

From Learning Management System to Affective Tutoring System

A preliminary study



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INTRODUCTION

LMS (Learning Management Systems) are « blind », providing an identical course to each student.

We explore here the combination of various indicators, such as performance, behavioral engagement, and emotional engagement, to detect students facing academic challenges.

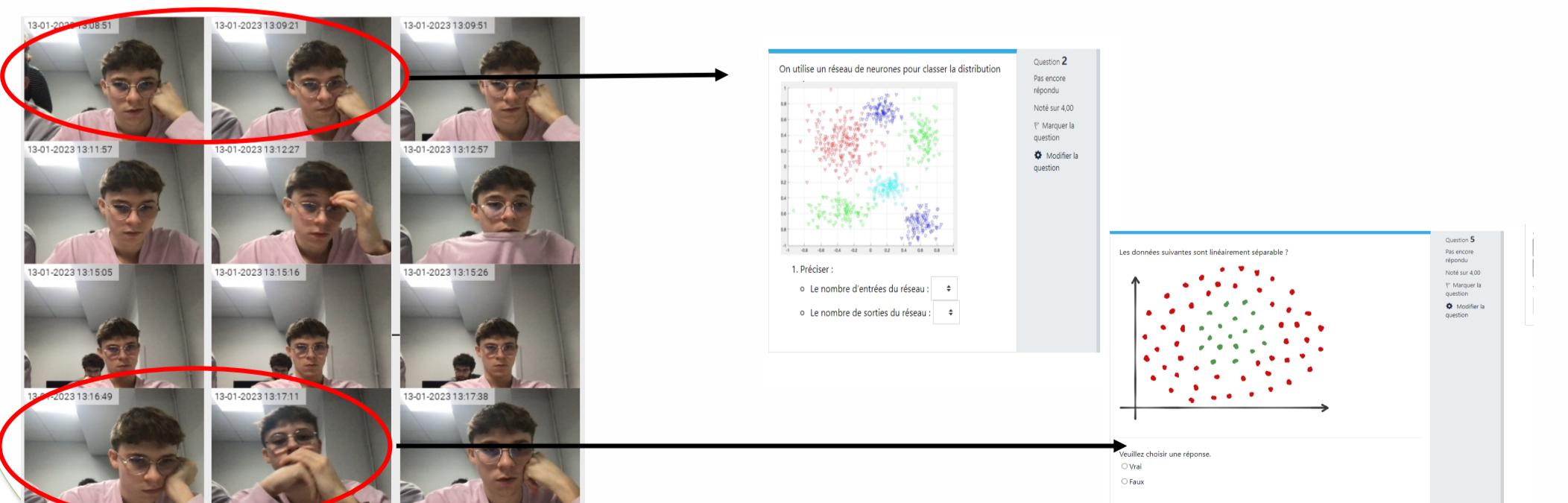
We used authentic data collected in a French engineering school during the 2022-2023 academic year.

We identified correlations between positive emotional states and improved academic outcomes. These initial findings underscore the significance of emotions in distinguishing between high and low-performing students.

DATA COLLECTION

Creation of a real dataset linking learning traces and student images in accordance with the GDPR:

- Obtain student agreement: Validate a consent form with a lawyer.
- Obtain photos: Retrieve images from an open-source module and store them on a secure server. Obtain the corresponding emotion for each picture.
- Link data: Link the photo-taking module and the LMS in a dataset.



CONCLUSION

- Exploring the connection among academic achievement, behavioral involvement, and emotional engagement.
- Challenges of data collection, analysis, and aligning facial images to the question.
- GDPR compliance.
- Our experimental results underscore the influence of positive emotional states in differentiating between high-achieving and low-achieving students.

SAMPLE & MATERIALS

- 77 students in engineering school (eq. Master 1).
- All students use Moodle and have a computer with a webcam.
- Emotion analysis is done locally with a pre-trained model predicting Valence and Arousal.

