

5 Mobile Technologies and Assessment of Student Learning



In this chapter you will learn about:

- Using mobile devices for different types of assessments
 - Formative Assessment
 - Summative Assessment
- Selected Response
- Performance-based assessments
 - Written Responses
 - Presentations
 - Portfolios

5.1 Formative Assessments

Assessment of learning is a very important part of instruction. In Chapter 2 we discussed the Understanding by Design (UBD) curriculum development framework and the importance of the interconnectedness of outcomes, assessments, and activities. A major premise of the UBD framework is that you first determine what you want your students to know by the time the instructional activity is complete. By first determining the desired outcomes, you can then determine which assessments will be used to assure that your students know what you want them to know. Based upon the assessments you have selected, you determine the learning activities that will best effect the learning outcomes and assessments. Assessments are central to the UBD model, as assessments tie desired outcomes together with the learning activities.

In this chapter we begin by providing an overview of assessment for student learning. We then discuss how mobile technologies aid with the variety of assessments that teachers utilize. We discuss formative and summative assessments and then discuss specific types of assessments; assessment types include selected response assessments and performance-based assessments. We also provide a brief listing of apps that can be effective tools for the various types of assessments.

5.2 Summative Assessments

According to McMillan (2011, p. 99) formative assessment “involves the gathering of evidence of student learning, providing feedback to students, and adjusting instructional strategies to enhance achievement.” The goal of formative assessment is to improve student learning and motivation (McMillan, 2011). These types of assessments are diagnostic in nature, meaning that they help determine student’s strengths and weaknesses. In other words, teachers and students are able to adjust their course of action based upon the results of the assessment.

Mobile technologies afford teachers and students the opportunity to communicate efficiently. Having an efficient means of communication allows teachers to gather information about students’ learning and then provide timely feedback to the students. Timely feedback is a key component of formative assessment. Results of such diagnostic assessments enable timely feedback for students and teachers alike, effecting more efficient use of class time, as teachers will be able to teach based on the needs of students.



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Recall that with the UBD approach teachers need to first determine the desired student outcomes; what do you want the students to understand after they complete the instruction? Teachers then decide on the assessments that will lead to the desired results. Teachers should choose formative assessments that will help their students build knowledge so that they can attain the desired results. These formative assessments should, in turn, allow the students to understand/complete the summative assessment.

Generally speaking you will want to select a variety of formative assessments in order to assure that students fully understand your instructional content, demonstrating that they have met the lesson's behavioral, cognitive, and/or psychomotor objectives. Again, feedback from the teacher is critical. There are many different ways to conduct formative assessments, which include both formal and informal formative assessments. Below we discuss a sampling of methods of formative assessment.

5.2.1 Formative Assessments: Formal

Formal formative assessments include assessments that are designed to be given to the students and that students are expected to complete. Student completion of the formal formative assessment may be noted in the teachers' grade book. These types of assessments are built into an instructional unit to assess students' learning as they progress through the unit. Typical formal formative assessments include: homework assignments and quizzes. The intention of these types of formative assessments is to give the student and the teacher opportunities to communicate understanding and to guide the student's learning towards the end goal.

5.2.2 Formative Assessments: Informal

Informal formative assessments are assessments that are context-specific and may arise based on need at a given time. These assessments are not necessarily built into the instructional plan ahead of time. Rather the teacher or student determines when there is a need and then they use the assessment as needed. Rather, informal formative assessments are the extra formative assessments that are used when the teacher or students determine that there is a need for such assessment.

For students, informal formative assessments are assessments that students can take independently as they see fit, or as the need arises. These types of assessments allow the students to self-assess.

For teachers, informal formative assessments can be used within an instructional context to gauge students' understanding at a given point within the instruction. For instance, a teacher might not be sure that students understand a mathematical concept that she is teaching. She could quickly ask the students to solve a mathematical formula and write the answer on a whiteboard app. She can then ask students to hold the mobile device up so that the teacher can see the students' answers. The teacher can then quickly determine if the students understand the content and then adjust her instruction as needed. The teacher didn't formally plan to do this, however she has this technique and others readily available to check students' understanding when the context warrants. Exit surveys are other common types of informal, formative assessments that teachers use to determine what the students learned during the just-completed class session.

