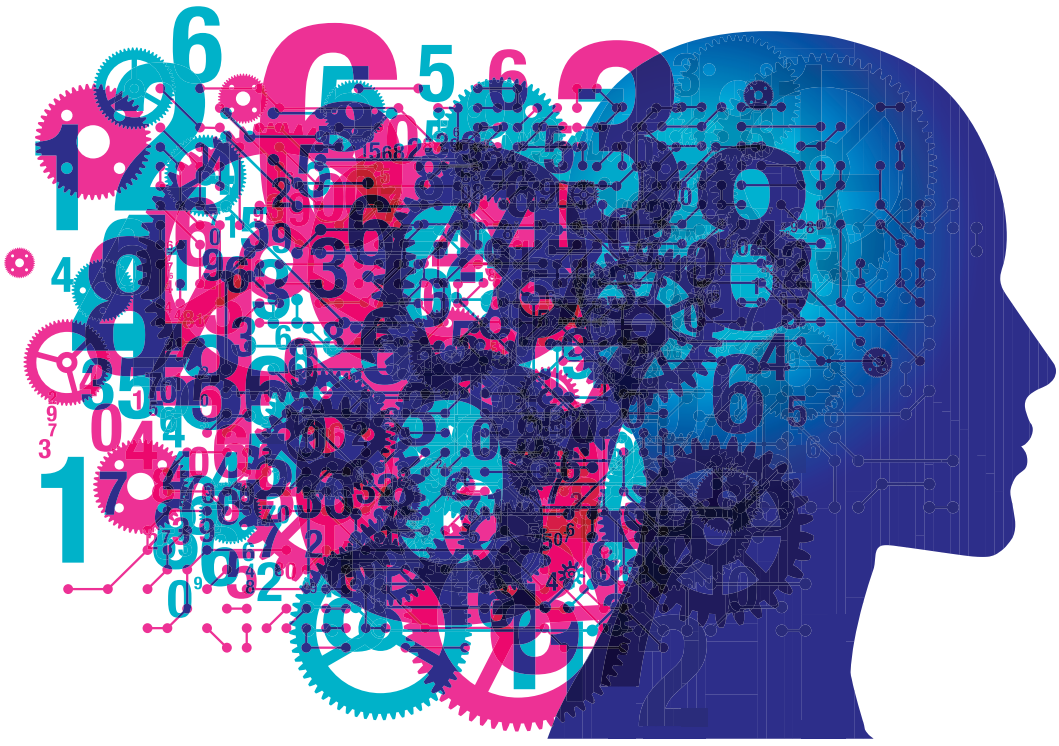
Redesigning the Assessment Experience WITH DESIGN THINKING:

Using the Creative Process to BREAK ASSESSMENT BARRIERS

By Tess Armstrong and Ingrid L. Johnson



In 2006, Gallo, Sheehy, Patton, and Griffin published an article titled, "Assessment Benefits and Barriers: What Are You Committed To?" This article offered three barriers to assessing students — determining who gets the best grade (higher-skilled/lesser-skilled debate), lack of time, and too many students — along with practical solutions. Some solutions presented include providing assessments in the cognitive, affective and psychomotor domains; using a stations set-up to eliminate time restrictions; developing assessment routines; and embedding assessment into teaching. Although

the solutions in this article are realistic and practical, many physical educators continue to confront the same barriers presented in 2006. In 2008, Lund and Veal added to the assessment-barrier conversation by highlighting the lack of an assessment culture in physical education. Although preservice teachers learn about the benefits of using assessment for student learning, we, as a profession, are not always modeling best practices and typically use observation (without objective measures) to evaluate student learning. Our preservice teachers are perhaps being socialized into this culture where it is acceptable to not assess, because that is what they see in their student-teaching placements.