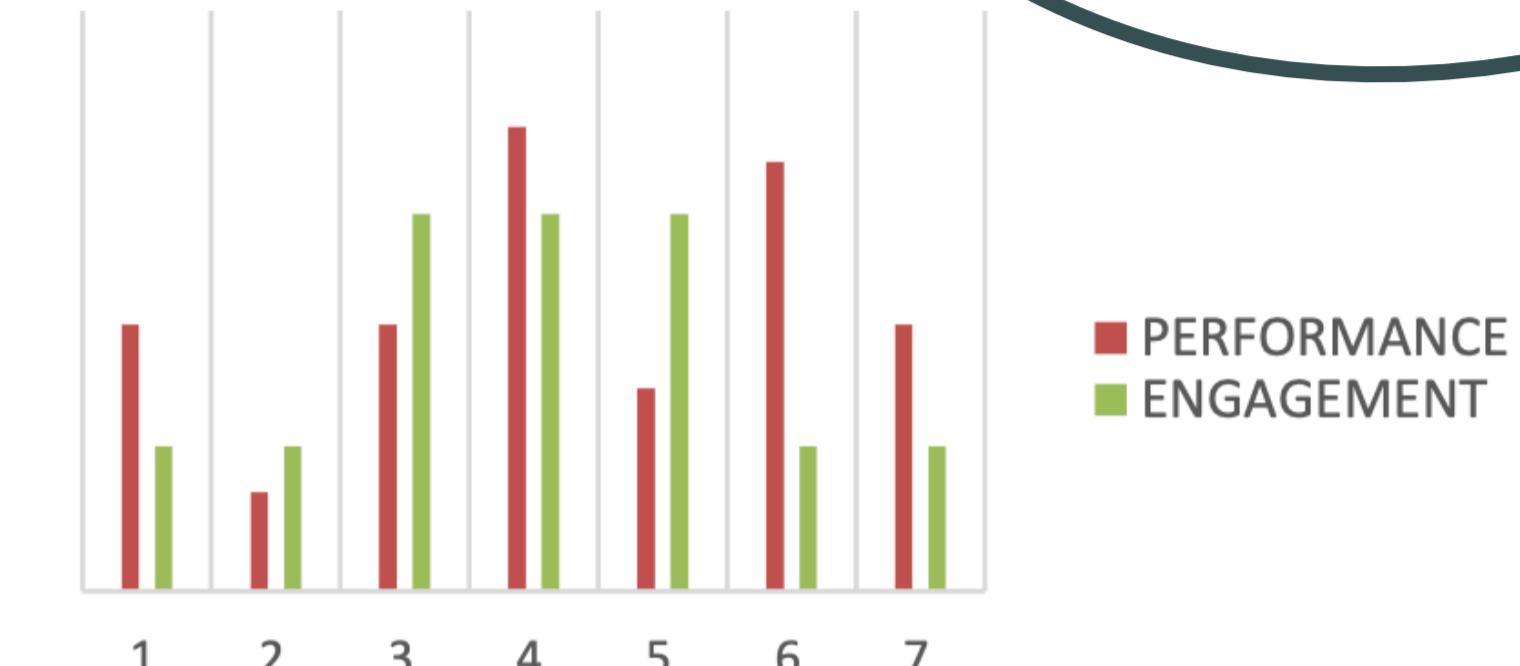


Figure 1. Performance and behavioral engagement scores for student 3859 on Quiz 2.

Q	Grade	DE	DG	TS(s)	Val	ED
1	0	71,64	0	99	-0,23	LOW
2	100	74,49	74,49	27	-0,31	LOW
3	0	55,76	0	46	-0,20	NICE
4	100	79,79	79,79	21	-0,28	NICE
5	100	45,56	45,56	39	-0,33	NICE
6	50	33,66	16,83	519	-0,16	LOW
7	100	45,64	45,64	52	-0,1	LOW

Figure 2. Representative data for student number 3859 across seven questions of Quiz 2.