Informal formative assessments include drill and practice, educational games, and web resource sites, among others. Oftentimes teachers provide a listing of tools to students as a resource for additional instruction and practice outside of class.

Examples of Informal, Formative Assessment Apps/Web sites

Kahn Academy (khanacademy.org). Website/resource developed by Sal Kahn. Kahn Academy is free for students and teachers to use and has an extensive collection of online instructional videos, materials, and resources. Students can review instructional videos and then test their understanding using the resources available on this site.

Math Blaster (mathblaster.com). Math skill development games for k-12 students.

National Manipulatives Virtual Library (nlvm.usu.edu). Utah State University's virtual library of manipulatives for a wide variety of mathematical concepts--a National Science Foundation supported resource. Allows students to use mathematical manipulatives to self-assess their understanding of mathematical concepts.

Quizlet (quizlet.com). Online flashcard site that students can use to self-assess their understanding of concepts and ideas.

Whiteboard Lite (www.greengar.com/apps/whiteboard). Tool that allows students to draw, sketch and write on a blank slate. Teachers can allow students to work problems on the whiteboard in order for teachers to quickly, visually assess understanding. Students can also work collaboratively using a peer-to-peer connection to peer assess.

As mentioned previously, an important part of the formative assessments is the feedback that students gain from the assessment, regardless of the whether the assessment is formal or informal. The assessment should provide constructive feedback and aid in student learning.

5.2.3 Summative Assessments

According to McMillan (2011, p.156) summative assessments “are used primarily to document student performance; it is an assessment of learning, completed after instruction.” In other words, what has the student achieved after completing the unit of study? As noted previously, the summative assessment should build off of the formative assessments. Formative assessments should have provided the students with the necessary skills and knowledge for the summative assessments. Recall that with the UBD process these summative assessments should be determined before the instruction is designed. These assessments should be used to determine the type of instruction that will be used.

5.3 Selected Response Assessments

Selected response assessments include multiple choice, matching, or true/false items among other types of questions. The students are provided with alternative responses and they then select the most appropriate response. Oftentimes, these types of assessments measure the students’ factual knowledge. These may be formal or informal.

Oftentimes formal assessments, such as quizzes and tests, have selected response assessments associated with them. Teachers use this type of assessment due to the objective nature of the assessment.

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Informal selective response assessments might be set up to allow students to self-assess. When the student is ready to check their understanding, they can quickly quiz themselves with this type of assessment and get feedback quickly and efficiently.

Selected Response Apps/Web sites

Nearpod (nearpod.com). A tool that teachers can use to create interactive presentation that allows teachers to assess students during the class so that they can adjust the instruction as needed. Nearpod enables teachers to poll students and collect selected response assessment information about students. Teachers can also use Nearpod for written responses and performance tasks as discussed below. Nearpod can be used in class, or for student homework.

Socrative (socrative.com). A Student response system that allows students to engage in educational exercises during class via their mobile devices. Teachers can create selected response assessments that provide students and teachers alike with a clear understanding of students' knowledge at that point in time.

5.4 Performance-based assessments

Performance-based assessments, also known as constructed response or alternative assessments, are alternative methods for measuring a student's ability to perform a task within a contextual situation (VanTassel-Baska, 2014). These types of assessments tend to measure higher levels of thinking such as comprehension, application, analysis, synthesis, and evaluation as compared to the selected response assessments discussed above which tend to measure factual knowledge.

One of the main differences between selected response assessments and performance-based assessments is that typically a teacher needs to evaluate the performance-based assessment where selected response assessments can be set up to be scored by a machine. Oftentimes rubrics, checklists and other assessment tools are used to note and evaluate observable competencies. These types of assessment are widely used in the common core. Examples of performance-based assessments include, written works, presentations, group collaborations and interactions, observations, performance tasks, exhibitions and demonstrations, and portfolios, to name a few. Written responses, presentations and other performance tasks, and portfolios are discussed in detail below.

