Class Mood App: a classroom orchestration tool for identifying and influencing student moods

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Abstract. Certain affective states are less conducive to learning than others. Moreover, results from studies suggest that a classroom's social-emotional climate affects student motivation and performance; and that moods can be automatically transferred among individuals in a group. The Class Mood App is an online classroom orchestration tool for social emotional learning that identifies the aggregate mood of a class and suggests classroom activities for educators to help shift the class mood to one that is more conducive to learning. Suggested activities are categorized based on how they aim to impact students' internal state of arousal. The application aims to facilitate learner and educator development of self-awareness and self-management competencies consistent with the CASEL framework for systemic social and emotional learning. Preliminary results, conducted as part of an iterative designed-based research process, suggest that the tool is perceived as being easy-to-use for both educators and undergraduate students.

Keywords: Learning Design, Learning Analytics, Orchestration Tool, Social Emotional Learning, Self-regulated learning, Mindfulness

1 Pedagogical background

Studies about the relationship between affective states and student performance suggest that certain physiological states or moods are less conducive to learning than others [1][2]. Study results also suggest that the emotional climate of a class affects student motivation, conduct, and performance [3][4]; and that moods can be automatically transferred among individuals in a group [5]. A classroom emotional climate can be described as "the extent to which teachers promote positive emotions and make students feel comfortable" [3]. Further, investigations have found that immediate interventions such as mindful breathing are able to induce a change in the affective state of individuals, specifically in reducing test anxiety and in increasing positive automatic thoughts [6].

Arguments to better support student social-emotional learning (SEL) in formal education have been put forth [7][8] and interventions supporting the social-emotional learning of students have been found to positively impact student wellbeing and their academic outcomes [9][10]. Weissberg et al., 2015 propose a framework, the CASEL

framework for systemic social and emotional learning, to help educators identify the core SEL competencies to prioritize. The Class Mood App has been conceptualized to facilitate learner and educator development of two of the prioritized competencies: self-awareness and self-management.

Therefore, it is important for teachers to consider the classroom emotional climate when orchestrating the activities proposed to their students, both to reach the best possible emotional conditions for their students to learn and to facilitate the development of the related competencies. The concept of classroom orchestration refers to "how a teacher manages, in real time, multi-layered activities in a multi-constraints context" [11]. Several orchestrations tools have been proposed in the literature to support teachers in classroom real-time management considering the the specific needs and constraints of a given context. However, these tools have focused on cognitive and social aspects [12] and there is a lack in addressing the emotional facet. The Class Mood App aims to fill this gap.

2 Technological Background

The Class Mood App is a standalone, web-based, social and emotional learning orchestration tool that provides teachers with real-time data that identifies the aggregate mood of a class and suggests classroom activities to help teachers guide learners to moods that are more conducive to learning. The application is compatible with mobile, tablet and laptop devices. Students insert a unique code and are prompted to select their current mood from a graphical interface that plots a selection of moods. The U-shaped graphical interface is based on an interpretation of the affective circumplex model [13][14] (see Fig. 1). After selecting their current state, students have the opportunity to submit a comment to notify the teacher of the cause of their mood. Student data and comments are collected anonymously.

Fig. 1. Screenshots of the Class Mood App (https://classmood.upf.edu/). (a) Student mood selection interface & (b) Teacher dashboard displaying an aggregate class mood.

Teachers start by creating a mood measuring event. The creation of the event results in teachers receiving a code to share with their students. As students enter their mood selections, teachers can monitor the submissions in the teacher's dashboard. The

learning analytics are displayed with differing levels of granularity (see Fig. 1). The first level categorizes the mood of the class based on aggregated categories of valence (e.g. happy or sad) and arousal (e.g. awake or sleepy). The second level presents a count of students per mood – to provide a more detailed mood mapping of the class. The final level displays the individual comments entered by students to explain their moods. The dashboard data is updated every 8 seconds. When ready, teachers can generate an activity suggestion from the dashboard. Suggested activities are categorized based on how they aim to impact students' internal states of arousal (see Table 1). The aggregate mood is calculated based on the ratio of happy-to-sad and awake-to-sleepy ratings with greater weight given to low arousal ratings. Activities are evidence-based or have been contributed by collaborating educators.

Table 1. Categories of suggested activities to impact student moods.

Category	Arousal	Sample Activity Names
Energize	Increase	Mindful walking
Calm	Decrease	Progressive muscular relaxation [15]

3 Use case, preliminary results and future work

As part of an iterative designed-based research process, the Class Mood App was presented to individual educators to elicit feedback and was tested in an undergraduate university class. In the class, the application was used to gauge the mood of the class and suggest an activity for the teacher to run for students as a warm-up activity prior to a regular lesson. Preliminary results suggest that the tool is perceived as being useful and easy-to-use for educators and undergraduate students. Future work is needed to validate and expand the offering of suggested activities, to refine the interface for younger students, and to facilitate teacher-adoption of the tool with formative training.

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