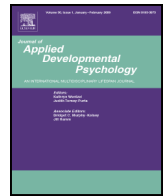




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## Establishing the criterion validity of Zoo U's game-based social emotional skills assessment for school-based outcomes

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### ABSTRACT

*Zoo U* is a game platform which implements performance-based assessment of social emotional (SE) skills through theory-driven content and customized game mechanics. Children engage with characters in a school-like story world to complete six virtual social situations specifically tailored to require the SE skills of communication, cooperation, empathy, emotion regulation, impulse control, and social initiation. Prior work established the scoring algorithms and construct validity for the six game-based scenes. In this study, we examined the degree to which social competence, as measured across the six *Zoo U* scenes, was related to school-based adjustment. As expected, children who demonstrated higher social competence when problem solving *Zoo U*'s virtual situations were significantly more likely to exhibit positive social, behavioral, and academic adjustment, above and beyond demographic influences, and children who performed poorly on *Zoo U* were significantly more likely to experience negative school-based outcomes. The potential for game-based platforms to enable broad-scale SE skills assessment with children is discussed.

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### 1. Introduction

In the past decade, there has been increasing recognition that social emotional (SE) skills are a driving force in student achievement and behavior (Duckworth & Schoon, 2010; Foster & Bussman, 2008; Heckman & Kautz, 2012; Joseph & Strain, 2003; Kautz, Heckman, Diris, Weel, & Borghans, 2014). Higher SE skills mean children are more likely to engage in positive behaviors at school and inhibit antisocial behaviors, such as aggression and social withdrawal (Dodge & Feldman, 1990; Merrell & Gimpel, 2014; Fleming et al., 2005). Prosocial behavior translates into more positive social interactions with peers and teachers, as well as fewer disciplinary and Disruptive Behavior Problems (Fleming et al., 2005; Kupersmidt & DeRosier, 2004; Parker, Rubin, Erath, Wojslawowicz, & Buskirk, 2006). And positive interpersonal relations at school help children feel more connected, safe, and supported, resulting in greater student engagement, lower absenteeism, and more positive attitudes toward learning (DeRosier, Kupersmidt, & Patterson, 1994; Farrington et al., 2012; Martin, 2015; Jones, Greenberg, & Crowley, 2015a, 2015b). As a result, children benefit from a more positive academic learning context that fosters not only academic success, but also greater emotional and behavioral well-being (Malecki & Elliot, 2002; Joseph & Strain, 2003; Zins, Bloodworth, Weissberg, & Walberg, 2007).

This connection between SE skills and school-based adjustment is particularly relevant for the upper elementary grades, a pivotal time when both social and academic challenges intensify significantly (Parker et al., 2006). Children who have difficulty navigating the social landscape of elementary school are substantially more likely to experience negative peer interactions, such as bullying and social isolation, and are at substantially greater risk for emotional and behavioral problems as well as academic underachievement (Kupersmidt & DeRosier, 2004; Woodward & Fergusson, 2000; Zins et al., 2007). A key to preventing the development of more serious maladjustment is intervening before problematic social behaviors become chronic and intractable (Coie, Dodge, Terry, & Wright, 1991; DeRosier et al., 1994; Greenberg, Domitrovich, & Bumbarger, 2001; Parker et al., 2006).

Fortunately, SE skills are malleable—instruction and practice can help children grow and develop these skills for success. And, in fact, a number of effective social emotional learning (SEL) programs are currently available to schools for use at the classroom level (to all children equally) as well as in pull-out settings (e.g., small group social skills training for children experiencing social difficulties) (Almlund, Duckworth, Heckman, & Kautz, 2011; Greenberg et al., 2001). In order to appropriately apply SEL efforts, schools must first accurately identify the SE needs of their students, and this is a significant challenge for many schools. Currently validated SE skills assessment methods—typically behavioral rating scale questionnaires (often completed by teachers), behavioral observation coding systems, and child interview protocols—require considerable staff time (e.g., training, administration, scoring, reporting) making them costly and time-

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consuming to implement. In addition to logistical barriers, current SE methods commonly suffer from psychometric challenges that can limit the utility of the resulting data, such as observer/reporter biases, lack of standardized administration, and student reactivity (i.e., children modify their behavior because they are being observed) (Crowe, Beauchamp, Catroppa, & Anderson, 2011; Christ, Riley-Tillman, Chafouleas, & Jaffery, 2011; Matson & Wilkins, 2009; Merrell, 1999, 2001). Without access to affordable, easy to implement, and validated SE skills assessment tools, it is extremely difficult for schools to assess children's SE skills on a regular basis, which severely limits their ability to both identify students in need of SEL efforts as well as monitor student improvement as a function of that instruction.

### 1.1. Game-based social emotional skills assessment

The current study examined the criterion validity of Zoo U, a game-based SE skills assessment tool ([www.zoougame.com](http://www.zoougame.com)). Zoo U uses theory-driven content and customized game mechanics to implement performance-based assessment of children's social competence (Craig, Brown, Upright, & DeRosier, 2016; DeRosier, 2014; DeRosier, Craig, & Sanchez, 2012; DeRosier & Thomas, 2013). The overarching goal of the Zoo U assessment is to address the logistical and psychometric shortcomings of current SE skills assessment options so that schools can more easily administer effective SE skills assessment with all students and as a result, be better able to identify the SE needs of children and ensure the social emotional health of their student body.

