Learning Analytics Dashboard on Moodle: An approach for the student in a control perspective

Thiago Gomes Veríssimo
Advisor: Paulo Meirelles
Co-Advisor: Ewout ter Haar

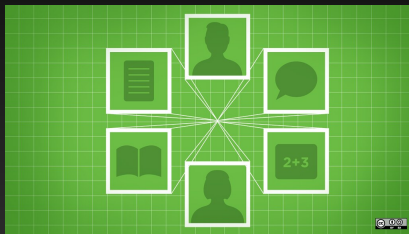University of São Paulo (USP) - Institute of Mathematics and Statistics (IME)

21 June 2024

Third Pitch

Context

Our aim is to study, scientifically, the construction of Learning Analytics Dashboards and related software engineering issues.
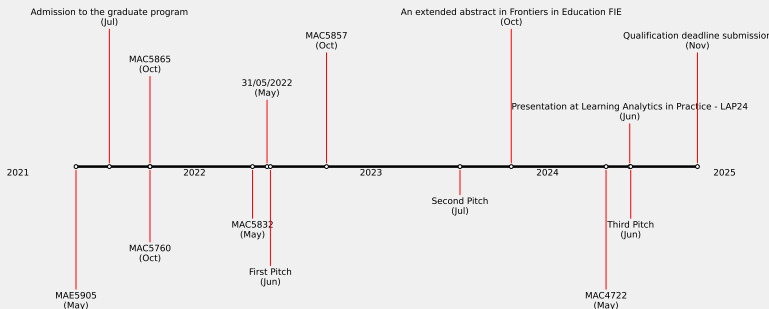

The data regarding the student learning process is dispersed across multiple sources
https://www.flickr.com/photos/opensourceway/8288335386/

It is a Learning Analytics research field [Lang et al., 2017].

The journey up to this point

My timeline

Admission to the graduate program
(Jul)

MAC5865
(Oct)

31/05/2022
(May)

MAC5857
(Oct)

An extended abstract in Frontiers in Education FIE
(Oct)

Qualification deadline submission
(Nov)

Presentation at Learning Analytics in Practice - LAP24
(Jun)

2021   2022   2023   2024   2025

MAC5760
(Oct)

MAC5832
(May)

Second Pitch
(Jul)

Third Pitch
(Jun)

First Pitch
(Jun)

MAE5905
(May)

MAC4722
(May)

IME

Research Questions (temporary yet)

1. **What kind of external data can be usefully and safely integrated with the Moodle (behavioral) data?**

Research Questions (temporary yet)

1. What kind of external data can be usefully and safely integrated with the Moodle (behavioral) data?

2. **How this enriched data can be used as features for Statistical and Machine Learning models (to be presented in dashboards) respecting privacy and student autonomy?**

IME

Our proposal

The traditional approach used to build dashboards (we are currently confirming through a Systematic Literature Review):

	Can choose Features?	Can see Predictions?
Student	No	No
Teacher	No	Yes
Manager	Yes	Yes

Our proposal

The traditional approach used to build dashboards (we are currently confirming through a Systematic Literature Review):

	Can choose Features?	Can see Predictions?
Student	No	No
Teacher	No	Yes
Manager	Yes	Yes

Our proposal: Student in Control Perspective

IME

Our proposal

The traditional approach used to build dashboards (we are
currently confirming through a Systematic Literature Review):

	Can choose Features?	Can see Predictions?
Student	No	No
Teacher	No	Yes
Manager	Yes	Yes

Our proposal: Student in Control Perspective

	Can choose Features?	Can see Predictions?
Student	Yes	Yes
Teacher	No	Maybe (student decides)
Manager	No	Maybe (student decides)

IME

Software Engineering Issues

Some issues this approach brings to software engineering:

- **The Moodle Analytics API is designed primarily for teachers and managers, so a lot of work is needed on plugins to empower students with similar capabilities**

Software Engineering Issues

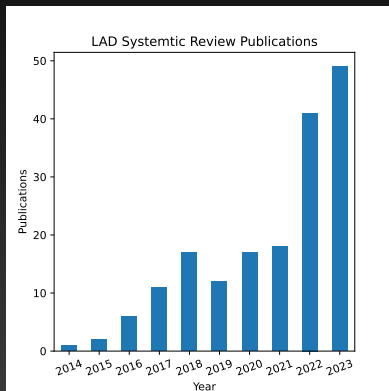Some issues this approach brings to software engineering:

- The Moodle Analytics API is designed primarily for teachers and managers, so a lot of work is needed on plugins to empower students with similar capabilities

- **The possibility for each student to choose their own data requires rebuilding the model many times, which can impact performance**

Tertiary Literature Review

We initially conducted a Tertiary Literature Review to identify any existing gaps in the reviews already performed. **Search String:**

"Dashboard" AND "Learning Analytics" AND ("Systematic Literature Review" OR "Systematic Review")

LAD Systemtic Review Publications

Databases	Publications
acm	64
engineering village	13
ieee	1
science direct	70
scopus	26
web of science	13

Tertiary Literature Review

From the 189 articles found, 15 were selected. These were categorized as follows: 6 evaluated educational foundations, 6 did not use specific criteria in the review, 2 verified articles validating dashboard application, and only 1 evaluated whether EPs utilized machine learning mechanisms.

Tertiary Literature Review - Results

No review considered dashboards in Moodle LMS, and more broadly, none considered implementations in open-source code.

https://moodle.org

Qualification

Our next step, up to qualification by the end of 2024, will be to conduct a systematic review focusing on primary articles that have developed dashboards within the Moodle environment, with particular attention to the following aspects:

1. **Use of machine learning in dashboards (and raising software engineering issues related to this)**
2. Whether the code is available or not

Qualification

Our next step, up to qualification by the end of 2024, will be to
conduct a systematic review focusing on primary articles that have
developed dashboards within the Moodle environment, with
particular attention to the following aspects:

1. Use of machine learning in dashboards (and raising software
   engineering issues related to this)
2. **Whether the code is available or not**

Bibliography

📑 Lang, C., Siemens, G., Wise, A., & Gasevic, D. (2017).
Handbook of learning analytics.
SOLAR, Society for Learning Analytics and Research New
York.

🏛 **IME**