Learning Analytics and teacher professional development

A study on the pedagogical affordances of collaborative digital environments

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Background

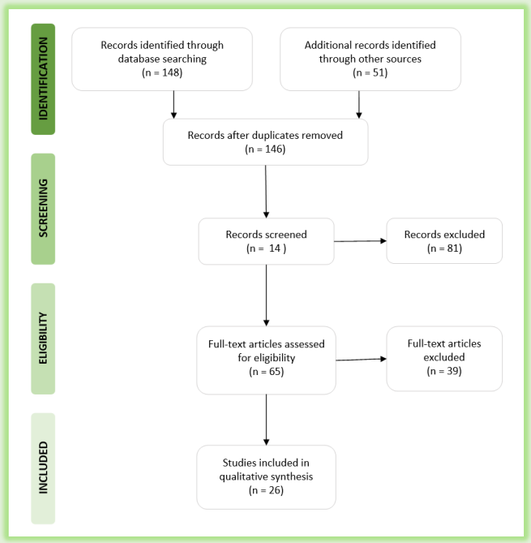
- Learning Analytics (LA) emerged as a significant area of **technology-enhanced learning**. It sits at the convergence of a variety of fields, particularly computer/data sciences, web analytics and educational research.
- The **educational value of big data** can be found in how they are able to assist educators, improving teaching and learning, and institutions, facilitating decision-making processes and guiding reform activities (Ferguson, 2014).
- In the last decade, the teachers' role is changing due to the development of new comparative big data methods that analyse and predict performances in real-time. A **re-professionalization effort** is needed to equip teachers with data analysis skills in favour of pedagogical practices, allowing them to become active players of the LA community (Wyatt-Smith et al., 2019). If these issues were not addressed, the design and adoption of automatic monitoring and evaluation systems and tools could remain limited to researchers and data analysis experts.

AIM: to investigate the potential of educational data mining and LA in supporting teachers to develop professional competences, both in formal and informal learning settings.

Method

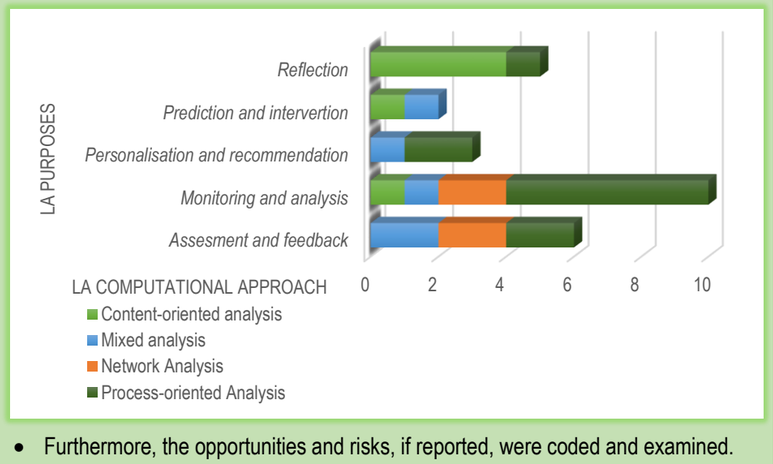
Systematic review (Cooper et al., 2019): data sources and study selection

- Four bibliographical databases (Scopus, ERIC, Web of Science, EBSCO*host*) and additional specialised resources were searched in March and April 2020.
- **Inclusion Criteria**: articles, conference papers and book chapters, with empirical and data-driven research designs, in English and Italian.
- Figure 1 shows the search strategy and study selection process used. The final sample consisted of **26 studies**.

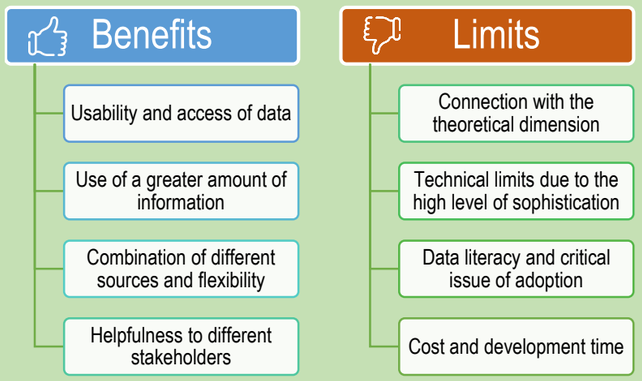


Findings

- Most of selected studies are scientific articles, published from 2011 to 2020 and are geographically located in countries on all continents.
- In the coding phase, the topics related to LA were identified. Figure 2 shows the classification and interpretation of the purposes (Chatti et al., 2012) and the computational approaches (Hoppe, 2017).



- Furthermore, the opportunities and risks, if reported, were coded and examined.



Conclusions

- In most papers, a top-down perspective describes the use of LA for the **supervision** and analysis of relevant characteristics in professional development training courses, applying the techniques to teachers' behaviour as trainees.
- A second horizontal perspective analyse the LA methods and approaches **used by teachers**, involving them with the help of traditional research methods.
- From a bottom-up perspective, in few studies LA tools are already implemented and their **impact on teaching** is assessed. The focus shifts to the pedagogical variables to be examined through computational techniques, in order to evaluate the differences between methods and their effectiveness.

Future research purposes

- The pedagogical affordances of LA methods applied to teacher professional development will be explored through consequential phases:
  1. identification of the variables that can be analysed from the available datasets of a **collaborative digital environment** for teachers;
  2. formulation of hypotheses of relationships between variables and application of a computational **model of LA**;
  3. analysis of the results of the **data-driven research** in terms of support for teacher professional development.

References

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"Our goal is not to create intelligent tutoring systems or stupid tutoring systems, but to create intelligent and successful students."
(R. S. Baker, 2016)

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