Self-Identification of Emotion through Ed Tech Tools by First and Second Graders

SREE Submission – "In the Pipeline" Poster Session

Contact Author and Email:
    Julie Neisler, PhD
    Jneisler@digitalpromise.org
    Presenting Author

First choice of conference section: Social and Emotional Learning in Educational Settings
Second choice of conference section: Use of Research Evidence across settings

Author Names, Affiliations, and Emails:
    1. Julie Neisler, PhD, Digital Promise, jneisler@digitalpromise.org, Presenting Author
    2. Wendy Xiao, Digital Promise, wendy@digitalpromise.org
    3. Andrew Krumm, PhD, Digital Promise, akrumm@digitalpromise.org

Background

Emotion knowledge, which begins to develop in early childhood, involves two steps: understanding what an emotion feels like and how to label it and properly recognizing them in others' facial expressions (Denham, 1986; Izard et al., 2001; Rhoades et al., 2011). Research suggests that young children first recognize the emotion of happiness followed by sadness, anger, and fear (Castelli, 2005; Denham et al., 1994; Pollak & Kistler, 2002). Emotion knowledge is vital for emotion regulation (Izard et al., 2011), and strong emotional regulation positively impacts many academic skills (Cohen, 2001; Graziano et al., 2007; Macklem, 2010). Regular emotion check-ins can facilitate increased emotion knowledge (Greenberg et al., 1995; Izard et al., 2008). Researchers have shown that practice with reflecting on emotions and recognizing emotions in others should occur more frequently in education (Immordino-Yang & Faeth, 2016). Moreover, research shows that negative emotions can negatively impact academic performance (Grills-Taquechel et al., 2012; Vukovic et al., 2013).

Purpose

While emotion knowledge has increased in popularity and has a strong evidence-base, a key challenge for researchers and practitioners alike is providing easy ways to capture students' emotional states. With the increasing use of technology in schools, there are growing opportunities to incorporate emotional learning into the everyday classroom activities. Done correctly, this work can lead to improved emotional regulation and increased emotion knowledge, in addition to creating opportunities for teachers to gain access to students' self-reported emotions.

Setting, Population, & Program

An EdTech company sought to better understand student's self-reported emotions through a learning / playing platform designed for K-3rd grade students. Each day when logging in, students were asked to identify "How they feel right now" before continuing on to activities and quizzes within learning "quests." Students could select one of eight emotions with corresponding figures: cool, sad, okay, excited, proud, happy, mad, and bored [Figure 1].

Quests are self-contained learning paths that include a pre-quiz, a pre-determined number of activities, and a post-quiz. Following each activity, students were asked to rate that activity with thumbs up or a thumbs down. The end result allows for data collected on each student regarding their daily mood check-in, their total number of thumb's ups and thumb's downs in a day, and quiz scores.

Research Design

Data from 1st and 2nd graders was gathered over a three-year period resulting in a total of n = 78,079 observations. Based on the structure of quests, we hypothesized that positive moods (i.e., happy excited, proud) would have a stronger association with thumbs up ratings while negative moods (i.e., mad, sad, bored) would have a stronger association with thumbs down ratings. Additionally, the relationship between mood and quiz scores was explored. It was hypothesized that negative moods (i.e. mad, sad, bored) would be associated with lower quiz scores while positive moods (i.e., happy, excited, proud) would be associated with higher quiz scores.

Data Analysis

Of the eight possible options, 'okay' was the most frequently reported mood (21.8% of all check-in's were this mood) and 'excited' (18.1%). The least frequently reported moods were sad (4.3%) and mad (5.1%)[Figure 2].

Activity ratings were quantified by assigning a -1 to a "thumbs down" and a +1 to a "thumbs up" rating. This allowed for a mean rating per student per day to be calculated and associated with the student's mood on that day. When examining the boxplot distribution for average activity ratings per day for each mood [figure 3], the median daily rating was +1 for all eight moods, suggesting that at least on 50% of days, regardless of mood, students positively rated every activity in a day. Additionally, while negative moods (i.e. mad, sad, bored) performed similarly such that the IQR ranged from +1 to 0.0, other moods did not present obvious groupings. Moreover, mood only accounted for 1.9% of variance in average activity rating in a linear regression.