While there are many barriers to using assessment, as the articles mentioned show, this conversation should be flipped to examine potential solutions. Many practitioners have offered solutions to these assessment barriers, ranging from traditional methods of evaluation, to using technology (Gallo et al., 2006; Kim & Gurvitch, 2018; Lopez-Pastor, Kirk, Lorente-Catalan, MacPhail, & Macdonald, 2013). While these solutions are practical and valuable, looking at assessment through a new lens may highlight innovative or novel solutions yet to be considered. A group of nine physical education teacher education (PETE) students in an undergraduate assessment class were challenged to use the design thinking model to redesign and rethink the assessment process, thus overcoming these barriers. These nine students had not yet begun their student-teaching semesters, so they offered fresh insights into ideal uses of assessment tools in physical education settings.

Design Thinking

The design thinking model engages students in a creative thinking process, enabling them to design something to specifically solve a problem. The design thinking approach recognizes that "problems are often messy and complex — and need to be tackled with some serious creative thinking" (*About*, 2017). This design thinking model follows a cyclical five-step approach. The process begins simply with at least one person as a designer and one as a user who has a problem that needs solving. The designer's job is to gain empathy for the user by listening to the needs of the user, and work with the user to create a solution. This process depends heavily on feedback from the user, and requires the designer to listen, understand and gain clarity about the unique needs of the user. The design thinking model is based on five stages (see Figure 1):

