Integrating Learning Analytics into Workforce Education to Develop Self-Assessment Competency

Lin Zhong
Southern Illinois University Carbondale
475 Clocktower Dr. #4605
Carbondale, IL 62901

Introduction

Self-assessment, which is a cyclic process of self-monitoring, self-evaluation, and identification and implementation of instructional correctives as needed, is fundamental and critical skill for lifelong learners (Yan & Brown, 2016). Lifelong learner needs to frequently assess individual performance, validity of learning resources, and the learning environment. Self-assessment affects learner's cognition, affection, and conation and assists learners to learn how to learn. Effective self-assessment can encourage deep as opposed to surface approaches to learning, with positive implications for the quality and sustainability of learning (McDonald & Boud, 2003).

Formative analytics has been identified as a good method to support students' self-assessment competency development (Singh & Terry, 2008; Zhong, 2016). As a new approach of learning analytics, formative analytics focus on supporting the learner to reflect on what has been learned, what can be improved, which goals can be achieve, and how to move forward. By providing analytics for learning rather than analytics of learning, formative analytics can empower each individual learner to reach his or her potential through personalized feedback and self-reflection

Though many theoretical discussions related to self-assessment and learning analytics have been conducted, empirical studies exploring how self-assessment competency can be supported through formative analytics appear to be scarce. Aimed at filling this research gap and get deeper understanding of how formative analytics can support self-assessment competency development, this study examined the effects of formative analytics on developing self-assessment competency in workforce education. The research question, *How formative analytics impacts students' self-assessment competency development?,* were examined in this study.

Literature Review

Self-assessment is defined as a cyclic process of self-monitoring, self-evaluation, and identification and implementation of instructional correctives as needed (McMillan & Hearn, 2008). In this study, self-assessment is considered as a learning strategy rather than a personal skill or a type of assessment method (Yan & Brown, 2016). Self-assessment has been recognized as fundamental and critical skill to lifelong learners (McDonald & Boud, 2003). Self-assessment affects learner's cognition, affection, and conation and assists learners to learn how to learn, which is an important lifelong learning competency in digital age. Effective self-assessment should neither overestimate nor underestimate learners' performance. Boud and McDonald (2003) believed that effective self-assessment can encourage deep as opposed to surface approaches to learning, with positive implications for the quality and sustainability of learning.

Self-assessment practices cover two major actions, self-directed feedback seeking and self-reflection (Yan & Brown, 2016). Self-directed feedback seeking refers to the process by which students initiate and take responsibility for seeking feedback from various sources for the purpose of self-assessment. 'Self-directed' is used to emphasize that the characteristics (the content, source, direction, etc.) of feedback are determined by the student him/herself rather than following external instructions. Feedback could be obtained from both external and internal sources (Butler & Winne, 1995). External feedback can be obtained from two sources including people and processes (Sargeant, Mann, van der Vleuten, & Metsemakers, 2008), or inquiry and monitoring (Ashford & Cummings, 1983). Internal feedback comes from within the self, such as emotions, motives, physical sensation and internal states (Epstein, Siegel, & Silberman, 2008). Self-reflection is the action by which students reflect on and evaluate the quality of their learning process and outcomes with the support of available/gathered feedback, and

identify their own strengths and weaknesses. By critical reflection, students may have a better understanding in terms of their strengths and weaknesses as well as how to facilitate achieving their goals.

Adaptive digital learning environment with low pressure is suggested to help learner's development of self-assessment competency (Yan & Brown, 2016; Zhong, 2015). Students need opportunities to expose their reflection without fear of shame or embarrassment. Adaptive learning environment can provide space and time for students' deep thinking. Instructors are suggested to create such learning environment where students are allowed not to disclose their self-assessments to the teacher or classmates, but are encouraged to share these with trusted people (Andrade & Brown, 2016).

Formative analytics has been identified as a good method to create adaptive learning environment that supports students' self-assessment competency development (Zhong, 2016). Formative analytics refers to using analytics to encourage students to reflect on how they are learning, or to initiate a conversation between a tutor and a student, instead of using the system to assess the student's performance or ability. As a new approach of learning analytics, formative analytics focus on supporting the learner to reflect on what has been learned, what can be improved, which goals can be achieve, and how to move forward. By providing analytics for learning rather than analytics of learning, formative analytics aim to empower each individual learner to reach his or her potential through personalized feedback and self-reflection.

Method

Case study was chosen to answer the research question. Participants were 8 students in workforce education at a large research university in Illinois. All participants are adult learners and have full-time jobs. Average age of participants is 34 years old. Data was collected from individual interviews and group interview with a semi-structured questions guide. In addition, students' academic outcomes, in this study ePortfolios (Zhong & Hartsell, 2015) and presentations, were included in data analysis. In this course, students were required to complete four group projects and three professional presentations and post a weekly reflection on the learning experience of the past week on their individual e-portfolios. Interviews and students' academic outcomes were transcribed and coded after students' grades were submitted.

Findings

Preliminary findings showed that formative analytics is effective in supporting self-directed feedback seeking. More student-initiated feedback seeking behaviors were reported. It indicates that formative analytics has positive impact on self-directed feedback seeking. Students was triggered by formative analytics results to independently assess their performance by using the same criterions as the instructor. In addition, internal self-directed feedback seeking behaviors were also found from students' interviews. Students tend to regularly reflect on performance not only in this particular course but also in other courses and even personal activities out of school. It shows that formative analytics not only affects students' academic performance but also performance out of schools. This finding shows the potential of formative analytics in developing students as lifelong learners, who are independent and self-regulated learners.

Unfortunately, self-reflection behaviors were not found in this study. All reflections behaviors performed in the class were required by the instructor. For example, students are required to post a weekly reflection to their ePortfolios. All students did what the instructor asked but no additional posts. Although some internal self-reflection activities (e.g., thinking in head) were mentioned in students' interviews, few students went back and checked their thoughts again after the class. Instructors still lead self-reflection processes and activities as found from previous research (Costa & Kallick, 2004; Zhong, 2017). One possible explanation may be students' age. Because all students are adult learners and have full-time jobs, students are not able to spend extra time on school work. Most students tend to meet the minimum requirements of the class in order to get the course completed. Thus, even though students had some self-reflections in head, no behaviors were observed. Another possible reason is the technical limitation in this study. Although there are some learning data related to self-reflection generated such as website tracking data, few of the data can be used to analyze students' self-reflection activities. In addition, as mentioned above, most self-reflection activities were occurred in students' heads. It is difficult to observe and capture. Therefore, researchers are not able to conclude whether formative analytics impacts self-reflection activities.

Conclusion

This qualitative study examined students' self-assessment competency development supported by formative analytics. Preliminary findings showed that formative analytics is effective in supporting self-directed feedback seeking but self-reflection was not found although students showed positive attitudes during interviews. This study demonstrated that formative analytics has the potential to achieve the goal of developing students as lifelong learners. Although few self-reflection behaviors were found in this study, I believe it is possible to promote self-reflection behaviors if formative analytics are properly designed and integrated into instruction. Thus, following step of this study is to improve formative analytics design in this course to ensure more data related to self-reflection can be captured and analyzed.

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