Learning Analytics in action: ethics and privacy issues in the classroom

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***Abstract*—The field of learning analytics (LA) is working on the definition of frameworks that structure the legal and ethical issues that stakeholders have to take into account regarding LA solutions. While current efforts in this direction focus on institutional and development aspects, this paper reflects on small-scale classroom oriented approaches that aim at supporting teachers in their practice. This reflection is based on three studies where we applied our teacher-led learning analytics approach in higher education and primary school contexts. We describe the ethical issues that emerged in these learning scenarios, and discuss them according to three dimensions: the overall learning analytics approach, the particular solution to learning analytics adopted, and the educational contexts where the analytics are applied.**

I. Introduction

The massive data collection in educational settings has raised new ethical concerns in the learning analytics (LA) research community. Despite the interest and need for gathering data, ethical concerns influence the adoption and acceptability of learning analytics approaches, such as data literacy and actionability, data ownership and openness, and potential abuse [1], [2].

Several authors have reflected on the ethical issues that affect the field [3], [4] and have made proposals to face them, like the set of design guidelines proposed by Pardo & Siemens [5] and the checklist for teachers, researchers, policy makers and institutional managers suggested by [6] to facilitate a trusted implementation of Learning Analytics. However, most of these analyses and proposals apply to higher education institutional contexts. There is scarce reflection on the implication of using learning analytics in smaller-scale contexts where teachers use the data to manage their classrooms both at university and school educational levels, but especially in the latter. However, as pointed out by Griffiths [7], the ethical considerations to be taken into account depend on the approach taken to learning analytics. Therefore, there is a need to reflect on what ethical aspects are relevant in the applications of learning analytics to small-scale teaching practices, and especially in school contexts.

Throughout three studies, involving two higher education and one primary school contexts, we have reflected on the ethical and privacy issues that teachers need to face when applying our LA approach in their classrooms. This paper summarizes the ethical issues that emerged in these learning scenarios, and discuss them according to (1) the overall learning analytics approach, (2) the particular solution to learning analytics adopted, and (3) the educational contexts where the analytics are applied.

A. Design-aware analytics

Our learning analytics approach aims at providing monitoring information to be used for regulation, formative assessment, or self-reflection about the learning design and the learning process. More concretely, we propose to provide teachers with feedback about the accomplishment of pedagogical decisions made at design-time [8].

Our solution consists of three components [8]: (1) a monitoring-aware design process of the learning scenario that takes into account the teacher's information needs; (2) a monitoring process guided by the decisions made at design-time; and (3) an architecture that addresses the need of data gathering and integration in Distributed Learning Environments (DLEs) made up by an institutional Virtual Learning Environment (VLE) and Web 2.0 tools. To support teachers in the analysis, we implemented GLUE!-CAS and GLIMPSE, an architecture and a tool, respectively, that automatize data gathering, integration and analysis, offering the teacher a comparison between the current and the desired state of the learning scenario [9].

B. Educational settings

The approach described in Section I-A was applied in 3 learning scenarios [10]. Two of these scenarios took place in higher education, involving 2 teachers and 165 students (150 the former and 15 in the latter). The third study was run at a first grade class (6-7 years old) with 24 students.

The three scenarios shared a common profile: 3-4 weeks, implementing learning designs inspired by blended Computer-Supported Collaborative Learning (CSCL) principles. In addition, in terms of technological support, the proposal was used with DLEs made up by VLEs (e.g., Moodle, Mediawiki or even Blogger), web 2.0 tools (e.g., Google applications), and GLUE! – an architecture devoted to integrate third-party tools in VLEs.

II. Lessons learnt

Implications related to the learning analytics approach. The outcomes from the studies showed that the concerns in smaller-scale teacher-led LA approaches require at least considering, in an explicit way, the role of teachers as main actors in the application of LA processes. Aspects such as action and impact have a particular dimension, and are closer to general ethical issues related to classroom orchestration, where teachers play a crucial role. In this kind of educational contexts, it is necessary to analyze from the ethical point of view what kind of actions should trigger the LA information, how to proceed and what the impact is in terms of classroom management, intervention, regulation and assessment.

