Optimize: Improvement through Design

Actions of Innovation

the Henry Ford
INNOVATION LEARNING

Grades 9-12 | **Science, English Language Arts, Social Studies**

Driving Question

When working through the "Optimize" phase of an innovation journey, how can students apply user feedback to assess design strengths and weaknesses and improve the function or process?

Learning Objectives

Students will be able to:

- Identify user needs and apply this perspective to a design
- Understand how user feedback can improve a design
- Understand how optimizing a design can result in an improved outcome (i.e. work is easier, faster, etc.)
- Create a model or design sketch of an optimized design

Why This Matters

Students often think that once a design has been created to solve a user's need, the process is "done." However, innovation requires constant re-evaluation of the original design. Incorporating user feedback is critical to improving—or optimizing—a design. It is empowering for young learners to understand that innovations often build and improve on ideas that already exist. In this lesson, students learn to improve upon a system that already exists—the function and arrangement of their classroom learning space. Students will understand how user feedback—their own experience—can be applied to improve the classroom design. Optimization of their own classroom is a real-world experience that is simple and relatable and will help students begin to think about the ways they could innovate other systems, processes and objects around them.

Standards

Common Core: CCSS.ELA-LITERACY.SL.9-12.1, CCSS.ELA-LITERACY.SL.9-12.4; **NGSS:** HS-ETS1-3; **C3 Framework:** D4.1.9-12, D4.His.8.9-12.

Prep Activities

Students will analyze The Henry Ford historical images of classrooms, evaluating the arrangement of desks and learning materials. Students will propose possible user need(s) that the classroom arrangement might have been designed to solve for and establish strengths and weaknesses of each feature.

Core Activities

Formative Performance Task:
Students will observe their own classroom, evaluating the arrangement of desks and learning materials to establish design strengths and weaknesses.

Students will work in small groups to optimize their current classroom, designing to the teacher and students' needs.

Follow-Up Project

Summative Performance Task:
Students will present their new classroom designs or share through a Gallery Walk. Teachers may select a design to implement.

Model i

Throughout this lesson, there will be opportunities to practice and develop Model I's Habits of an Innovator and Actions of Innovation. Listed below are the Habits and Actions that students will be developing and practicing.

Developing Habits of an Innovator

Be Empathetic
Students will understand the needs of teachers and their peers to optimize their classroom arrangement.

Collaborate
Students will work together to optimize their classroom arrangement.

Challenge the Rules
Students will challenge the rules as they discover new ways to design and improve their classrooms.

Learn from Failure
Students will encounter failure as they redesign their classroom arrangement. They will learn from their mistakes to optimize their design.

Practicing Actions of Innovation

Design
Students will design a floor plan arrangement to best meet the user (teacher and students) needs.

Optimize
Students will make improvements to their current classroom design to make their learning space work better for the user (teacher and students).

Prep Activities

Show students The Henry Ford image of a Motorola Brick Phone (1985).
https://www.thehenryford.org/collections-and-research/digital-collections/artifact/36600

Ask students if it looks like today's cell phone? Ask them to elaborate on how it is different. Explain that cell phones have been optimized, likely because people provided something called "user feedback," or constructive critiques on how cell phones could be better.

Explain to students that this is innovation. Sometimes innovation is having a brand-new idea. Other times it's looking at the objects, systems and processes around you and wondering how they could be done better.

For example, classrooms—like the one where they are sitting—have been "optimized" to include furniture arrangements and equipment that researchers say best support students' ability to learn. Today, the class will consider these optimized features and if they meet specific needs of teachers and students.

Students will begin by analyzing classrooms of the past. On a piece of paper, ask students to draw a chart with three columns. Label the left-most column "Image Title", the middle column "Classroom Features" and the right column "Possible User Need."

Display some or all of the images linked below. Students will write the title of the image in the left column. Ask the students to record at least three "Classroom Features" for each classroom image in the middle column. In the right column, students should make their best prediction of the user need that each feature solves. Collaboration in the form of small groups or a class discussion is recommended.

For example, in the first image, "Student in Sewing Classroom," students may observe a common workstation with students gathered around a large table. They may conclude the user need that this solves to is a space for students to work together on a large project.

After each image, discuss whether the students believe this feature was successful at addressing the user's need.

Use The Henry Ford images below. Teachers may want to search out images of today's classrooms as well.

From The Henry Ford:

Students in Sewing Classrooms at George Washington Carver School, Richmond Hill, Georgia, circa 1940.
https://www.thehenryford.org/collections-and-research/digital-collections/artifact/339360#slide=gs-253096

Edison Institute Schools Students in Town Hall Classroom, Greenfield Village, 1969
https://www.thehenryford.org/collections-and-research/digital-collections/artifact/350475#slide=gs-182774

Navy Service School Classes at Ford River Rouge Plant, Dearborn, Michigan, 1940

https://www.thehenryford.org/collections-and-research/digital-collections/artifact/306914#slide=gs-255755

Edison Institute Schools, High School Geography Class, 1949-1950
https://www.thehenryford.org/collections-and-research/digital-collections/artifact/101812#slide=gs-447233

Core Activities

Formative Performance Task:

Students will now conduct the same activity with their own classroom arrangement. Ask students to identify three Classroom Features of their own classroom and make their best prediction of the need this solves.

Share out as a class and discuss. Have students share their "user" feedback: How well are these features meeting the needs of the user—the teacher and students?

The teacher should explain that s/he has attempted to arrange and design the classroom to best address the user needs. However, the teacher would like to give students a chance to optimize the space.

As a full class have student identify needs not currently being met. Remind students that innovation often comes from considering aspects or features of a design that currently work but could potentially work better.

For example, some thoughtful considerations to ask students:

- Consider what features "work" in the classroom and what features could use improvement?
- Consider how students interact with each other and with the teacher in class.
- Identify times when students are disorganized or inattentive.
- Consider how students spend their time and transition from one activity to the next.
- Identify where materials are stored and how students access them.

Create a list of responses. The teacher should also make suggestions. Be sure to keep the students focused on the NEED. They are not yet attempting to solve it.

Once the class has identified several needs, select no more than THREE to solve. Students should work in small groups to optimize—redesign—their classroom arrangement and workspace. Using large newsprint-type paper, each group will draw out a floor plan, specifically noting how their design addresses the user needs.

Enrichment: The teacher can provide specific constraints, such as desks must be in partner groups, or all supply tables must stay where they are. Or teachers can provide no constraints, including the option to include materials or furniture not currently in the classroom.

As students work through each part of the project, encourage them to reflect on how they are using or might use the Model i Habits and Actions to guide their project building.

Follow-Up Project

Summative Performance Task

After completing the **Core Activity**, have students present their design plans to the class. Ask students to clearly identify how their optimized design addresses the user needs or engage in a Gallery Walk. Students should take notes or provide verbal feedback on their peers' designs. Remind students that the optimize-redesign cycle can happen many, many times. User feedback is a critical part of the innovation process.

If the teacher is inclined, s/he may implement elements of the students' designs.

Standards

Common Core State Standards In English Language Arts

CCSS.ELA-LITERACY.SL.9-12.1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade level topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

CCSS.ELA-LITERACY.SL.9-12.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

Next Generation Science Standards

HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

College, Career and Civic Life (C3) Framework for Social Studies State Standards

D4.1.9-12. Construct arguments using precise and knowledgeable claims, with evidence from multiple sources, while acknowledging counterclaims and evidentiary weaknesses.

D4.8.9-12. Apply a range of deliberative and democratic strategies and procedures to make decisions and take action in their classrooms, schools, and out-of-school civic contexts.