Many online learning programs have faced the challenge of students’ low motivation and limited participation, which often resulted in learners’ low performance and high attrition rates.

There has been no satisfactory way to detect real-time learners’ motivation levels at a particular moment.

Educational scholars have demonstrated that learner’s current emotions and motivation mutually influence each other when learning occurs (Atkinson, 1964; Dici & Ryan, 1985; Weiner, 1985; Ford, 1992; Ho, 2016; Jackson-Kersey & Spray, 2016). Also, recent neuroscience studies have proven that emotions and motivation share neural systems and are tightly intertwined with each other (Cromwell et al., 2020).

We developed Artificial Intelligence-Augmented Motivation Indicator (AIMI) system, leveraging ML techniques and building on theories of the relations between emotions and motivation.

**RESULTS**

From a total of 1,073 students, ranging from kindergarten to 12th grade, at three schools located in the southeastern United States:

Comparison of Motivation level between AIMI and Written Motivation Survey (IMMS)

• A positive and strong correlations between the students’ motivation levels measured by AIMI and IMMS ($r = 0.71$, $n= 1073$, $p < 0.01$)

**DISCUSSION**

- Findings of the present study demonstrate the potential of the AIMI System to automatically measure students’ motivation in real time and help educators to respond to the motivational needs of individual learners.

- (a) measuring individual students’ motivation in real-time and reporting the status of at-risk learners to the teacher/instructor. The teacher can then provide individualized support in an online learning environment, where it might otherwise be extremely difficult to check individual students’ learning pace and difficulties.

- (b) identifying what learning contents, activities, and instructional methods significantly undermine learners’ motivation through the data provided by AI. This additional information can enable educators to revise instructional materials and activities to improve learner engagement.