Implications derived from the actual solutions. Our solution to LA, involving teachers from the very beginning in the design and enactment of the monitoring process helped to overcome issues that can appear also in these smaller contexts, such as control on the analytics, awareness, etc. The teacher participation in the design of the monitoring process contributes to introduce "ethics by design" (parallel to the idea of "privacy by design") in the application of LA solutions. According to this schema, the teacher is the one who defines the educational purposes of the analysis, reflects on the available data sources, contributes to improve the validity of the results (adding new evidence coming directly from teachers and students), and is aware of the limitations of the results obtained.

Implications imposed by the educational contexts. The application of the approach in primary and higher education shows that the reflection on LA has to take into account the specific ways of working on the different contexts, and even legal aspects that apply to the particular case of schools, where work with minors poses specific challenges, and make us include families as new actors in the framework. The cloud-based tools that are becoming widespread at these educational levels, do not cover information needs required by LA, and may pose legal and ethical problems related to data ownership and virtual identity, difficult to solve when working with minors. Not only LA, but also the wider technology-enhanced learning community have a big challenge in providing appropriate tools to these educational levels.

Emergent framework. As a final result of our reflection, we propose a set of recommendations for teachers aiming to conduct learning analytics scenarios of the kind discussed in this paper (see Table I). These recommendations should be considered as a first attempt to structure reflection on ethical issues and logistical concerns in small-scale teacher-led learning analytics. They should be subject to refinement by their application to other cases, and by public discussion with experts in the field.

III. Conclusion

The interest in addressing ethical issues in learning analytics is starting to flourish in the form of ethical frameworks that guide codes of practice for different stakeholders. These frameworks are useful instruments to structure the discussion and promote a more mature application of LA. Since many of these frameworks are fundamentally devoted to institutionally oriented higher education Learning analytics [11], this paper has focused in a complementary target: smaller-scale teacher-led learning analytics in primary and higher education contexts.

This work has analyzed the ethical and privacy issues according to three different dimensions that may affect them: the overall learning analytics approach, the particular solution to learning analytics adopted, and the educational contexts where the analytics are applied. This work can be considered as a first step towards further work in the refinement and adaptation of ethical frameworks to the different approaches currently coexisting in the learning analytics field, for example defining different itineraries depending on the approach to LA, so that practitioners can focus their view on the most important questions for their approach.

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TABLE I
LIST OF RECOMMENDATIONS FOR SMALL-SCALE TEACHER-LED LEARNING ANALYTICS [10]

Category	Recommendation
Consent	If there is information already being tracked, inform the students (or families) about it, otherwise, ask for formal consent/agreement before data can be collected and/or analyzed. Be explicit about what you might do with that information and, if possible, agree it with the students. Provide students the option to update their digital dossiers and provide extra (possibly qualitative) data but triangulate it to verify they do not "fake" the system. Data should be deleted when individuals no longer want them to be processed or when it is no longer of use for its original purpose, as any other student's data. Reflect on the consequences that opting out of the analysis would have on the participants (e.g. lack of feedback due to the lack of analytics) and inform them.
Transparency	Be explicit regarding which data is collected, how it is interpreted, why and how it will affect the learning process.
Access	Reflect on whether the students should access the data held abut them, the analysis of the data, the labels attached to them, and if so, in which format this information should be provided to them. Consider the possibility to let students correct the data stored about them.
Responsibility	You are in charge of interpreting and validating the analyses as well as deciding what to do based on the analytics (e.g., how to regulate, intervene, etc.).
Privacy	If some data has to be anonymous, be sure it cannot be re-identified by contextual information available to the users. If you use data coming from external sources, (e.g. Web 2.0 tools) be sure you can manage it to identify properly the owner, and that not other ethical or privacy issues are put at risk when using those sources.
Validity	The evidence obtained may be incomplete. Try to involve students (and families) to increase its accuracy.
Stewardship	Use the data strictly needed for the analysis, not more. Be sure that you comply with the data protection laws applicable in your region or country. The data should be preserved, secured and shared as any other student's data
Impact	Consider that your analysis may led to un-expected findings that led you to intervene as a teacher with the student, and which kind of obligation do you think will have on that.

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