Using Plickers in Formative Assessment to Augment Student Learning

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ABSTRACT

The aim of this quasi-experimental research is to investigate the effectiveness of formative assessment on the progress of private elementary school students. 77 students (33 girls and 44 boys) were split into two groups. The experimental group used an app called the Plickers app daily and was further divided by gender into two groups, while the control group used a revision sheet as a formative assessment. Student progress was assessed by comparing the mean scores of a pre-test to those of a post-test taken after one week of using the formative assessment tools. The results indicate that both formative assessment tools help improve student progress. However, the Plickers App had a greater positive impact than the revision sheet. Further, greater improvement was displayed by girls compared to boys. The researchers concluded that continuous usage of Plickers in classes can help promote positive students’ perception, improve performance, and reduce gaps between high and low achievers.

KEYWORDS

Educational Technology, Formative Assessment, Learning, Online Tools, Plickers, Teaching

INTRODUCTION AND RATIONALE

Although technology is not the panacea to 21st-century education issues, it is still by far the most common topic concerning the process of teaching and learning in the current era’s education. Integrating technology into the learning setting is “the road to motivate and encourage students to learn…paved with their passion for technology and digital tools” (Elmahdi, Hattami, & Fawzi, 2018). Accordingly, a wide array of research has developed to explore the role of technology in the teaching/learning process and verify its effect on the classroom environment. Existing researchers also emphasized the potential of technology to increase motivation, improve teaching/learning and assessment processes, and to positively impact the students’ performance and achievement of knowledge and skills (Chou, 2017; Irving, 2016; Damick, 2015).

One of the most exciting applications of technology in the enhancement of student learning is the use of modern online classroom response systems for formative assessment (Elmahdi, Hattami, and Fawzi, 2018). In their research on formative assessment, the team of Regional Educational Laboratory (REL) Central’s Formative Assessment Research Alliance in the United States, including principals and administrators, showed that teachers in the region vary widely in their understanding of formative assessment and how to use it in class. (Klute et al., 2017). Formative assessment is “a planned process in which assessment-elicted evidence of a student’s status is used by the teacher to adjust their ongoing instructional procedure or by students to adjust their current learning tactics” (Popham, 2011, p. 270). Technology tools were predicted and proved to “help teachers quickly collect and make sense of the formative assessment data, which leads to more purposeful planning in
instruction” (Robinson, 2018). Ramsey and Duffy (2016) confirmed that the most essential area in a classroom environment is a formative assessment. It “provides teachers and students with continuous, real-time information that informs and supports instruction.” Evidence from research suggests that a huge number of research studies emphasize the effect of teaching and learning strategies in general and on classroom formative assessment in particular (Irving, 2016; Beatty & Gerace, 2009; Damick, 2015; Schell, Lukoff, & Mazur, 2013; Preszler et al., 2007; Caldwell, 2007; Ravitz, 2002).

The difficulties that teachers might face in finding time to apply strategies of formative assessment in classrooms is another area of focus for other studies such as Wei (2010). To solve this problem, to detect how teachers can face the most common challenges with formative assessments, students should be engaged and active in the process of teaching (Black & Wiliam, 1998). James Denby (March 2017) stated that formative assessment is an important topic of discussion in the faculty meetings and professional development sessions for teachers.

In addition, Duckor and Holmberg (2017) stated that “Powerful, tangible results come from teachers who are assessing and reassessing student learning—minute-by-minute, hour-by-hour, day-by-day” (p. xix). For an effective assessment, he suggested creating more nurturing and supportive environments that meets students’ need. According to Duckor and Holmberg (2017), nurturing environment can be created through information that sets the stage for the lesson’s content and prompts students to share prior knowledge. He emphasized the importance of students’ background knowledge, often called prior knowledge, to which a teacher needs to connect new information.

Literature strongly supports the importance of providing immediate feedback during the formative assessment process, with the aim of improving the teaching/learning process and thus enhancing students’ performance and achievement (Kornell, 2014). In addition to the fact that “The more we know about individual students as they engage in the learning process, the better we can adjust instruction to ensure that all students continue to achieve by moving forward in their learning” (Garrison & Ehringhaus, 2016). This can be done by using a popular piece of educational software known as Plickers (Howell, Tseng, & Colorado, 2017), a form of learning response system that enables the collection and analysis of student responses to questions posed by teachers. Many previous studies have focused on the importance of formative assessment and how such systems can help in organizing it (Christodoulou, 2016; Kirby, 2015; Damick, 2015).

Statement of the Research Problem

Even though a significant number of researches suggest that hardware-based clickers technology is commonly used for classes with high enrolment in university settings (Milner-Bolotin, Antimirova & Petrov, 2010), clickers practice in middle school science classrooms is still very limited in numerous highly developed countries, including the United States (Gilles, 2017). According to Bruff (2011) among the primary reasons for negative feelings about clickers were: technical problems and the cost of the devices. Thus, Plickers are an excellent alternative to clickers, as they are easier and cheaper to use in the classroom. Plickers is a type of classroom clickers using paper instead of a device (“paper clickers”). It can be described as a set of sheets of paper that work like a set of classroom clickers when used with a smartphone. Plickers takes its name from a play on words (Paper + Clickers). Due to the limited research of clicker use in middle school science, there is also limited research regarding Plickers’ influence on student learning in the same field. Using Plickers as a formative assessment tool in middle school science classrooms is still in its infancy. Beatty and Gerace (2009) confirmed that “[t]eachers have limited time to assess students’ performances and provide feedback, but new advances in technology can help solve this problem.” (p. 142). Given that Plickers is a popular form of clickers that can be used in the classroom to get the benefits of clickers and to avoid many of its drawbacks, in such a way that can be easily accessed at no charge and does not require students to have dedicated devices, it was used in this study.
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