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Curriculum Analytics as a Communication Mediator among Stakeholders to Enable the Discussion and Inform Decision-making

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ABSTRACT: Despite the momentum gained by Competence-Based Learning (CBL), certain crucial aspects such as the competence assessment remain still open. The lack of systematic evidence about how those competencies are delivered and acquired limits different stakeholders -namely curriculum designers, teachers and students- from understanding what is the current state and how to intervene to better support the competence development. To support the stakeholders in this endeavor, this paper presents our approach and plan towards enabling evidence-based decision making in competency-based programs delivered at Tallinn University. More concretely, our proposal collects data from course designs (created by the teachers) and learning traces, and analyses them in the framework of the competence model prescribed at the national level, extracting to what extent competencies have been included in the curriculum and acquired by the students. To reach this goal, we propose a Design-Based Research approach where solutions will be iteratively designed, applied, assessed and refined, involving the different stakeholders in the process.

Keywords: Curriculum Analytics, Competence-Based Learning, Evidence-Based Decision Making, Design-Based Research

1 INTRODUCTION

As raised in multiple International and European reports, there is a global concern about student success and dropout rates in Higher Education Institutions (HEIs) (Vossensteyn et al., 2015). HEIs are trying to address this issue by improving teaching practices and curriculum (Hilliger et al., 2019), e.g., supporting teachers in better selecting, planning and designing suitable activities for the students (Vergas et al. 2019). However, improving the teaching strategy is not enough for student success: improvements at the curriculum level are also necessary (Gottipati & Shankararaman, 2018). For that purpose, Curriculum Analytics (CA) is a systematic approach used by HEIs to develop a curriculum (Hilliger et al., 2019) but still exploratory and mainly oriented towards teachers, leaving curriculum developers' aside (Hilliger et al., 2019).

Among other disciplines, Tallinn University (TLU) has developed CBL study programs in the teacher education degrees to help preservice teachers acquire the competencies defined in national-level teacher qualification standard[1]. Thanks to the infrastructure available (namely, eDidaktikum[2], ad-hoc CBL management system), each subject can be designed attending to the national qualification standards, specifying which competencies are trained in different learning activities. Based on these data, it would be possible to obtain the overall map of how competencies are trained in each degree

[1] https://www.kutsekoda.ee/

[2] https://edidaktikum.ee/

as well as extracting which competencies have been already acquired by each student. However, this potential has not yet been explored and there is no systematic evidence about how these competencies from the professional qualification standards are covered in the study programs. Thus, the goal of this study is to support the different stakeholders (mainly, curriculum or program designers, teachers and students) to raise awareness of how the competencies are distributed in the teacher education curriculum, informing potential interventions towards the improvement of teacher education programs, and contributing to the student awareness and decision-making regarding the competence profile they want to achieve.

2 CA FOR CBL: THE TLU CASE SEEN FROM THE SHEILA FRAMEWORK

To prepare HEIs for the integration of learning analytics solutions, the EU project SHEILA created a framework[3] to guide institutions during the implementation process. Following this framework, this section provides an overview of our CA initiative towards student success in CBL programs at TLU:

Political context. Aligned with the European guidelines for HEIs (Vossensteyn et al., 2015), TLU is elaborating and implementing strategies to address student success and dropout,e.g., by refining and supporting CBL programs in collaboration with other Estonian universities, TLU has developed eDidaktikum a learning management system that enables teachers to connect their courses to the program and competence model, and also map the competencies to be trained to learning outcomes. Even though the university expected to assess and recognize the competencies achieved by the students at the end of the program, doing it systematically is still extremely challenging. While teachers are expected to use eDidaktikum in their practice, not all of them use it (e.g., in Early Childhood Education, out of 42 courses, 18 are delivered through eDidaktikum, 9 using Moodle, and the rest use other platforms. In addition, the preliminary analysis shows that, in general, teachers are not mapping the competence model with the learning outcomes (e.g., in Early Childhood Education program, only 2 courses have assigned competencies from its corresponding model)and, on the other hand, multiple courses in this program include competencies from other related models).

Stakeholders. The main actors who can contribute to the improvement of CBL programs are: the *program designers*, who are in charge of implementing the national curriculum into the degree; the *teachers*, who connect competencies and learning goals in their courses; and *students*, who should be aware of the competencies that they have or would like to acquire to succeed in their career.

Desired behaviour changes. The main goal of the proposed solution is to raise awareness and support decision making in CBL programs. Program designers will be able to identify the gaps between the competence model defined by the government and the ongoing curriculum offered by the university, triggering potential interventions and contributing to the coordination with the teachers in charge of the different subjects. Teachers will be able to understand the competence level of the students and how their subjects fit in the overall program, refining the course program accordingly. Students will be able to get more global information on their level of competency achievement and based the course selection on the competencies that they want or need to achieve at the end of their studies.

[3] https://sheilaproject.eu/sheila-framework/

Develop engagement strategy. To achieve that goal, our CA solution will combine systematic tagging and monitoring of competencies in CBL programs. Following the Design-Based Research (DBR) methodology (Wang and Hannafin, 2005), we will iteratively understand the current practices and develop solutions involving the different stakeholders. More concretely, we will gather data about how TLU has implemented CBL programs in eDidaktikum, and compare the competencies expected in those curriculums with the ones developed in the different subjects, and finally acquired by the students. The first study will take place on the first semester of the 2020-2021 course and 6 teachers together with the program designer will participate. Thereafter, the study will expand up to the whole program iteratively (addressing all teachers), other CBL programs and other LMS platforms. Also, in future stages, we will progressively involve students.

Internal capacity to affect change. This initiative is aligned with TLU's goal and initiatives to change the mindset among university members towards evidence-based decision-making, especially promoting the adoption of learning analytics solutions. Regarding ethics and privacy issues, following the EU regulations and the institutional policies, this proposal will be GDPR compliant and will follow the Estonian research code of conduct. In addition, we will involve the TLU GDPR specialist and an institutional expert on ethics to validate and refine the proposal.

Monitoring and learning frameworks. Inspired by the EFLA framework[4], an evaluation instrument will be developed to assess the performance, effectiveness, impact and maturity of our CA solution with our three stakeholders. The evaluation will be carried out after each iteration of the DBR lifecycle.

3 CONCLUSION

This paper proposes a CA solution and process to support decision-making among the different stakeholders of CBL programs. Given the wide adoption of CBL, we expect to inspire other workshop researchers and practitioners who can promote student's success by improving the curriculum. Similarly, we expect to gather feedback and recommendations to refine the future iterations of our DBR process.

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[4] http://www.laceproject.eu/evaluation-framework-for-la