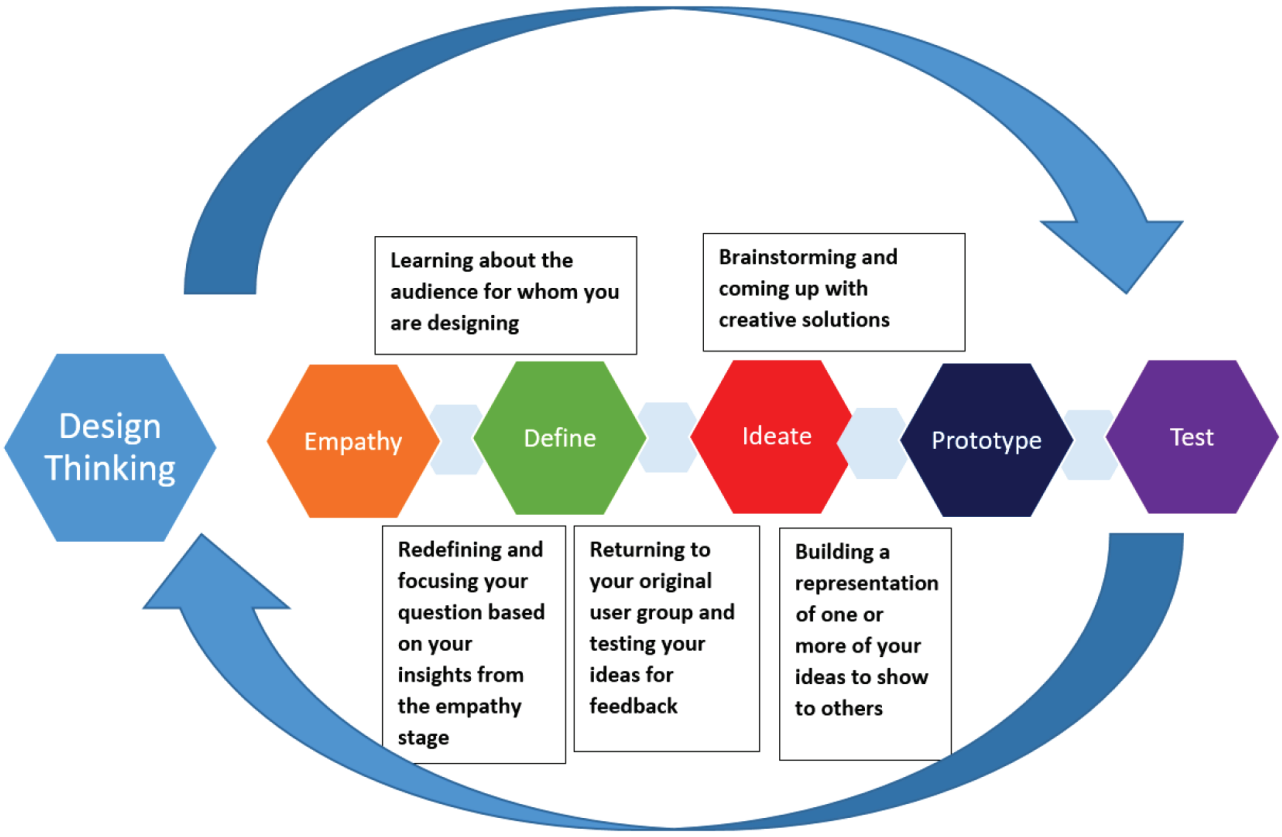


Figure 1. Five-step cycle of design thinking.

Note. Graphic representation of the design thinking model by MrJanzen1984 (Photographer). (2016, August 2). *Design thinking* [digital image]. Retrieved from https://commons.wikimedia.org/wiki/File:Design_thinking.png under a Creative Commons attribution share-alike 4.0 international license.

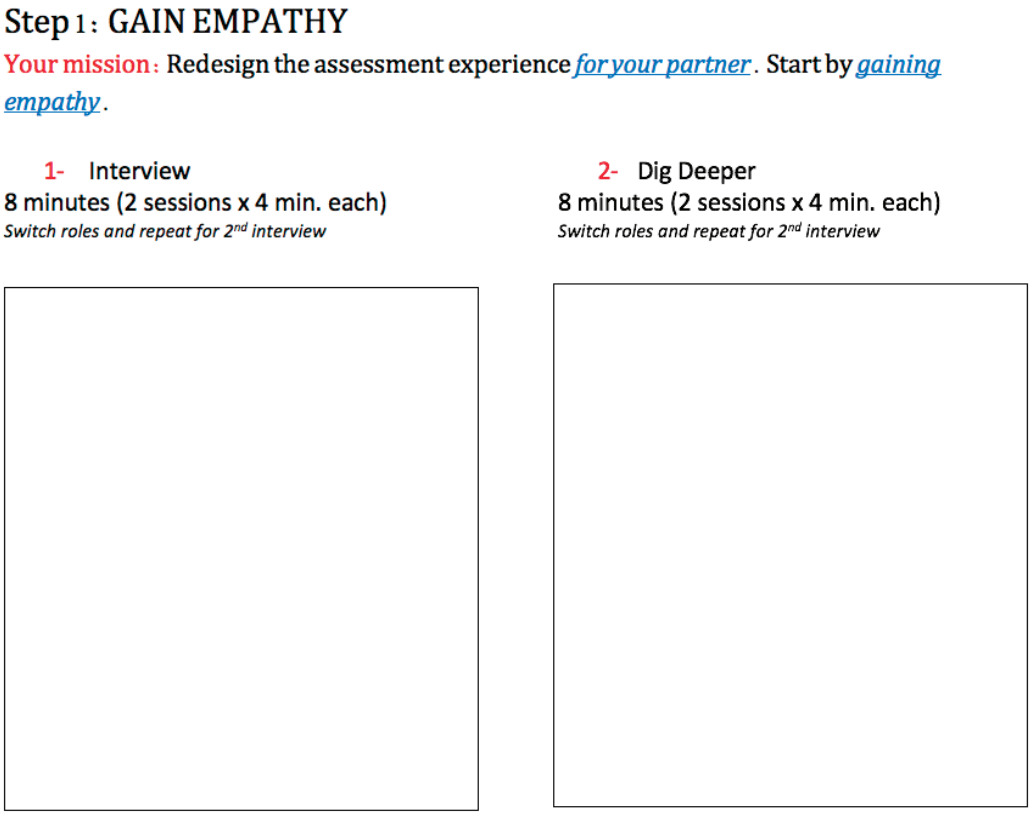


Figure 2. Step 1: Build empathy.

