Sensing Affect to Empower Students: Learner Perspectives on Affect-Sensitive Technology in Large Educational Contexts

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AGENDA

01 INTRODUCTION

02 RESEARCH QUESTIONS

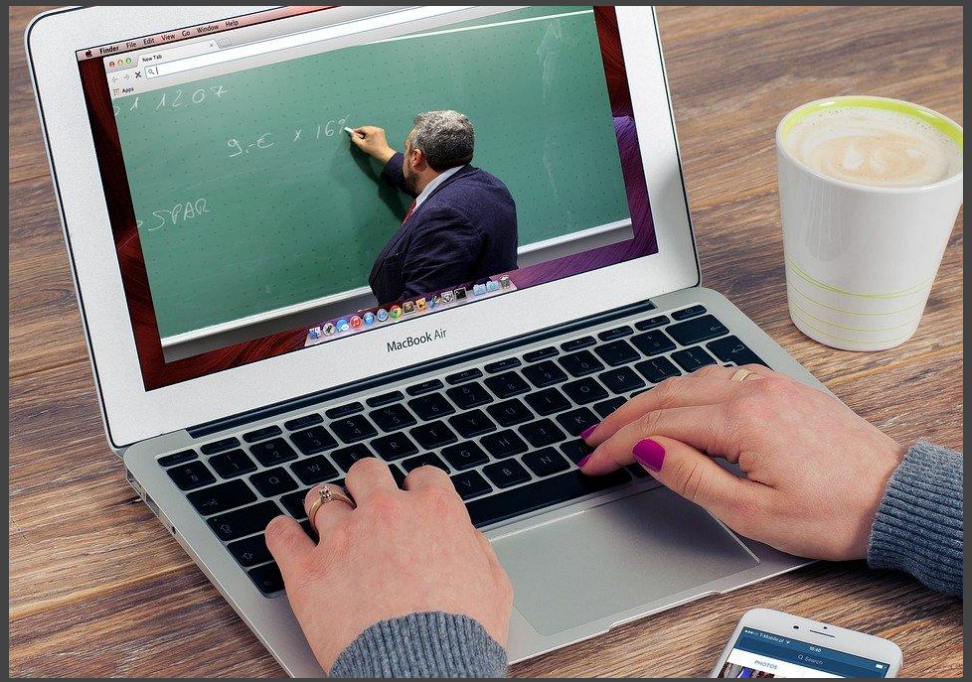
03 METHODS

04 FINDINGS

05 DISCUSSIONS


Literacy

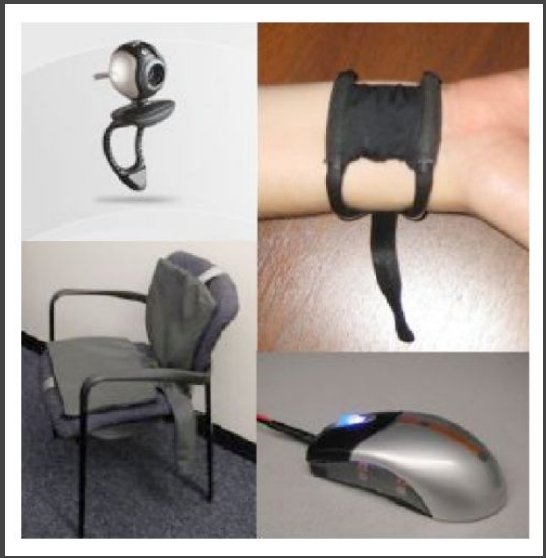
Lack of Emotion Feedback in Large-Scale Educational Contexts



Students expected to take more responsibility and control of their own learning

- Self-regulated learning is very important to learners in large-scale educational settings

Affect-Sensing Technology for Learning@Scale



Facial expression sensor, conductance bracelet, sensor chair, pressure mouse, taken from Arroyo et al, 2009

Provide the lost emotional context

- Timely intervention
- Improve future curriculum efficiently
- Facilitate students' self-evaluation

... and so much more

Arroyo, I., Cooper, D. G., Burleson, W., Woolf, B. P., Muldner, K., & Christopherson, R. (2009, July). Emotion sensors go to school. In *AIED* (Vol. 200, pp. 17-24).

Existing work on affect sensors for learning…

- … focuses on “scaling through efficiency” instead of “scaling through empowerment” (Kulkarni, 2019)
  - How to empower students?

- … focuses on “what can be done” instead of “what should be done”
  - How to make students feel comfortable using it?

Kulkarni, C. (2019, June). Design Perspectives of Learning at Scale: Scaling Efficiency and Empowerment. In Proceedings of the Sixth (2019) ACM Conference on Learning@ Scale (pp. 1-11).

Research Questions

- How can students leverage their affect data to **support their learning processes**?
- What are students' **concerns** regarding the use of affect sensors at scale?
- What are students' **preferences for the physical design** of affect sensors when used in large-scale educational settings?

Methods

On-campus Students

- Enrolled in large, lecture-based classes (> 200 students)
- In-class observation sessions
- Semi-structured interviews
- Analysis through open coding

Online Students

- Enrolled in Georgia Tech's Online Master of Science in Computer Science program (OMSCS)
- Online survey with 301 students
- Analysis through descriptive statistics and thematic analysis

Findings

Students' attitudes on the use of student affect data

Students' concerns about affect data

Students' preferences for sensor design in the classroom

Students' attitudes on the use of student affect data

"Students could use that as a study tip. If everyone seem real sad during this topic, maybe they need to go back and review that material."

-P11

- Students are willing to offer their affect data for legitimate purposes
- Students pointed out some potential usage to support their own learning, but some students are doubtful.

Students' concerns on the use of student affect data

"I would definitely be concerned if the data was used to track when, where, or how often students were studying and used as a grading/performance metric."

-Online Student

- Validity and accuracy
- Data privacy and security
- Secondary use

Students' preferences for sensor design

- General sensor design guidelines still apply
- Aesthetics and social acceptability is more important for on-campus students
- Information feedback to ensure transparency

Students' preferences for sensor design

What are the three most important factors for the design of affect-sensitive wearables?

19.27% chose "transparency of device mechanism"

14.62% chose "aesthetics"
14.29% chose "ease of use"
7.31% chose "social acceptability"

Discussion

Scaling for empowerment: support students' SRL

Scaling for efficiency: take into consideration students' concerns

Design priorities for affect sensors in large-scale educational contexts

Scaling for Empowerment: Design to Support Students' SRL

Students, especially online students, face challenges in various phases of SRL

Students have many concerns about giving their affect data to others

Students are open to the use of affect-sensitive technology to improve their own learning

Designing affect-sensitive technology to support students' own learning as a promising direction

Scaling for Efficiency: Usage and Concerns

- Students' affect data should be shared in anonymized and aggregated format only
- Schools and instructors should give students full control of their affect data
- Schools and instructors should provide an ethical contract prior to the use of affect-sensing technology

Design Priorities for Affect Sensors in Large Educational Context

- Balance between minimizing distractions and providing transparency
- Importance of aesthetics and social acceptability depends on the learning context

Design learning technology at scale *for* students, *from* students.

Thank you!

Questions?

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