Additionally, performance assessments work well with what was discussed in Chapter 2, about Kolb's ELM Learning styles (Kolb, 1984). Individuals with different learning styles as outlined in Kolb's ELM theory, may prefer alternative types of performance-based assessments.

For example, students with an *accommodator* learning style might prefer to build portfolios, as they prefer concrete experiences and active experimentation. Thus, portfolios allow for concrete experiences while allowing *accommodators* to build a collection of work as they experiment with concepts and ideas and grow intellectually. *Assimilators* would be well suited for assessments where they can record their analysis of a concept. *Assimilators* can research online, digest the information, and then synthesize the information using a tool such as ExplainEverything. *Convergers* would do well with creating video documentaries using iMovie, since they prefer learning by abstract conceptualization and active experimentation. While *divergers* would do well with assessments that use blogs or vlogs, as they prefer concrete experiences and reflective observations.

In addition to using mobile devices for students to create products that the teacher assesses, mobile devices can also be used as tools for teachers to assess students. Using mobile technologies, teachers can evaluate students while students engage in performance-based assessments. Teachers are able to enter evaluative information into the device as the student is performing a task. Teachers can evaluate students and digitally send the information for student review in a much more efficient manner than is typically possible.

General Performance Assessment apps/Web sites

Easy Assessments (thepegeekapps.com/assessment). An assessment tool that allows teachers to create rubrics and perform written assessment of students. The results can be emailed to students.

The Answer Pad (theanswerpad.com). An assessment tool that allows teachers to assess students formatively during class. Or, teachers can create assessments for students that are tied to standards. The results can be shared electronically.

5.4.1 Written Responses

Written responses are commonly used as alternatives to selected responses. Some performance-based assessments tend to take the form of essays, research papers, and journals. They tend to begin with a prompt that the teacher provides to the student and then the students respond appropriately. Different kinds of written responses provide students with opportunities to illustrate different types of cognitive, affective, and psychomotor abilities. For instance, essays allow students to show a wide range of cognitive skills such as comprehension, analysis, and synthesis, dependent upon the prompt that the teacher provides. Students are also able to illustrate affective skills in written responses such as values, beliefs, and opinions. Mobile apps/websites such as *Nearpod* allow students to provide written responses to teachers during the class, so that teachers can review student responses in context as the learning occurs.

Other forms of written responses include journals. Journals allow students to reflect on their learning over a period of time and to illustrate their growth over time. Blogs allow for journaling in a chronological progression as each blog posting is date and time stamped. Additionally, students can tag their postings to aid in organizing their thoughts. This type of synthesis illustrates higher-order thinking as well as the ability to organize their thoughts. Another mobile device tool that is popular for journaling is 53's award-winning app *Paper*. This app allows students to quickly and efficiently use a stylus to write their thoughts into their own journal. Students can electronically send journal entries to the teacher for review.

Students who are considered *divergers* based on Kolb's learning styles, would most likely prefer written assessments.

5.4.2 Presentations and Other Performance Tasks

Another way for students to show what they learned, beyond selected response assessments, is through presentations and other performance tasks. These types of assessments include real-time, observable tasks that teachers typically evaluate based upon predetermined criterion. These performance-based assessments can include formal presentations, group work, and other observable classroom interactions, performance tasks, and exhibitions/demonstrations to name a few. As discussed above, teachers can use electronic rubrics or checklists, to efficiently provide feedback to students as the students perform the task at hand and communicate the feedback in a timely manner. This efficiency in assessment provides timely feedback to students and cuts down on possible teacher memory lapses between the time that the student completed the task and when the evaluation is recorded.

In addition to using mobile devices to evaluate students, mobile devices can be used to record the performance of students. Students can create videos of themselves giving a presentation, or students can use recordable whiteboards to perform computational problems while verbally explaining their thought process.

Students who are *assimilators* and *convergers*, in the context of Kolb's learning styles, would most likely prefer assessments such as presentations and other performance tasks discussed in this section.

Presentation Apps/Web sites

Explain Everything (morriscooke.com). An award winning interactive whiteboard and screencasting tool that can be used by students and teachers alike.