Note. Graphic representation of the first design thinking phase by the d.school (2018) was edited to reflect the assessment process. Source: d.school (Photographer) materials: D.Gift Worksheets [digital image]. Retrieved from https://static1.squarespace.com/static/57c6b79629687fde090a0fdd/t/58992ddd46c3c4da5df52911/1486433757845/Participant-Worksheet.pdf under a Creative Commons attribution non-commercial 4.0 license.

1. Build empathy
2. Define the problem
3. Ideate
4. Prototype
5. Test the solution

As mentioned previously, this process is very cyclical. The designer must return to the user frequently throughout the process and receive important feedback on the way to help create an innovative solution.

Design Thinking In Action

In a university physical education assessment class, each student was asked to pretend they were a veteran physical education teacher, struggling with assessment implementation. This student was called the "user," a term typically used in the design thinking model when identifying a person with a problem that needs to be solved. Each user was assigned one of three barriers to assessment (based on Gallo et al., 2006), and had to imagine what their program would look like and feel like if faced with that barrier. The three barriers assigned were:

1. It's not fair to grade because only the highly skilled students will do well.
2. It takes up too much time to assess. Students should always be moving in class.
3. There are too many students, so it is impossible to capture a grade.

After each user was assigned a barrier, the students worked in groups to begin the process of designing solutions. The following five-step design-thinking process was followed:

Step 1: Build empathy

The first step in the design-thinking process is to build empathy for the user by asking questions about the current process. In this case, students asked their partners about the fictitious assessment practices at their school. They dug deep and asked many clarifying questions. Some of these included asking about their last time assessing, particular methods they had tried in the past, and how the user assessed when they were in K–12 schools. Students dug deeper and really engaged in the empathy process, using "how" and "why" questions to ascertain fundamental assessment problems (see Figure 2).

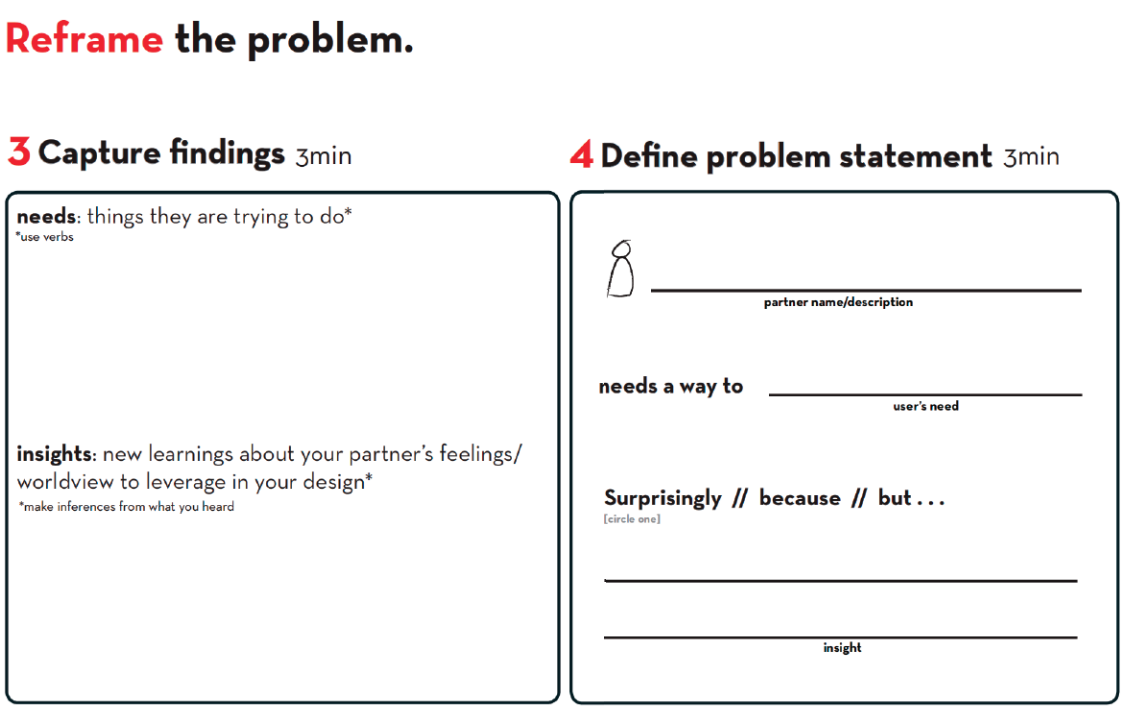


Figure 3. Step 2: Define the problem.

