Making Better Digital Formative Assessment Tools

Teachers perform assessments with paper and pencil or more modern forms such as software designed for this purpose.

Existing apps have led to greater strides in performing assessments, but many educators feel that continued better design and additional features could help create more depth in assessments and improve learning.

A Short Definition of the Different Types of Assessments:

The general definition of assessment in education is an ongoing process of measuring what students are learning to help the teacher plan subsequent lessons and determine where extra effort is necessary. Assessments provide educators with both objective and subjective data in order to understand student progress and whether a subject has been mastered. There are numerous types of assessments, which include summative, formative, diagnostic, performance, adaptive and alternate. The goal of all these types of assessments is not only to assign grades, but also to keep on top of student knowledge and ultimately improve student performance. In this paper we will just be discussing digital (online or app based) formative assessments though many of the suggested improvements may also have a role in other types of assessments.

What is Formative Assessment? :

Specifically, "a *formative assessment* or *assignment* (as defined by **David Wees**, Formative Assessment Specialist for New Visions for Public Schools) is a tool teachers use to give feedback to students and/or guide their instruction. It is not included in a student grade, nor should it be used to judge a teacher's performance". Examples of formative assessments can be quizzes, discussions, projects, Q&A, journals, using

graphs or drawings to represent a concept or using movement to express a concept. Peer and self-assessments are also important ways to produce these types of assessments and help motivate students. Common core standards emphasize the need for assessments in the form of constructive feedback to improve student performance and teaching alike.

In addition to the many methods there are of performing formative assessments, there are numerous tools, which teachers can use to implement these assessments. As we all know, paper & pencil, are often being replaced by multi-media and educational apps designed specifically for this purpose. I think educators and non-educators alike agree that frequent and timely assessments are essential to increased learning, but the *quality of a tool* is an essential ingredient to success.

What Types of Digital Assessment Tools Are Available Today:

A plethora of digital and online tools exist to help teachers perform and glean knowledge from assessments. For example, Quizlet, a very popular collaborative platform, allows teachers and students to create quizzes and study guides such as flashcards with the added ability to upload audio and images. Another popular platform for formative assessments is Socrative where a teacher can create quizzes and quick polls and get responses instantly. Socrative also aggregates the data and provides analysis of results so that the teacher can discover immediately if the lesson is being understood. i-Ready of Curriculum Associates goes a step further and provides adaptive tests for K-12 reading and mathematics. These tests diagnose the level of the student per common core standards, provide individualized next steps for instruction and aggregate this data over their school years. Most teachers use a combination of paper and pencil along with several different applications that suit their needs.

Assessment tools should work across all platforms:

Many schools do not yet have 1:1 tablets or computers so planning time in the computer lab or rolling in the ipad cart is necessary to facilitate some digital assessment or learning. Schools also vary in the types of computers and tablets they buy- chrome, ipad etc. Successful apps should work across all platforms and/or devices. Being web based is advantageous because it does not depend on the device being used and mobile apps are increasingly useful because most school kids have a smartphone, even if they don't have an ipad or computer to use everyday in class.

Formative assessment apps should do more than create quizzes:

In summary, most available formative assessment apps allow a teacher to generate a quiz and/or conduct a poll and the better ones provide some analysis of the data over a length of time. However, as you read in the third paragraph of this paper, there are numerous ways to conduct a formative assessment. No single quiz can provide all the information necessary to create a complete picture. Multiple approaches are necessary to deepen learning and meet different needs. Software can be designed to also perform many other types of formative assessments such as creating a graph or a visual representation of a concept to demonstrate understanding. Some of these varied methods also help students get more meaning from the lesson, create more engagement and increase understanding. Having other methods available for teachers would decrease their planning time and improve organization by keeping formative assessments in one place. To its credit, Socrative also has "space ride", "polling" and "exit ticket" in its assessment tool portfolio. There are many sites on-line to get ideas for other types of formative assessments, many of which can be fashioned into apps. I found this list "sampling of types of formative assessment" a good place to start-
http://www.isbe.net/common_core/pdf/da-form-asmt-chart.pdf .