Additionally, average post-quiz scores were aggregated based on mood. The average post-quiz score for each mood ranged between 52.0% (bored) and 57.9% (okay), where students scored between 0% and 100% on post-quizzes for all moods. The median post-quiz scores for each mood can be seen in Figure 4 which also shows the similar variation in spread of scores for all eight moods, with only noticeable differences seen in the lower half of the IQR. The mean post-quiz score for negative moods (i.e., mad, sad, bored) was 53.3% and the mean post-quiz score for positive moods (i.e., happy, excited, proud) was 56.2%. While this difference is statistically significant ($p < 0.001$), the effect size is small ($d = 0.097$). Finally, mood only predicted 0.5% of variance in post-quiz scores in a linear regression.

Preliminary Findings & Next Steps

The first hypothesized relationship that mood would influence activity ratings was not supported for all moods. While the negative moods (i.e., mad, sad, bored) did show an association with lower activity ratings, there was not a clear differentiating relationship between neutral and positive moods as related to activity ratings. The second hypothesized association was partially supported; quiz scores were higher on positive mood days but with a small magnitude of difference and mood predicted negligible variation in quiz scores.

The next steps based on these preliminary, exploratory analyses will be to re-evaluate the display of the mood checks. While being able to distinguish between the various moods is important, it's plausible that this number and nuance of moods is too complex for these ages. In the next iteration of this research, the number of moods will be reduced and be presented more simplistically while still providing an opportunity for students to understand their own emotions and then recognize it in the facial expressions of the figures. In the next iteration of analysis, researchers would anticipate that a more apparent relationship between mood check-ins and both activity ratings and quiz scores. The overall outcome of this research will produce a technology-based mood measurement approach that for early elementary school students.
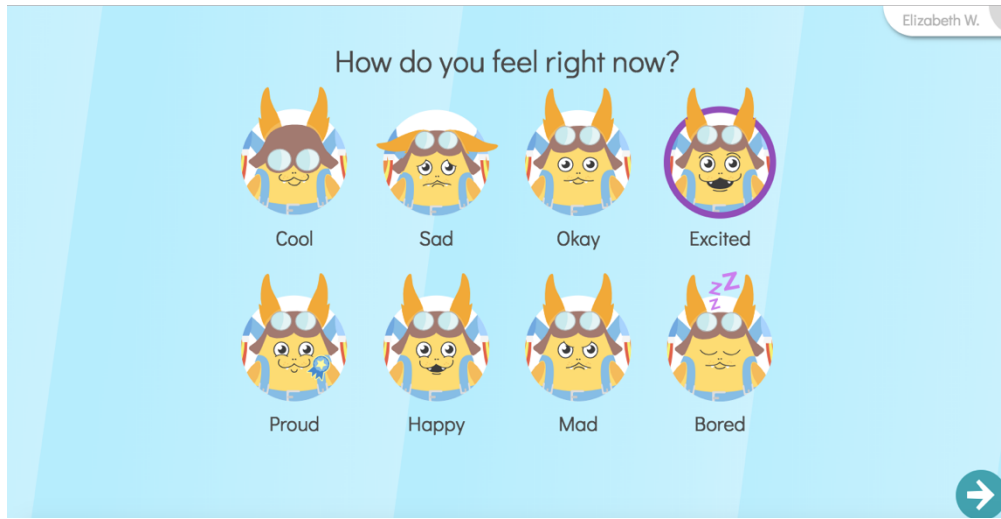
Figure 1.