Note. Graphic representation of the second design thinking phase by the d.school (2018). Source: d.school (Photographer) materials: D.Gift Worksheets [digital image]. Retrieved from https://static1.squarespace.com/static/57c6b79629687fde090a0fdd/t/58992ddd46c3c4da5df52911/1486433757845/Participant-Worksheet.pdf under a Creative Commons attribution non-commercial 4.0 license.

Step 2: Define the problem

The next step asked students to analyze what their user *really* said, and record any "needs" that their user had, or "insights" into the user's feelings. Students were challenged to look at the problem from their own point of view, based on an understanding of what they heard during the interview with their user (see Figure 3). This step was done separate from the partner. After processing insights from the initial interview, students took time to define the user's problem in a concrete way. An example of a problem statement generated in class is:

> Kristen needs a way to quickly capture evidence of student learning for her K–5 students, but it needs to be engaging and portable since she teaches at multiple locations.

Step 3: Ideate

Step 3 is by far the most exciting step of the process for preservice teachers. During this step, they begin to generate unique and radical ideas. Students were asked to identify quantity over quality and to not focus on practically solving the problem at this point. Instead, they were to list all the possible solutions they could imagine. From this list, students are then asked to sketch out five potential ways to work toward a solution (see Figure 4).

At first, students were stumped at the level of creativity that was being asked of them and wrote safe solutions such as, "only assess a portion of the students during one class period," or "focus summative assessments on cognitive or affective domains." While these solutions are absolutely beneficial, they are safe and practical. The purpose of this step is for students to think beyond safe and practical. Students were guided to "bank" their safe ideas and still write them out, but to continue to dream about solutions that may even be impossible or impractical, because "innovative concepts can often come from the most outlandish ideas" (Doorley, Holcomb, Klebahn, Segovia, & Utley, 2018, p. 8). After some encouragement and time, students came up with many solutions that were radical and novel, including:

- Have assessment robots who could assess all students' psychomotor performance simultaneously
- Have helmets that drop from the ceiling to read the minds of students and capture their cognitive knowledge
- Hire one physical educator per student for maximal feedback
- Pass laws allowing classes to get no bigger than 15 students, and have PE meet every day

Following the process of generating innovative ideas, students were asked to evaluate the possibilities that they felt best

