continued):

D) Guided practice: The teacher bridges from the introduction of new learning to independent student practice by engaging students in a task similar to the one assigned in independent practice. Guided practice is interactive between the teacher and students.

E) Independent practice: These activities allow each student to apply or practice the newly acquired skills individually. The purpose of the independent practice is noted here as well as any needed student instructions, including how the work will be checked (self-check, peer check, teacher check). This may include digital learning.

F) Homework: The homework assignment should reinforce student learning from the lesson through practice and may provide opportunities for more learning; entry includes how the work will be checked (self-check, peer-check, teacher-check).

3 Resources or materials:

The resources and materials needed by students and also the teacher should be specified.

4 Technology integration:

Technology can enhance and personalize learning. The technology tools (hardware or software) used by the teacher or students, if any, should be listed along with each item's purpose and use.

5 Accommodations:

Accommodations help a student access the lesson without changing the content or skills being taught. The accommodations needed for English learners, students with disabilities, and students with IEPs should be specified.

6 Modifications:

Changes to either content or skill to meet the needs of students for either accelerated learning or acquisition of prerequisite skills to master the lesson objective.

Accelerated: The modified content and assignments to accelerate learning and keep students who have already demonstrated mastery of the learning objective engaged should be specified.

Prerequisite: The modified content and assignments that support students who have not yet mastered the prerequisite skills or content needed for the new lesson objective, assignments, or homework to provide them the building block skill and knowledge development that will enable them to ultimately meet the objective should be specified.

7 Big 4 strategies to increase learning outcomes:

Active student responding (choral responding, response cards, guided notes), learning pictures (student graphing of mastery), close reading, and norming are the big 4 strategies recommended by the Center on Innovations in Learning.

REFERENCES

Bloom, B. S. (1971). Mastery learning. In J. H. Block (Ed.), *Mastery learning: Theory and practice* (pp. 47–63). New York, NY: Holt, Rinehart, & Winston.

Cothren Cook, S., Rao, K., & Cook, B. G. (2016). Using Universal Design for Learning to personalize an evidence-based practice for students with disabilities. In M. Murphy, S. Redding, & J. Twyman (Eds.), *Handbook on personalized learning for states, districts, and schools* (pp. 239–247). Philadelphia, PA: Temple University, Center on Innovations in Learning. Retrieved from http://www.centeril.org

Gagne, R. (1975). *Essentials of learning for instruction*. Hinsdale, IL: Dryden Press.

Gagne, R. (1977). *The conditions of learning*. New York, NY: Holt, Rinehart, & Winston.

Gagne, R., & Briggs, L. (1979). *Principles of instructional design*. New York, NY: Holt, Rinehard, & Winston.

Hall, T., Meyer, A., & Rose, D. (Eds.). (2012). *Universal design for learning in the classroom*. New York, NY: Guildford.

Hall, T., Strangman, N., & Meyer, A. (2011, January 14). *Differentiated instruction and implications for UDL implementation*. Retrieved from http://aem.cast.org/about/publications/2003/ncac-differentiated-instruction-udl.html#.WvIJofhdNhg

Mager, R. (1962). *Preparing instructional objectives.* Belmont, CA: Fearon.

Mahon, K. L. (2016). Personalizing curriculum: Curation and creation. In M. Murphy, S. Redding, & J. Twyman (Eds.), *Handbook on personalized learning for states, districts, and schools* (pp. 117–130). Philadelphia, PA: Temple University, Center on Innovations in Learning. Retrieved from www.centeril.org

Marzano, R. (2007). *The art and science of teaching: A comprehensive framework of effective instruction*. Alexandria, VA: ASCD.

Marzano, R. (2009). *Designing and teaching learning goals and objectives*. Alexandria, VA: ASCD.

Marzano, R. (2017). *The new art and science of teaching*. Bloomington, IN: Solution Tree.

Moss, C. M., & Brookhart, S. M. (2012). *Learning targets: Helping students aim for understanding in today's lesson*. Alexandria, VA: ASCD.

Skinner, B. F. (1954). *The science of learning and the art of teaching*. Harvard Educational Review, 24(2), 86–97.

Skinner, B. F. (1968). *The technology of teaching*. New York, NY: Appleton-Century Croft.

Sota, M. S. (2016). *Co-designing instruction with students*. In M. Murphy, S. Redding, & J. Twyman (Eds.), Handbook on personalized learning for states, districts, and schools (pp. 57–71). Philadelphia, PA: Temple University, Center on Innovations in Learning. Retrieved from http://www.centeril.org

Tomlinson, C. (1995). *How to differentiate instruction in the mixed ability classroom*. Alexandria, VA: Association for Supervision and Curriculum Development.

Twyman, J., & Redding, S. (2015). *Personal competencies/personalized learning: Learning plan reflection guide.* Washington, DC: Council of Chief State School Officers.

Wang, M. C. (1992). *Adaptive education strategies: Building on diversity*. Baltimore, MD: Paul H. Brookes.

For more information about Personalized Learning
please visit:

www.centeril.org

The contents of this publication were developed under a grant from the Department of Education. However, those contents do not necessarily represent the policy of the Department of Education, and you should not assume endorsement by the Federal Government.