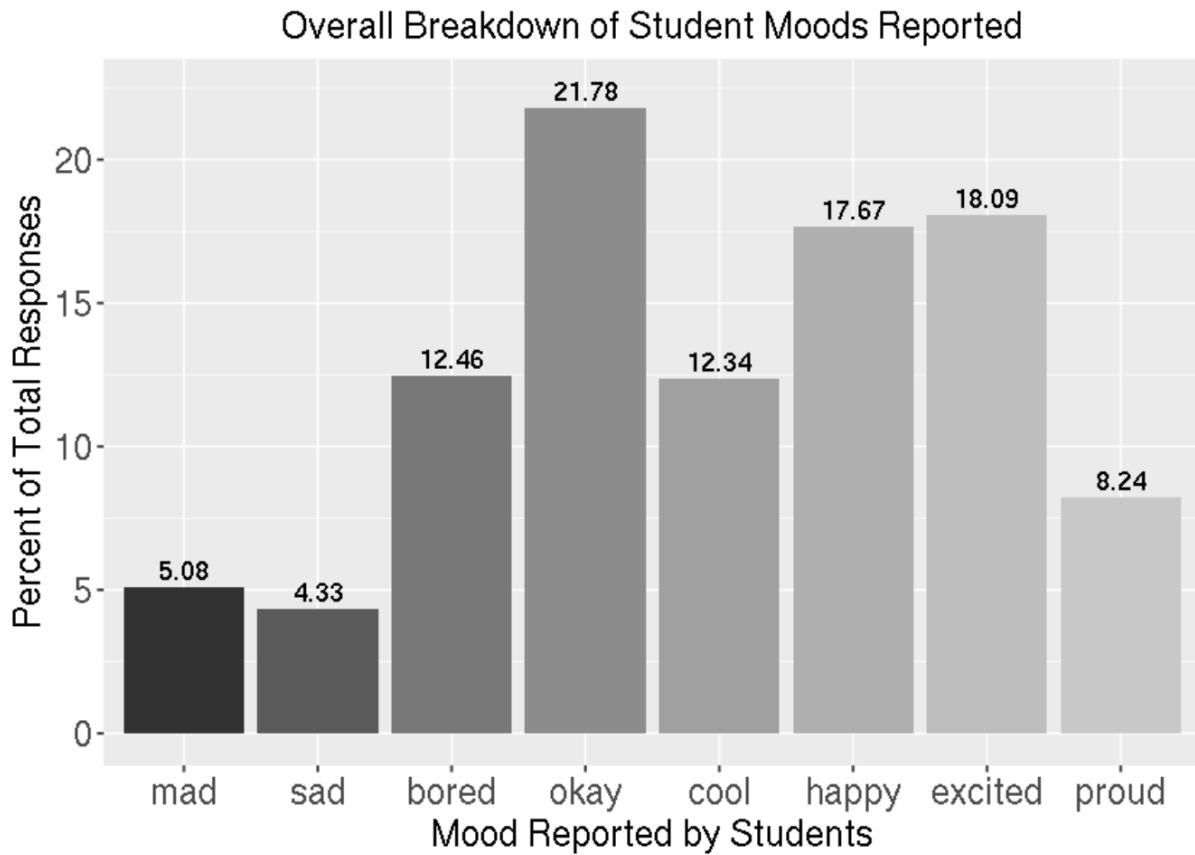How do you feel right now?

Cool   Sad   Okay   Excited

Proud   Happy   Mad   Bored

Figure 2.

Overall Breakdown of Student Moods Reported

21.78

18.09

17.67

12.46   12.34

8.24

5.08   4.33

Percent of Total Responses

mad   sad   bored   okay   cool   happy   excited   proud

Mood Reported by Students

Figure 3.