EduCreations (educreations.com). A popular recordable interactive whiteboard for students and teachers that also has publically available directory of lessons created using EduCreations.

iMovie (<http://www.apple.com/ios/imovie>) User-friendly movie production tool for the iPad.

54.3 Portfolios

A student *portfolio* is a collection of a student's schoolwork. Generally speaking these collections are organized based on chronology, criterion/standards, or a student's best work (also known as showcase).

For portfolios to be meaningful they must be organized in some way and for a particular purpose. Furthermore, for portfolios to be meaningful there needs to be some way for the student to reflect on his/her work and a way for students to articulate the importance and significance of pieces included in the portfolio.

Mobile technologies can be useful in portfolio creation as portfolios in the past were typically housed in three-ring binders. The physical nature of the portfolios in the past made it difficult for students to go through their portfolio and reflect on their work, while also allowing teachers opportunities to review their work as a portfolio is being built. Electronic portfolios, however, foster greater communication between students, teachers, and caregivers (Harris, 2009). Students can actively build portfolios while gaining feedback from teachers and caregivers. Being able to move students' work to electronic portfolios, and the ability to virtually share a portfolio, makes the process much more efficient when compared to the three-ring binder portfolios of years past. The technology has advanced enough as students' work can be protected in secure, password-protected sites in order to protect students' educational records and assessments.

Students who are considered *accommodators*, based on Kolb's learning styles, might prefer to build portfolios, as they prefer concrete experiences and active experimentation. Thus, portfolios allow for concrete experiences while permitting students to build a collection of work as they experiment with concepts and ideas, and grow intellectually.



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Portfolio Apps/Websites

LiveBinders (livebinders.com). Online resource multimedia management tool that offers security features to protect confidential student documents.

Google Drive/Docs (drive.google.com). Google drive is an online file storage site that works with Google docs and allows individuals and teams to collaborative create and develop documents, spreadsheets and presentations.

EduBlogs (edublogs.org). Educational blogging site that can be used by teachers and students in a safe and protected environment. Students can use the blogs for journaling or for online electronic portfolios.

There are many different ways that mobile devices can be used to assess students’ learning as we learned in this chapter. The teacher can input evaluative scores and feedback for students into mobile devices, or, students can use mobile devices to create products that will be evaluated by the teacher. As noted many times in the chapter, mobile devices afford an efficient means for communicating between student and teacher, thus enabling timely feedback for student learning.

5.5 Summary

In this chapter you have learned:

- How mobile devices can be used for formative and summative assessments.
- Mobile devices can provide feedback to students via selected response assessments.
- Mobile devices can be used to assess performance-based assessments using rubric and checklists, while students can create performance-based products that will be assessed by teachers can also use mobile devices.

Key Terms

Constructed Response Assessments	Portfolios
Formative Assessment	Selected Response Assessments
Performance Based Assessments	Summative Assessment

Reflection to Action

1. Reflect on an instructional unit that you teach on a regular basis and consider how you assess your students.
 - a) How can you use mobile technologies to conduct formative assessments of your students?
 - b) How can you use mobile technology for summative assessments?
2. Revise the instructional activity so that you use mobile technologies for both the formative and summative assessments. Consider using both selected response assessments and performance-based assessments. Use the following table as a template for this activity.

Unit Name:

of Class Sessions for the Unit:

General Description:

Type of Assessment	Current Assessments	Mobile Technology Enhanced Assessments
Formative	Current formative assessment, with brief explanation	1. Mobile Technology enhanced formative assessment, with brief explanation....
	Current formative assessment, with brief explanation <Repeat as necessary>	<Repeat as necessary>
Summative	Current summative assessment 1, with brief explanation	Mobile Technology enhanced summative assessment 1, with brief explanation
	Current summative assessment 2, with brief explanation....(if you have it) <Repeat as necessary>	Mobile Technology enhanced summative assessment 2, with brief explanation.... (if you need it) <Repeat as necessary>

3. Create a portfolio using one of the portfolio tools discussed in Section 5.3.3. Consider how students can use the tool for reflection and to track their own intellectual growth.

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