Analysis can become deeper:

As technology advances increase, analysis could become deeper. At the moment, most apps provide the teacher instantaneous student scores for quizzes and/or a % of questions answered correctly in a poll. They could also use more learning analytics and identify the specific areas of knowledge that students might need help; or the questions that the majority got wrong if it's a multiple question quiz and other useful statistics.
This type of reporting and deeper analysis is being done in adaptive assessments, but they do not exist for every subject or application. More importantly, there is no ability to modify or customize these applications and one must completely rely on the software to provide everything you need. Adaptive learning platforms are not foolproof; students have been known to "game" the system. Often, if students just keep clicking, they eventually figure out the right answer by process of elimination and don't really learn much in completing the exercise.

Formative assessment apps for arts, music and other non-core subjects:

Most formative assessment apps are not applicable for all types of classrooms. I have only found one app specifically designed for arts, music, health and physical education; Learning Point OnCore, by American Institute for Research. A design teacher I know has students using the presentation software Keynote so they can imbed text and graphics to illustrate a design or concept. This software was, however, designed for business purposes and not educational assessment. Some teachers use Padlet, which is a virtual bulletin board. Students can collaborate and/or create a graphic to represent what they are learning but this might not be very helpful in music or other non-core subjects. Subject specific templates could help teachers form quizzes; for example common topics in art include color, composition, function and others. In addition, some formative assessment apps allow for graphics however, the quality can be low. According to some design and art teachers I spoke to, classes would love a photoshop link to these other collaborative programs.

Consolidation and Link to gradebook, LMS or SIS:

Most teachers use blended assessments; i.e. a combination of paper and pencil along with several different types of apps. It would be helpful if all apps could easily link to a schools data system, so that all student assessments could reside in one place. In addition, if formative assessment apps were subject specific, it would be easier to consolidate all the many different create ways to assess in one particular subject. Steve Hendricks, a computer science teacher at the Morris County School of Technology in New Jersey recently told me, "The fewer places you have to go, the better. One stop shopping is always preferable".

Send results to parents:

Assessment apps can also be a way of communicating more with parents. It is difficult to help your child if you can't really tell how they are doing before the end of a term or semester. Parents play an important role in their child's education and can help a great deal if informed. Teachers often send home tests to sign or exit slips etc. but that little piece of paper can get lost or chewed up by the dog ;-) It's nice for a parent and a teacher to have a trail of comments and assessments to refer back to.

Connect to test engines and open source teacher content:

Many or most teachers generate test questions from exam generators like ExamView by Turning technologies which allows teachers to create tests online with publisher and user content. ExamView can also create multiple versions of the same test. These created tests are presently just for paper and pencil. I believe that ExamView is planning to have multiple assessment delivery methods but they were not available to review at the time of this writing. Other companies like Socrative share premade quizzes created by educators. Every formative assessment app would benefit from a partnership with a publisher or test engine generator and/or an open source of teacher created quizzes and content.

Tests can become deeper:

Teachers inherently know to present information or ask questions in several different ways or suggest a different task to illicit more information but ***don't often have the time or resources***. The right software could suggest different questions or even better questions. Some aspects of this would require non-trivial artificial intelligence programming but I'm sure there are easier ways of improving present methods.

Technology can make assessment more powerful:

A recently published report by the OECD (organization for economic cooperation and development) entitled "Students, Computers and Learning-Making the Connection" (Sept, 2015), found that students who only used computers moderately scored higher in mathematics and ELA than students who used technology much more frequently. However, they also found that technology made assessment much more powerful. ". *Teachers who use inquiry-based, project-based, problem-based or co-operative pedagogies often find a valuable partner in new technologies; and industry is developing several technologies (learning analytics and serious games, for example) that promise to exploit the rapid feedback loops afforded by computers to support real-time, formative assessments, thus contributing to more personalised learning (Johnson et al., 2014).* "
http://www.oecd.org/publications/students-computers-and-learning-9789264239555-en.htm

Educators and administrators alike would agree that formative assessments are one of the most important and effective strategies to increase learning and the efficacy of teaching. "According to an OECD (2005) study on the implementation of formative assessment in international classrooms found that while the concept of formative assessment may resonate with teachers, **many protest that it is too difficult to put into regular practic**e". ("Making it Happen: Formative Assessment and Educational Technologies" by Janet Looney)

Lets make it easier for them.