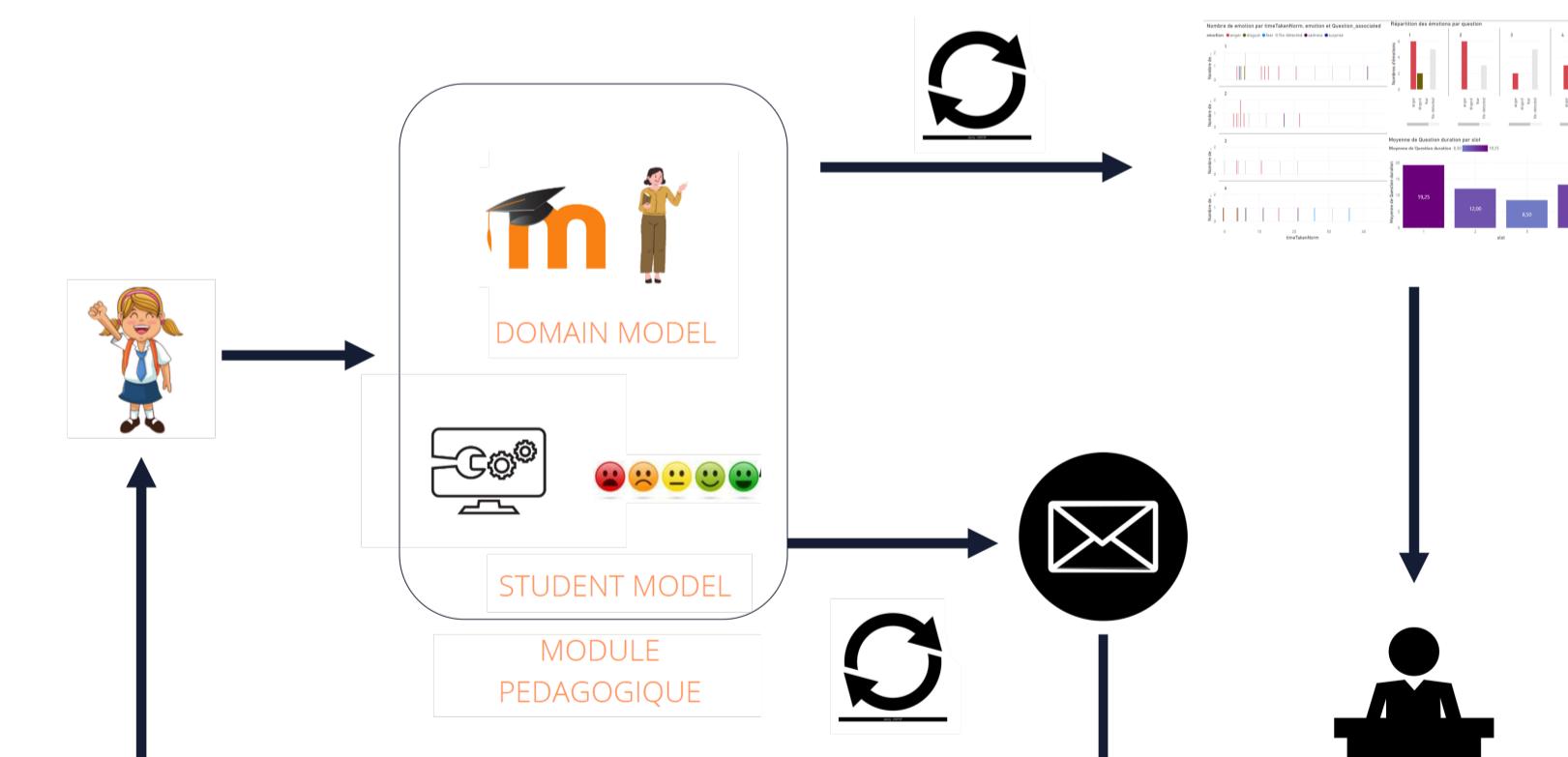


Figure 3. Representation of the STIA designed by the LDR.