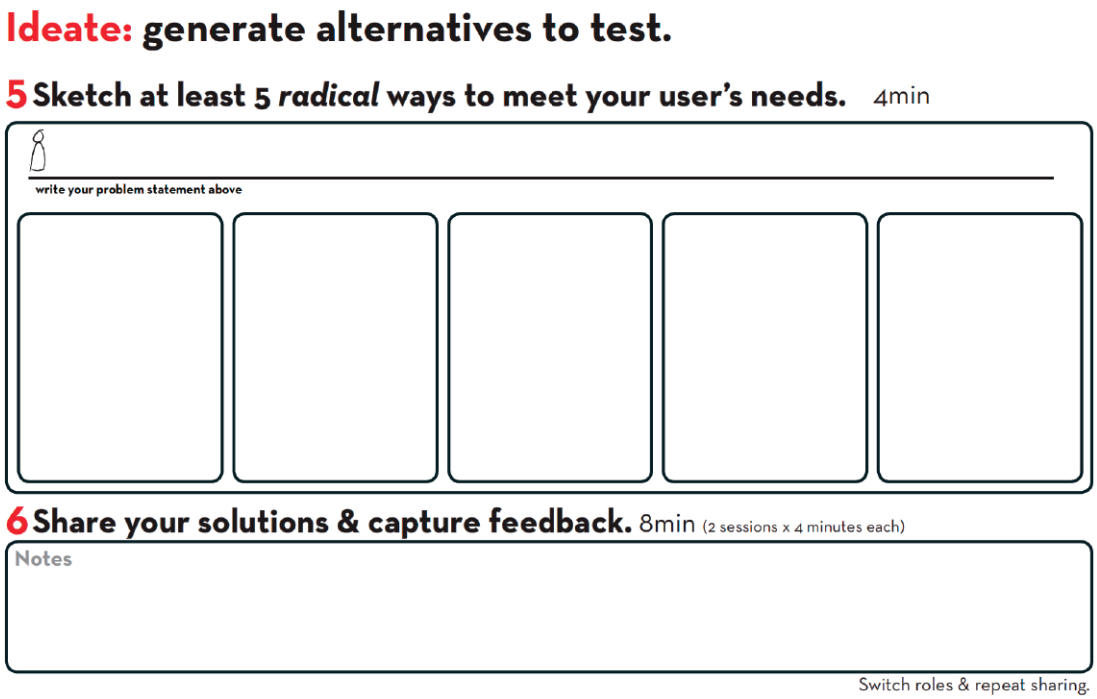


Figure 4. Step 3: Ideate.

Note. Graphic representation of the third design thinking phase by the d.school (2018).
Source: d.school (Photographer) materials: D.Gift Worksheets [digital image]. Retrieved from https://static1.squarespace.com/static/57c6b79629687fde090a0fdd/t/58992ddd46c3c4da5df52911/1486433757845/Participant-Worksheet.pdf under a Creative Commons attribution non-commercial 4.0 license.

met the needs of their user. Students were not allowed to be more realistic with their solutions, but to try to stay in the innovative ideate head-space. During this phase, students took pieces of their innovative ideas and used them to sketch out a prototype of an idea they really thought would meet the needs of their user. For instance, the idea of mind-reading robots often transformed into quick response (QR) code scanners, and the idea of hiring more physical education teachers turned into eliciting parent volunteers or teacher aides. This new idea was sketched out by the designer and used to inform the creation of a prototype (see Figure 5).

Step 4: Prototype

After step 3, students were tasked to go home and create an actual, physical prototype to represent their solution. Students were told to think of a way to visually represent the solution using inexpensive supplies (Figure 6). The prototype is representative of the solution, and should be something the user could actually use to solve the initial problem. The prototype is a rough draft of the final product, since the user needs to provide input and guidance before anything final is created. Some examples of prototypes created by the PETE students were: QR code magnets using the Plickers application (called Plagnets) that were appropriate for varying developmental levels and a homemade tablet to represent the idea of recording videos and bringing them home to assess at a later time. Again, this prototype is not the final product. It represents a conversation starter between the user and the designer to work out all the kinks before time and effort are spent on the final solution. Student designers were able to share their prototypes in class with their user and receive valuable feedback to further refine their solutions (see Figure 7).

The solutions created in class represented ideas from the soon-to-be "newest" practitioners in the field. These ideas were full of optimism, practicality and respect for the culture of assessment. The college students grounded their work in a belief that assessment is a valuable and necessary tool for their future physical education programs, and that they need to find unique solutions to confront the common barriers to assessment. These PETE students shared the belief that preK–12 students come to their class to be educated and that it is vital that they capture evidence of learning and growth in the psychomotor, cognitive and affective domains. Table 1 highlights the solutions presented by the physical education teacher candidates.