Zoo U is a virtual school-like world where children are learning to be zookeepers. This story world provides a setting that's similar, but not identical, to a real school setting in order to present virtual social situations analogous to those commonly experienced by children in elementary school. Children engage with the software in a self-paced fashion using any browser-enabled device (e.g., tablet, laptop, desktop) with headphones (so as not to disturb others as all text in Zoo U is read aloud to the child). In a school setting, Zoo U can be implemented in an individual or group setting with minimal supervision by a teacher. As illustrated in Fig. 1, when children first login to the software, they engage in several preparatory steps (approximately 5 min). First, Principal Wild provides a brief introduction, set up instructions, (e.g., to ensure child can hear adequately), and directions to complete scenes as the

child would in real life and try his/her best. Then, the child uses the Character Creator to create a personal avatar (i.e., representation of self within the virtual story world) by customizing characteristics, including gender, skin and hair color, hair style, and clothing. Then, using this personalized avatar, the child completes a brief tutorial to train him/her in how to navigate the software (e.g., how to click to move, how to talk with other characters, how to select menu options). Once these steps are completed, the child completes six Zoo U assessment scenes (see Fig. 2) in order via a corkboard interface that unlocks the next scene once the prior scene is completed. Each assessment scene takes approximately 2–4 min to complete for a total assessment time of approximately 20 min.

Zoo U leverages children's natural propensity toward games (Gee, 2003) to engage them in social problem solving and critical thinking for performance-based assessment of SE skills. In developing the Zoo U assessment scenes, we built on educational and developmental theories and empirical research, and used an approach commonly implemented by educational game designers known as Evidence Centered Design (ECD; Mislevy, Almond, & Lukas, 2004; Rupp, Gushta, Mislevy, & Shaffer, 2010) to adapt theory and research to a game-based platform. Specifically, ECD requires three components: competency, evidence, and task models. First, we defined what competencies we wanted to assess as well as the real-world behaviors that would provide evidence for these competencies. We then developed in-game tasks that we knew from empirical research were associated with both the competencies of interest and their related real-world behaviors (DeRosier, 2014).

Based on a large body of research identifying specific social behaviors that promote positive peer relations for children in elementary school (e.g., Asher & Renshaw, 1981; Coie et al., 1999; Dodge & Feldman, 1990; Merrell & Gimpel, 2014), we targeted six SE skills which have repeatedly been shown to impact social, emotional, behavioral, and academic outcomes. These six SE skills are communication, cooperation, emotion regulation, empathy, impulse control, and social initiation. As displayed in Fig. 2, Zoo U presents children with a series of six virtual simulations specifically crafted to elicit the target social skill and require the application of that social skill to solve the presented social challenge. Collectively, these six SE skills formulate Zoo U's overall conceptualization of social competence.

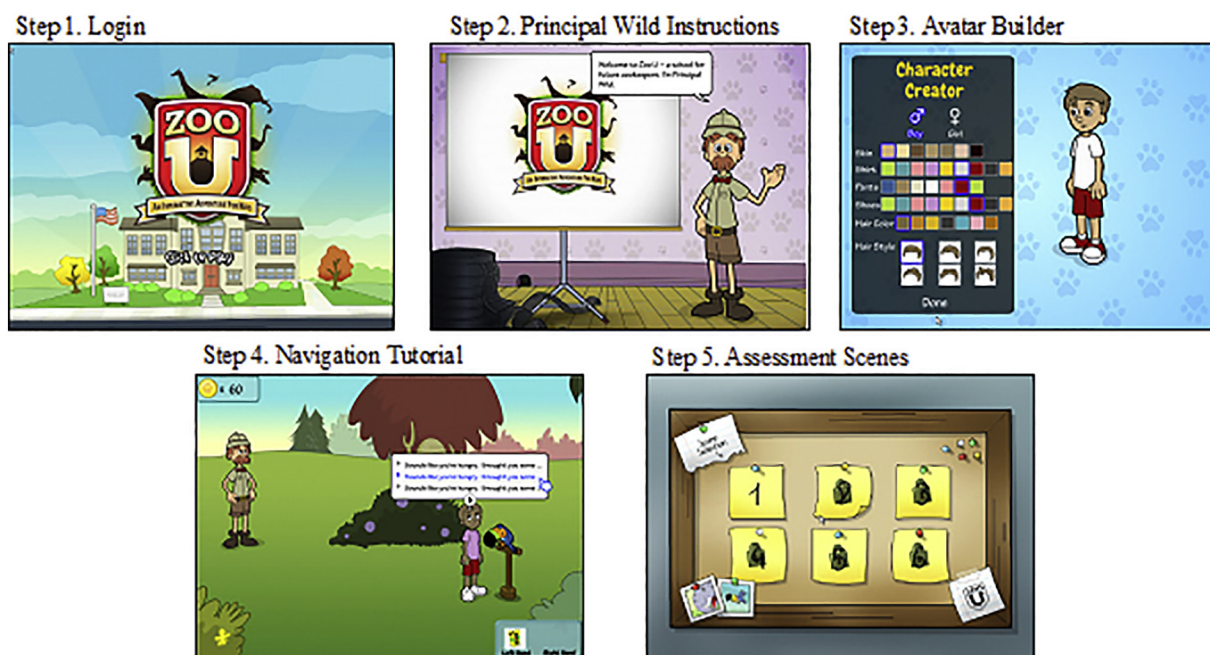


Fig. 1. Steps completed by children for the Zoo U assessment software.

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