

Designing and Validating a Story-Based Socio-Emotional Learning Assessment Instrument

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Abstract: Current assessment instruments for socio-emotional skills typically focus on diagnosing dysfunction and need to be administered by teachers and parents. To explore socio-emotional learning in novel environments, the learning sciences community needs scalable, easy-to-administer research instruments that measure growth in normal children. In this paper, we report on an iterative design process and a series of validation studies for a story-based multiple-choice assessment tool that can be used efficiently by researchers in large-scale evaluations of technology-based socio-emotional learning (SEL) environments.

Introduction and Theoretical Framework

Technology enhanced learning environments such as computer games and intelligent tutors provide the opportunity for early childhood learners to collaborate in order to acquire domain-specific knowledge (Alevin et al 2013). To succeed with technology-based collaborative learning—such as online education—learning researchers have increasingly focused on supporting development of socio-emotional skills. In order to gauge the success of emerging technologies for early childhood education with this important goal in mind, the research community needs assessment instruments that are reliable and sensitive enough to measure growth of social skills in normal children. This paper contributes a new assessment instrument targeting children in grades K-3rd for measuring three socio-emotional skills: 1) asking for help, 2) discussing differences in order to resolve conflicts, and 3) cooperating to solve problems. We document our process and progress towards designing a multiple-choice story-based SEL assessment tool (see example item in Figure 1), including multiple rounds of iteration and three validation studies. We discuss progress and remaining challenges.

We hypothesize that stories provide a valuable paradigm for assessing SEL with our target population. Storytelling has been used to gain insight into the thinking processes of a child. A child can envision him or herself as a character in the story and respond through self-projection within that reality (Hordstal, 2012),

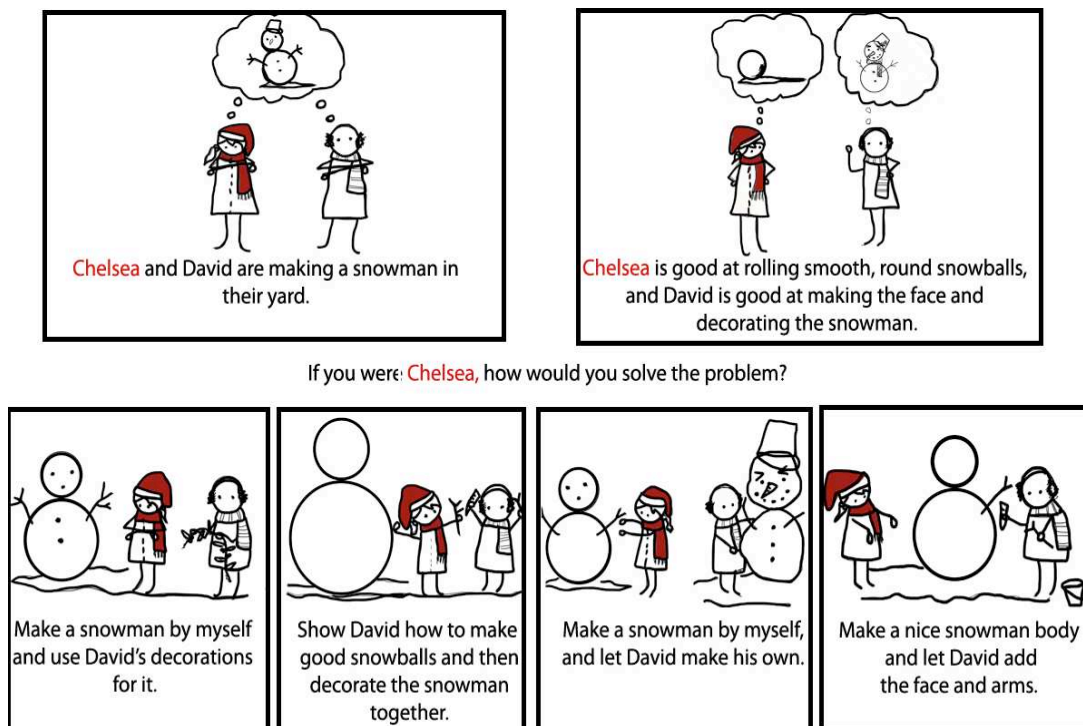


Figure 1. The "Snowman" story assessment item. Students read the top row and then choose between four possible outcomes (bottom row), from left to right: anti-social, social (preferred solution), non-social, and mildly social.

providing insights that would not be possible through direct observation. The capability for children to engage in such self-projection develops between the ages of four and six (Waytz & Mitchell). Although stories have drawn the attention of developmental psychologists and child psychotherapists to diagnose children's developmental disorders for therapeutic purposes (Kaland et al, 2005), they have not typically been used to assess socio-emotional skills in the broader student population.

Illustrated stories have been used in the past for assessing inquiry skills. Specifically, *Inquiry Comics* presents cartoons of children discussing scientific ideas in an inquiry process, from choosing a topic of investigation, to collecting data and concluding results (Ainsworth, Jong, Hmelo-Silver, 2010). However, the assessment items evaluate the characters' scientific investigation skills, not core SEL skills such as discussion and collaboration. This prior work provides inspiration for our own design and development effort.

Assessment Design and Validation Studies

Our multiple-choice story-based SEL assessment tool includes twelve different story scenarios, four to measure each of the three skills. Each assessment item consists of two story panels, a main question, and four answer choices (see Figure 1). The first story panel introduces the context and characters. The characters are different in each story, and we have worked to balance assignment of gender and apparent ethnicity to characters. The second panel presents a conflict or challenge. Across all scenarios, the students see the same question: "If you were [the character] how would you solve the problem?" Students choose among four answer choices, presented in random order, which have been pre-assigned to the categories of Social, Mildly Social, Non-social, and Anti-social. Answer choices are a range of hypothetical actions the main character can choose to solve the problem. Ideas for the details of the stories and answer options were developed over a series of design workshops and pilot studies with the target age group.

We also developed and tested the digital version of this assessment tool using the Cognitive Tutor Authoring Tool (CTAT) platform (Aleven et al., 2009) with a total of 24 students in grades K-4. The online version adds three more features to the paper-based version. First, it provides a voice-over feature that is enabled by default when students login. The system plays pre-recorded voice recordings for each story panel, the main question, and the answer choices. Students can re-activate the audio recordings by clicking/tapping panels independently. Second, the digital version also supports data logging, either to the local computer or in an online depository. Third, the digital version can be installed on computers locally or accessed through the Internet using a URL. The combination of multiple-choice scoring and online data logging creates an opportunity for researchers to measure social emotional learning in large-scale studies.

Through user testing, we confirmed that our story assessment instrument provides convenience since students can answer questions relatively quickly; it's also easy to deploy online, especially now that the voice over feature allows students with reading difficulty to answer questions without human assistance. We conducted three validation studies with 283 students in K-3rd grade students and achieved moderate reliability scores across the three target social skills. We will share further evaluation details in subsequent papers.

Conclusions

Our work demonstrates an online story-based assessment instrument to measure social-emotional growth in young children. Preliminary studies show that K-3rd grade children can comprehend and respond to the story scenarios without adult supervision. We still have challenges to address in terms of isolating the specific skills of interest and achieving the level of sensitivity desired for SEL assessment in the context of technology enhanced learning. Future work will focus on revising our story items to support greater sensitivity to growth.

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