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Learning Analytics for Humanities and Design Education

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Abstract: Many Learning Analytics interventions are created and adopted in the context of STEM disciplines and medical education for in class and online learning. However, the focus of using a learning analytics platform for humanities and design related courses are still rare. This position paper focuses on the need of interdisciplinary work to bridge the humanities and design faculties with the learning analytics community and possible research agenda. We illustrate how the Learning Evidence Analytics Framework (LEAF) can be used to probe the learning processes in the context of the humanities and design related topics.

Keywords: Learning Analytics, LEAF, Humanities Education, Design Education, Critical Reading Activity, Sense making

1. Motivation

Learning analytics as a domain has evolved over the period and its techniques have been applied to understand the process of learning and supporting it in various e-learning contexts. The interdisciplinarity of such a domain can be based on the four realms: knowledge, research, education, and theory (Nissani 1997). While there are many studies which look at the different applications of Learning Analytics (LA) in STEM domains (Sergis et al. 2019) and medical education (Chan et al. 2018), the focus on humanities courses at the university level is still limited. Teaching modalities of humanities and design courses have adopted online learning. Currently nearly 338 courses on Coursera and 365 courses on EDx that are offered relate to the humanities and design disciplines. However the analytics used on such platforms are generic which is applied to all courses and intend to be scalable. We found a lack of systematic research to understand the learning objectives of Humanities and Design topics which are orchestrated within an elearning environment and then develop appropriate indicators which can be analysed to understand the learning process and assist it. Our LA-ReflecT project is positioned in that space.

2. Learning Analytics of Reflective Tasks (LA-ReflecT)

The LAReflecT project aims at developing a data-driven narrative of learner behaviors during any reflective tasks. It focuses on the context of Humanities and Design related topics. Such an investigation requires a well-designed activity plan with technology affordances to collect indicators of learning behaviors and then applying educational data mining techniques to model that specific context. This collaborative work brings in expertise from the domain of humanities and design studies and learning analytics.

To initiate, Learning Evidence Analytics Framework (LEAF) provides the overarching technology framework to collect evidence of learning behaviors from the logs generated in a technology-enhanced learning environment (Ogata et al. 2018). In our instantiation of the framework,

the instructor can coordinate the activity on Moodle, as the learning management system. BookRoll (Ogata et al. 2015), an e-book reader, is used to upload reading contents related to the learning activity such as reference articles and activity sheets in PDF format for students to access. Tools like BookRoll can be considered as a learning behavior sensor in the smart learning environment that log teacher's and student's interactions with the system (reading and annotations in case of BookRoll) in a Learning Record Store (LRS) as standard eXperience API (xAPI) statements. This log data from the learning environment, the artefacts created by the learners and any of their collected data for example surveys regarding pre-dispositions, perceptions or affect are analysed within the learning analytics framework, LEAF. Such an integrated data about context and the learner would assist to build models of the learning process and thereby design possible feedback and teaching learning support. Figure 1 presents an overview of our approach.

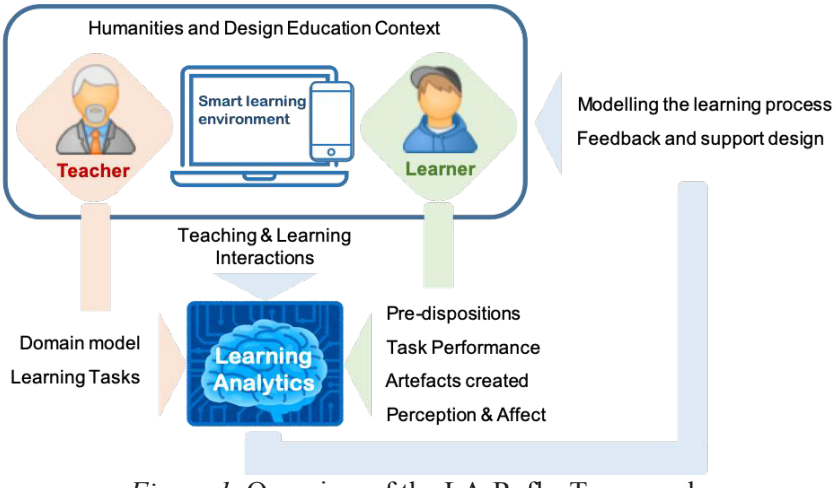

Figure 1. Overview of the LA-ReflecT approach

3. Research Agenda : Humanities, Design and Learning Analytics perspectives

From the Humanities education standpoint, developing critical reading skills is crucial (Holm et.al. 2015). Such an activity requires cognitive tasks such as comprehending, analyzing, evaluating, interpreting and synthesizing. A critical reading activity requires one to highlight important ideas in the text, relate it to one's personal experiences, pose questions and think about answers for such questions, look into the patterns within the text, and make connections with other texts. In certain contexts, it would involve identifying socio-cultural contexts and reading through them. Critical reading enables the reader to read not only the explicit meanings but the layered and the implicit meanings as well. Over and above, critical reading enhances one's ability for task-focused thinking. We conducted a pilot study where a learning task was identified to annotate cultural references and performative elements. Learning logs were gathered for analytics during that task to define the reader's profile in the context of the task (Majumdar et al. 2020). Of the four profiles identified, highly engaged readers validated that the annotation task given to them led them to read the text with more focus and analyze it properly as opposed to blindly reading it.

Similarly, in Design related topics too, focusing on developing a critical eye about analysing issues and proposing a design as a solution becomes an essential learning objective. Design, like humanities, often focuses on processes and not just the outcome. Also, the emphasis is not on the procedural knowledge, instead focus is on whether the learner is applying a set of design principles or not while maintaining their own style of design. For instance, graphic design is one of the common topics in the design domain. For the ease of analysis we take an example of a concept in Graphic design, which is: Designing a Logo. This is a common assignment which expects the learners to express their thinking through an unique design and analyse their choices relating to the principles justifying the communication works. Therefore, when the teacher announces the assignment to create a logo for a petroleum company, the learners can /will create different 'looking' submissions, which

could be based on 'different' theories/guidelines. The submissions may/may not have commonality of shapes, elements, colour, typography, etc. and that is perfectly fine.

In STEM domains, the learning environment often provides learning tasks with predetermined step-by-step problem solutions (Aleven and Koedinger, 2002). Recently open-ended learning environments developed in the science domain provides the learner with a complex problem and the tools and resources that are required to solve the problem (e.g. Betty's Brain System, Biswas et al, 2016). Learning analytics have been applied to the data obtained from these environments to model learners and to provide personalised feedback, hints and content. In open-ended learning environments, there can be multiple paths (solution approaches) to solve the given complex problem. However, students' knowledge can be compared with the expected solution and personalised feedback are provided.

In the humanities and design domain, the problems are solved using multiple solution paths and also there can be multiple correct solutions. Hence the traditional learning analytics approaches that are used in STEM domains might not be directly applied to problems in the humanities and design education domain. We would like to instantiate a multilevel learner modelling (Biswas et al, 2019) to develop a learner model in design problems. In this model, the students' interaction with the learning environment is captured and learners' cognitive skills and strategies will be measured. Based on learners' interaction and performance on the learning task, the learner model will provide personalised feedback to support the learners.

Given such a context, in this workshop we plan to initiate a conversation among domain experts from the allied fields and develop a research agenda regarding analytics of learning in the context of humanities and design topics and developing interventions for different learner profiles while they explore aspects of layered understanding of narratives and design as their learning task.

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