2nd International Workshop Education meets Process Mining (EduPM 2023)

Process Mining is a powerful interdisciplinary tool to analyze and enhance processes in many fields, such as healthcare or finance. Education is no exception. Recent approaches to process mining proposed for learning analytics, curricular analytics, or MOOC analytics are just a few examples of how process mining can be used to provide insights into learning processes. However, Education as a discipline contributes to process mining by providing best practices for teaching and methodologies for creating new educational artifacts that improve teaching and assessment of process mining across a spectrum of education levels.

The International Workshop "Education meets Process Mining" aims to provide a high-quality forum for researchers, educators, and practitioners interested in the intersection of education and process mining. The interdisciplinary nature of EduPM is framed in the following two directions.

- Process Mining for Education (PM4Edu) is concerned with investigating how process mining techniques can be used to address some of the challenges in education. This covers process mining for learning analytics, curricular analysis, student trajectories, MOOCs, blended courses, etc.
- Process Mining Education (Edu4PM) is concerned with improving the teaching of process mining. This includes, among others, new learning strategies tailored to process mining, new tools to automatically assess specific process mining topics, systematic studies on how process mining is taught in different educational programs or new curricula on process mining.

The call for papers solicited two types of contributions: regular papers and Show&Tell submissions. Regular papers should make a research contribution to one of the topics listed above. They were evaluated based on their significance, originality, technical quality, and potential to generate relevant discussion. Show&Tell submissions are non-research contributions that give authors the opportunity to present an item or initiative of interest to the EduPM community. They include experiential cases, educational resources, innovative tools, and lightning presentations for tentative or preliminary work, ideas, and collaborative opportunities.

The second edition of EduPM received 15 submissions, of which nine regular papers and six Show&Tell contributions. After thorough reviewing by the program committee members, four regular submissions were accepted for full-paper presentation. Additionally, after careful consideration by the workshop chairs, two Show&Tell submissions were invited for a short presentation. Below, we briefly describe the papers included in these proceedings.

The paper by Maldonado et al. explores the application of process mining techniques, specifically trace ordering for anomaly detection (TOAD) and hierarchical agglomerative trace clustering (HATC), to detect collusion in online exams. The authors also highlight the challenges and limitations of these methods, including the configuration of parameters and dealing with the lack of negative

examples in the data. Preliminary results suggest that HATC might be more effective in identifying collusion clusters. Still, a teacher-in-the-loop approach is essential to tune the parameters and interpret the results.

The paper by Rafiei et al. describes how event data derived from student exams can be used to analyze the study paths of higher education students and provide guidance for their study planning. Process and data mining techniques are used to investigate the impact that specific sequences of courses taken by students have on academic success. Based on this analysis, the authors use decision trees to generate recommendations to support students in making informed decisions about their course selection and study plans.

The paper by Potena et al. presents a case study using educational process mining techniques to analyze students' careers at an Italian university. The results reveal trends in curriculum compliance, exam patterns, and graduation times. A predictive model is used to identify critical factors that impact the students' graduation time. The insights from this approach can be used to guide educators and universities to improve the success rate of students.

Finally, the paper by Delcoucq explores how gamification, intended as the integration of game mechanisms into the practice of teaching process mining, can promote active learning and enhance the understanding of complex concepts. The paper details gamification strategies that might be useful for process mining and discusses their potential benefits and limitations.

In addition to research contributions, the workshop featured two engaging Show&Tell presentations. The first focused on the newly introduced Celonis Rising Stars Program, an online teaching initiative supporting individualized learning journeys. The second presentation issued a compelling call for cross-university curricular analysis, delving into the requirements and challenges in undertaking such a comprehensive analysis.

Finally, the workshop included a presentation by Gert Jannssenswillen of the results of the brainstorming workshop on "best practices for teaching process mining", which was organized the weekend before the workshop as an activity of the Scientific Research Community on Process Mining. The talk presented the main outcome of the brainstorming, namely the design of a 'game plan' for a process mining case that should serve as a modular tool for process mining educators to design their courses. The presentation was followed by an open discussion with all workshop participants on the foreseen usefulness of such a resource and the challenges it could help overcome.

We would like to thank all the members of the EduPM'23 Program Committee for their efforts in reviewing the papers. Our sincere thanks go to all the authors and the workshop participants, who contributed with their work and the lively discussions on the workshop day. A special note of gratitude goes also to the organizing committee of ICPM'23 for the successful edition of the conference.

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