Measuring Soft Skills in Authentic Learning Environments

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Abstract

Soft skills, such as critical and creative thinking, are recognised as increasingly important in the 21st century. They have been shown to predict academic achievement and are highly valued in modern workplaces. While teachers can help students foster soft skills in Authentic Learning Environments, there is no clear consensus as to how they should be developed, measured and assessed. In this round-table discussion, we will examine suitable data types and instruments to measure soft skills, and we will situate this discussion within the context of existing learning analytics research.

Keywords

Soft skills, Authentic Learning Environments, Team-based learning, Measurement, Assessment

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1. Developing soft skills in Authentic Learning Environments

The term soft skills describes the set of knowledge, skills, attitudes and personal traits that are considered important to thrive in today's world (Care, Griffin & Wilson, 2018). These skills predict academic achievement (Farrington et al., 2012) and are forecast to substantially contribute economically to organisations and society (Deming, 2017). Assessing, measuring, and developing soft skills, therefore, is becoming an important area of focus within the academy.

Soft skills include critical and creative thinking, collaborative skills, self-regulation, problem solving skills, communication skills, and empathy. Although, they are already widely implemented and included in school curricula around the world, questions remain about formally measuring them.

Authentic Learning Environments (ALE), such as project-based learning, can provide richer learning experiences for fostering soft skills than traditional learning environments thanks to their emphasis on active engagement with peers while solving realistic problems. ALEs focus on real-world, complex problems and their solutions, and are inherently multi-disciplinary (Lombardi, 2007). Tasks in ALE are often ill-defined to allow for competing solutions and diversity of outcomes (Herrington, Reeves, Oliver & Woo, 2004).

Teaching in ALEs allows us to capture more valuable learning data going beyond what is traditionally viewed as a primary cognitive activity. They provide opportunities for students to collaborate, innovate and reflect on their own learning (Herrington & Herrington, 2008). One promising example is the Epic Challenges Program (ECP) developed by NASA (Camarda, de Weck & Do, 2013). ECP connects teams of students to experts to solve complex, open-ended, multidisciplinary problems (e.g. How can we sustain life on Mars?). These challenges promote phenomenon-based learning, teamwork and creativity. This program will be developed in the Adelaide region in 2020 in collaboration with the University of South Australia and will provide a good opportunity to collect data on soft skills.

2. Measuring soft skills with Learning Analytics

How can researchers get accurate, valid and reliable real-time insights on the development of soft skills? To assess the psychological attributes of student learning, log files are inadequate. Instead, researchers need to look at interactions between students while they are involved in activities that include solving complex problems. While this is an under-developed area of research, some proposals for methods to measure soft skills are being developed. D'Mello and colleagues (2017) introduced the Advanced, Analytic, and Automated (AAA) approach to measure students' engagement during learning. They suggest measuring multimodal data (e.g. facial expressions, heart rate and skin conductance) to infer mental states associated with students' engagement. However, this approach has been criticised, as facial expressions can denote more than one emotion and vary depending on culture (Barrett et al., 2019). A separate methodology to measure student behaviour and affective states in the classroom was developed by Ocumpaugh and colleagues (2015). For any particular computer-based task, researchers can combine these observations with log files to develop models to infer students' emotions and engagement with the task.

There are a number of other ways to measure soft skills yet to be explored in depth. Eye-tracking, EEG, and electromyography could be used to measure non-cognitive abilities in addition to what is recorded in Learning Management Systems. Analysing interactions that a student has with other students, teachers, technology, etc. may provide a sophisticated, nuanced means of measuring soft skills.

3. Goal of this round-table discussion and questions to be discussed

This round-table will provide an opportunity for researchers to explore ways to measure soft skills in light of increased resistance, societally, to assessing psychological attributes. Questions around suitable data types and instruments to measure soft skills will be discussed. This session will explore soft skill assessment through real time social analytics based on participation (affective, cognitive and collaborative), dialogic and discourse analysis. The round-table will also focus on what, if any, promise is held in a range of new approaches and technologies such as EEG, HRV, pupil dilation, eye tracking, and emotion detection through facial expressions. Finally, the panel will situate soft skills assessment within the context of existing learning analytics research and suggest next steps in advancing both the measurement of skills and intervention strategies to improve learner development.

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