Step 5: Test

The final step is to test the solution and then come back with even *more* feedback for the designer about ways to improve the final product. The PETE students did not create ac-

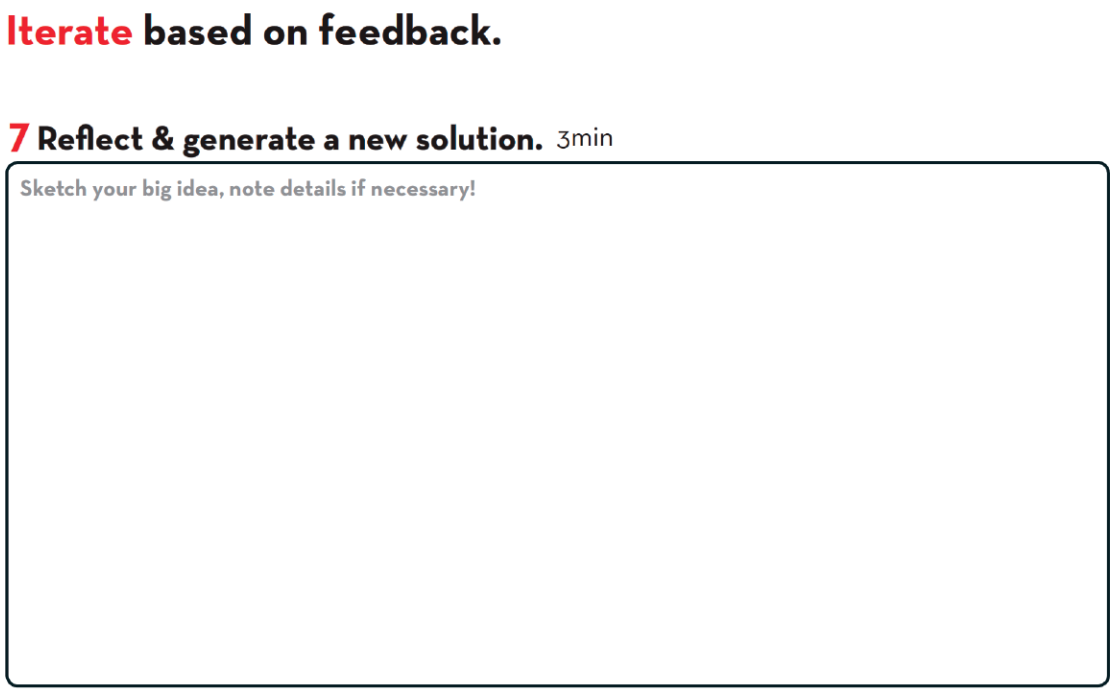


Figure 5. Step 4: Prototype sketch.

Note. Graphic representation of the fourth design thinking phase by the d.school (2018). Source: d.school (Photographer) materials: D.Gift Worksheets [digital image]. Retrieved from https://static1.squarespace.com/static/57c6b79629687fde090a0fdd/t/58992ddd46c3c4da5df52911/1486433757845/Participant-Worksheet.pdf under a Creative Commons attribution non-commercial 4.0 license.

Figure 6. Supplies used to create a prototype.

Note. Photo representation of potential materials used in fourth design thinking phase by McIntosh, E. (Photographer). (2013, December 13). *TalkTalk plc design thinking session* [digital image]. Retrieved from https://www.flickr.com/photos/91712888@N00/8462844646 under a Creative Commons attribution non-commercial 2.0 generic license.

tual solutions during this assessment class and were not asked to test out the solutions since they were only fictitiously creating these solutions. The students, however, were encouraged to test out their solutions when they began assessing during their student-teaching experience. During their student-teaching semester, PETE students were expected to implement a variety of assessments. They were encouraged to use this process with their cooperating teacher to address assessment barriers and to come up with solutions that they could test at their placement sites.

Conclusion

Physical education teacher education students were asked to identify barriers to using assessment in physical education. They approached the assessment barriers with optimism and focused on solutions that met the needs of the users. These students recognized the value of assessing students using a standards-based approach that focused on student learning in the cognitive, affective and psychomotor domains.

