Formative Assessment

"At the very least, when we use testing to exclude, we run the risk of squelching creativity before it has a chance to develop."
– Salman Khan, *The One World Schoolhouse: Education Reimagined*

Research Foundations

The term formative assessment goes back to the 1960s[1], but its modern conceptualization is well summarized by Sadler[2], who said a "key premise [of formative assessment] is that for students to be able to improve, they must develop the capacity to monitor the quality of their own work during actual production." While a student moves through a curriculum, they need to be made aware of their standing on the path toward mastery. Formative assessment is a way of speeding up a student's journey on the path to mastery by "short-circuiting the randomness and inefficiency of trial-and-error learning."

The formal framework of formative assessment can be broken down into three components:

1. A standard of quality/mastery
2. Understanding where the student's current level is compared to (1)
3. Knowing the next steps to close the gap between (1) and (2)

The teacher should be proficient in all of the above steps, and beyond only teaching their students about the domain knowledge of the curriculum, they should train students to build up such a formative framework as well. When information that falls under any of these points is given to the student, it is considered feedback, and

	Where the learner is going	Where the learner is right now	How to get there
Teacher	**1** Clarifying learning intentions and criteria for success	**2** Engineering effective classroom discussions and other learning tasks that elicit evidence of student understanding	**3** Providing feedback that moves learners forward
Peer	Understanding and sharing learning intentions and criteria for success	**4** Activating students as instructional resources for one another	
Learner	Understanding learning intentions and criteria for success	**5** Activating students as the owners of their own learning	

Figure 1: Aspects of formative assessment

when the student makes a judgement their self on any of these points, it is considered self-monitoring.

Following on the definitions laid forth by Sadler, Black and Williams published their first work on formative assessment in 1998, and it has been cited [number] times since. They continue to develop a theory of formative assessment in the subsequent years, with their 2009 summary of the field[3] developing on Sadler's framework a little further to include communication between peers as well, as seen in Figure 1.

Current Tools

There are a few popular tools right now that I think of as "Piazza with more media types". Teachers and students can post topics (including text and annotated images and videos), and have others post follow ups. Similar to how Piazza is used to assess engagement of CS6460 students, tools like Flipgrid[4] and Recap[5] provide "Snapchat-like" ways to interact with the rest of the class. Teachers can monitor students' posts to see who seems to be unengaged, and students can receive feedback on their ideas or projects.

EDpuzzle[6] is more of a one-way communication tool, giving teachers the ability to create video content for their students and add breakpoints with quizzes to make sure students are grasping the material as they go along. This tool is similar to Udacity's video lecture structure, but it is open to any teacher who wants to provide custom video lectures to their students, instead of Udacity's official library of classes.

Khan Academy, a video-lecture platform with quizzes and ways for students and (until now, informally) teachers to track progress since 2005, is starting a new project with several southern California school districts to allow teachers to incorporate standardized curricula on the site into their classrooms.[7] The concept graph that Khan Academy generates looks similar to many game maps, as if the student is completing the campaign-mode seen in many video games.

Problems with the Current Tools

Many of these tools brag about cloning functionality from Snapchat and Instagram, but I find this to be a huge negative. Students are likely already using those social media platforms, and I don't think they'd be thrilled about using a second-rate clone. Furthermore, since the participation model is similar to Piazza's, I think that it could easily turn into participation for participation's sake, which is very different from authentic engagement.

EDpuzzle and Khan Academy show more promise to me, but they seem lacking in how they utilize technology. Essentially, their services use technology for its easy distribution of video content, but ignore richer forms of content like interactive simulations.

References

1. Scriven, Michael (1967). "The methodology of evaluation". In Stake, R. E. Curriculum evaluation. Chicago: Rand McNally. American Educational Research Association (monograph series on evaluation, no. 1.)

2. Sadler, D. Royce (1989). "Formative assessment and the design of instructional systems". Instructional Science 18:119-144

3. Black, P. & Wiliam, D. (2009). Developing the theory of formative assessment. Educational Assessment, Evaluation and Accountability, 21(1), 5-31.

4. https://info.flipgrid.com/

5. https://letsrecap.com/

6. https://edpuzzle.com/

7. https://www.edsurge.com/news/2017-04-25-khan-academy-s-new-teacher-aid-tool-goes-for-a-test-drive-in-southern-california