Relationship Between Mood and Engagment on Activities
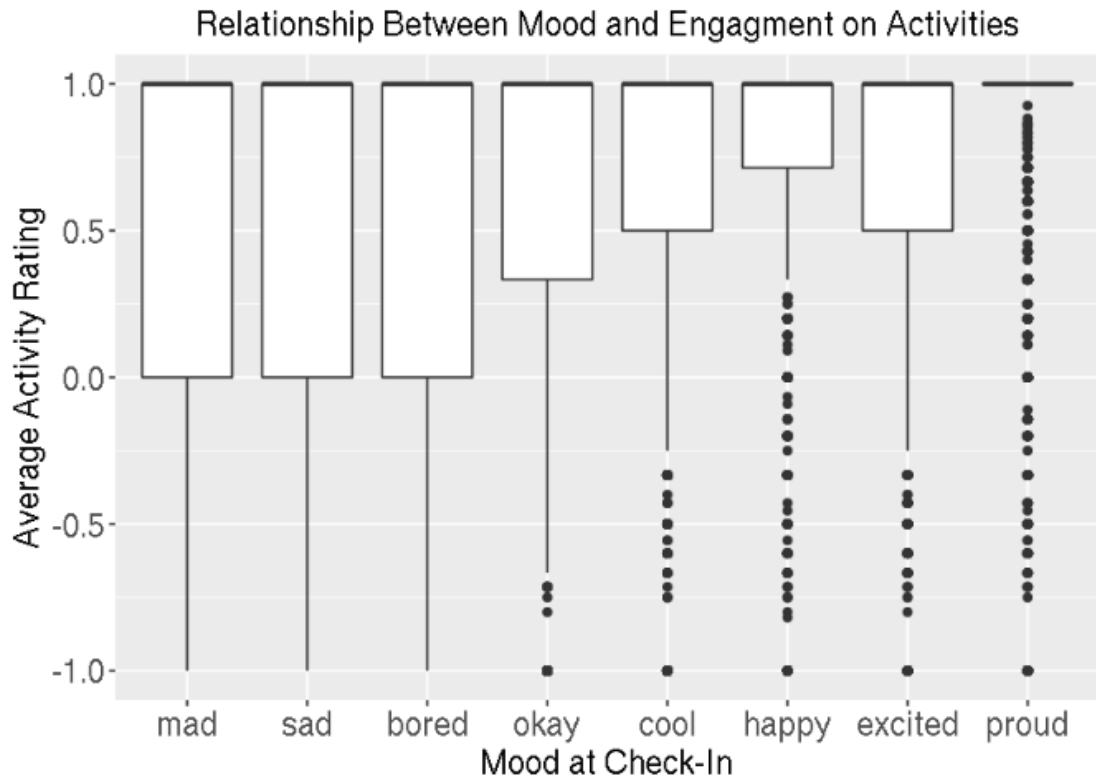
Figure 4

Relationship Between Mood and Post-Quiz Score
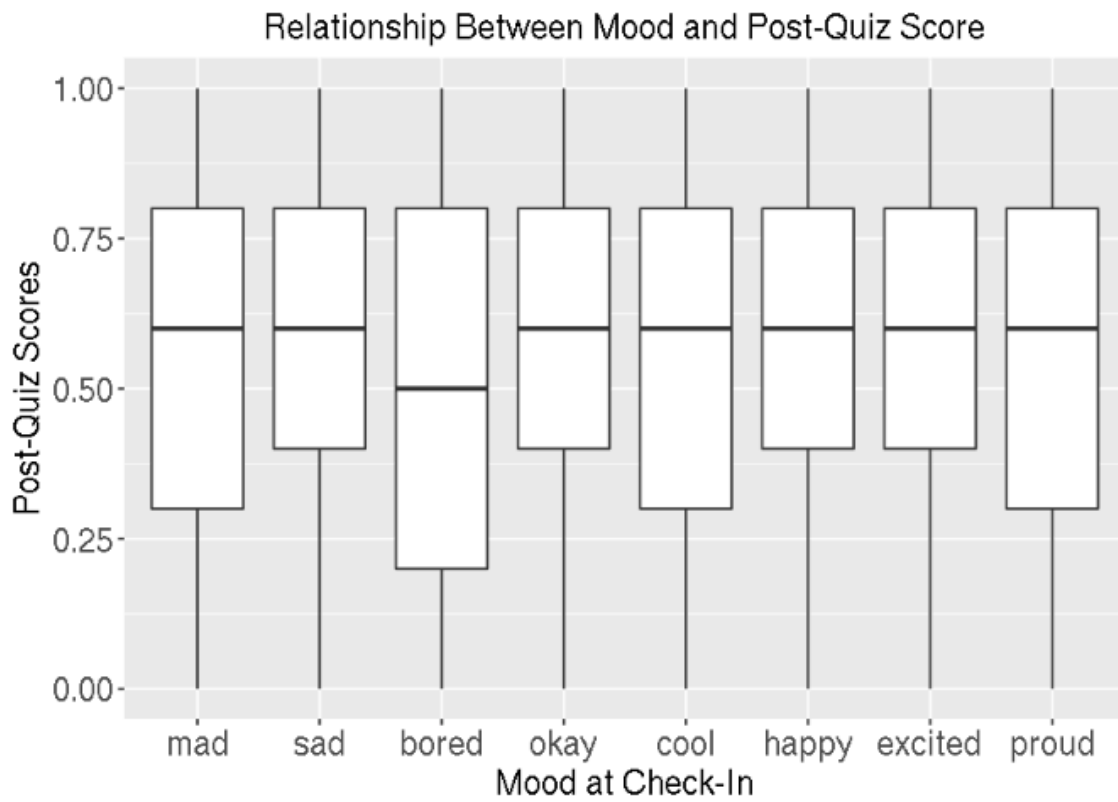
References:

Boaler, J. (2015). *Mathematical mindsets: Unleashing students' potential through creative math, inspiring messages and innovative teaching*. Hoboken, NJ: John Wiley & Sons.

Castelli, F. (2005). Understanding emotions from standardized facial expressions in autism and normal development. *Autism*, *9*(4), 428-449.

Cohen, J. (2001). Social and emotional education: Core concepts and practices. In J. Cohen (Ed.), Caring classrooms/intelligent schools: The social emotional education of young children (Chapter 1). New York, NY: Teachers College Press.

Denham, S. A. (1986). Social cognition, prosocial behavior, and emotion in preschoolers: Contextual validation. *Child Development, 57*, 194-201.

Denham, S. A., Zoller, D., & Couchoud, E. A. (1994). Socialization of preschoolers' emotion understanding. *Developmental Psychology*, *30*(6), 928-936.

Graziano, P. A., Reavis, R. D., Keane, S. P., & Calkins, S. D. (2007). The role of emotion regulation in children's early academic success. J*ournal of School Psychology, 45*(1), 3-19.

Greenberg, M. T., Kusche, C. A., Cook, E. T., & Quamma, J. P. (1995). Promoting emotional competence in school-aged children: The effects of the PATHS curriculum. *Development and Psychopathology*, *7*(1), 117-136.

Grills-Taquechel, A. E., Fletcher, J. M., Vaughn, S. R., & Stuebing, K. K. (2012). Anxiety and reading difficulties in early elementary school: Evidence for unidirectional or bi-directional relations? *Child Psychiatry & Human Development, 43*(1), 35-47.

Immordino-Yang, M.H., & Faeth, M. (2016). The role of emotion and skilled intuition in

    learning. In M.H. Immordino-Yang (Ed.), Emotions, learning, and the brain (93-105).

    New York: W.W. Norton & Company.

Izard, C. E., King, K. A., Trentacosta, C. J., Morgan, J. K., Laurenceau, J. P., Krauthamer-

    Ewing, E. S., & Finlon, K. J. (2008). Accelerating the development of emotion

    competence in Head Start children: Effects on adaptive and maladaptive

    behavior. *Development and Psychopathology*, *20*(1), 369-397.

Izard, C. E., Woodburn, E. M., Finlon, K. J., Krauthamer-Ewing, E. S., Grossman, S. R., &

    Seidenfeld, A. (2011). Emotion knowledge, emotion utilization, and emotion

    regulation. *Emotion Review*, *3*(1), 44-52.

Larsen, J. T., To, Y. M., & Fireman, G. (2007). Children's understanding and experience of

    mixed emotions. *Psychological Science*, *18*(2), 186-191.

Macklem, G. (2010). Practitioner's guide to emotional regulation in school-age children. New

    York, NY: Springer Science + Business Media, LLC.

Pekrun, R., & Bühner, M. (2014). Self-report measures of academic emotions. In *International*

    handbook of emotions in education (pp. 571-589). Routledge.

Pollak, S. D., & Kistler, D. J. (2002). Early experience is associated with the development of

    categorical representations for facial expressions of emotion. *Proceedings of the National*

    Academy of Sciences, *99*(13), 9072-9076.

Rhoades, B. L., Warren, H. K., Domitrovich, C. E., & Greenberg, M. T. (2011). Examining the

    link between preschool social–emotional competence and first grade academic

    achievement: The role of attention skills. *Early Childhood Research Quarterly, 26*(2),

    182-191.

Vukovic, R. K., Kieffer, M. J., Bailey, S. P., & Harari, R. R. (2013). Mathematics anxiety in

young children: Concurrent and longitudinal associations with mathematical

performance. *Contemporary Educational Psychology*, *38*(1), 1-10.