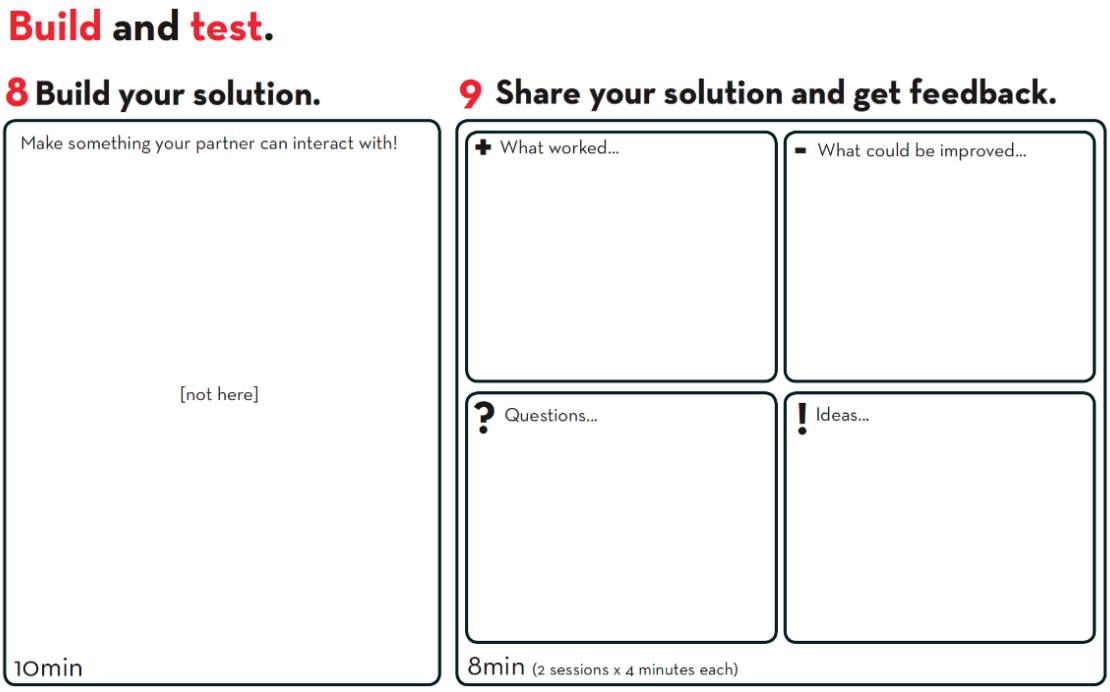


Figure 7. Getting feedback on the solution.

Note. Graphic representation of the fifth design thinking phase by the d.school (2018). Source: d.school (Photographer) materials: D.Gift Worksheets [digital image]. Retrieved from https://static1.squarespace.com/static/57c6b79629687fde090a0fdd/t/58992ddd46c3c4da5df52911/1486433757845/Participant-Worksheet.pdf under a Creative Commons attribution non-commercial 4.0 license.

Table 1. Design-Thinking Solutions to Assessment Barriers

It's not fair to grade because only the highly skilled students will do well.	It takes up too much time to assess. Students should always be moving in class.	There are too many students, so it is impossible to capture a grade.
• Design a series of authentic assessment rubrics with weight distributed for cognitive, affective and psychomotor domains. These rubrics will reinforce that athletic skill is not the most important part of physical education, and that everyone can be a successful mover.	• Use quick response (QR) codes for routines in class (Feith, 2013). Assess frequently using Plickers or Plagnets for both the cognitive and affective domains. • For lower elementary grades, create your own QR code magnets that align with the Plickers tool or Plagnets that use emojis, the school mascot, or the school colors to engage and capture student interest. • Use videos to assess in class, and *bring home* the videos to help with summative assessments.	• Use parent volunteers to come help during summative assessments. Send out newsletters and request parents to come and monitor activities while the teacher works with small groups for assessments. • Ask the administrator if you can borrow an educational aide during summative assessment time, or even borrow the administrators themselves (this also allows them to see the work you are doing in your program).

These future physical educators are now ready to change the assessment culture and understand that being an effective teacher often means bringing home work to complete after school hours, which is not dissimilar to teachers in other subject areas. The design-thinking process allowed students to reframe the way they problem-solved and encouraged them to collaborate with others to find solutions that may have never been considered before. It seems prudent that PETE

students and current teachers consider using this model within physical education whenever possible to solve class-related challenges.

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