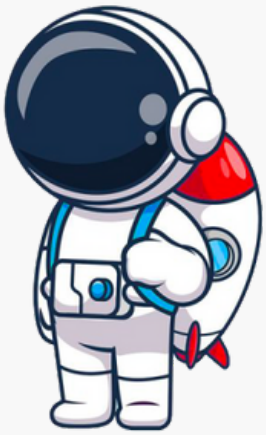
HELMeTO 2023
UNIVERSITY OF FOGGIA

5th International Conference on
Higher Education Learning Methodologies and
Technologies Online

Foggia, September 13th - 15th, 2023



BOOK OF ABSTRACTS

Università di Foggia

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HELMeTO 2023 - Book of Abstracts

Editore STUDIUM s.r.l. a socio unico
Prima edizione Settembre 2023

ISBN 978-88-99978-64-8

The 5th International Conference on Higher Education Learning Methodologies and Technologies Online (HELMeTO2023) confirmed a growing interest in the topics of higher education learning methodologies and technologies, as well as the relevance of the interdisciplinary approach that characterizes our community.
This increased interest drove us to translate the HELMeTO event from a workshop to a conference (for the second year), hosting a higher number of contributions from several countries and bringing a more international perspective on the topics. During the presentations and talks, it became clear that there is a complex relationship between technology and pedagogical approaches. These discussions also brought up new emerging topics, such as the potential role of learning analytics, artificial intelligence, augmented and virtual reality, and big data analytics. Additionally, the importance of tutorship and learning design in online learning was emphasized.

The Department of Humanities at the University of Foggia hosted the 2023 edition of HELMeTO. This was the second in-person event since HELMeTO 2020 and 2021 were conducted fully online due to the Covid-19 pandemic. We received 108 submissions from over 313 authors and 19 countries (Algeria, Brazil, Croatia, Estonia, Germany, Italy, Japan, Latvia, Malta, Morocco, Netherlands, Poland, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom), thus confirming the growing interest from the scientific community in the conference and its international scope.

The 2023 edition of HELMeTO featured dozens of high-quality contributions spread across 11 special tracks and two general tracks. This volume provides an overview of the current international context of online learning. Theoretical approaches, technologies, and practical cases are covered in-depth, making it a valuable resource for scholars and researchers interested in online learning and the future of education from pedagogical and technological perspectives.

This editorial does not aim to systematically review every publication but rather provide a general overview of each track, assisting readers in deciding what to pursue further. To this extent, *General Track 1* is focused on *"Online pedagogy and learning methodologies"*. It presents how to design a survey, how to implement social learning for professional development, the outcome of using a machine-learning app on peer assessment, and the after-effects of COVID-19 in Higher Education.
General Track 2 is focused on *"Learning technologies, data analytics, and educational big data mining as well as their applications"*. It presents predictions both in course quality and in students' success. It also presents analytics on a specific MOOC and on university data cultures, as well as a deep analysis of digital tools and the related roles.

Special Track 1 is focused on *"Smart Systems for context-aware Education"*. It aims to create a platform for discussing the latest research trends and applications of smart systems integrated with artificial intelligence approaches for context-aware education. It provides an opportunity for instructors, researchers, instructional designers, and administrators to identify and discuss new and promising research directions in this challenging field.

Special Track 2 is focused on *"Emotions and art in higher distance education"*. It aims to collect and analyze eLearning practices that focus on the role of emotions in university courses. It invites teachers and researchers to reflect on the relationship between emotions, community building, and art, and to reconstruct teaching methods and participatory mechanisms that clarify this relationship. Specifically, the track focuses on the following aspects: emotional presence in building an online learning community, aspects of interaction (such as emotional intelligence, empathy, and affect), emotional responses experienced in an e-learning environment, and the effects of emotional presence on disciplinary knowledge.

Special Track 3 is focused on *"Performing art-based methodology to improve online learning experiences"*. It aims to investigate how a specific laboratory teaching experience, which is conducted remotely and focuses on performance, can impact the perception of the empathic relationship, learner interaction/engagement, and the perception of non-verbal cues such as body language, gaze, and tone of voice. These factors are crucial to establish a meaningful teaching process that promotes participatory online learning experience, emphasizing a shift from a mere "experience-of" some object to an "experience-with" that involves active engagement and collaboration among learners.

Special Track 4 is focused on *"E-learning for providing "augmented" mathematics education at University level"*. The use of technology, especially the internet, cannot be overlooked in any aspect of modern life. In the field of education, students naturally turn to digital resources like videos, tutorials, and mathematical software. This poses a challenge for university teachers to create new learning environments that integrate both traditional and digital resources, and utilize them to enhance students' learning experiences. It is important to explore how technology can be leveraged to create new and innovative teaching methods that provide students with augmented learning experiences.

Special Track 5 is focused on *"Supercyberkids! The importance of promoting cybersecurity education among teacher education students"*. It aims to facilitate the exchange of research results, experiences, and products related to cybersecurity education in primary school settings, including teachers and parents. Its ultimate goal is to explore new ideas and trends in gamification platforms and specific games related to cybersecurity, with a focus on teacher education and professional development as a reference context.

Special Track 6 is focused on *"Effects of high-performance artificial intelligence systems and immersive technologies in education"*. It aims to discuss the impact, potential, viewpoints, merits and drawbacks of both high-performance AI systems and immersive technologies in the field of education. It includes contributions related to the impact of new AI systems on education, novel artificial intelligence systems to bolster education, the use of readily available AI systems for education from the perspective of students and teachers, supportive AI for creating XR scenarios, XR in education and teaching.

Special Track 7 is focused on *"The future of learning: Exploring the intersection of posthumanisms, e-health, technologies, and artificial intelligence in education innovations"*. This track covers new research directions in e-health education, including virtual reality, gamification, mobile health, and personalized healthcare. It also explores the challenges and opportunities of integrating e-health technologies into clinical practice and the ethical considerations of using them. Additionally, it addresses health equity and implementation of e-health education interventions in diverse settings.

Special Track 8 is focused on *"Technology-based learning interventions in higher education for combating inequalities and increase the psychological well-being of youngsters"*. The purpose of this special track is to gather reflections, best practices, and experiences related to the use of serious games and digital interventions in higher education. The goal is to ensure inclusive environments for youngsters that help improve their well-being, combat inequalities and promote psychological wellness.

Special Track 9 is focused on *"Innovative inclusive university"*. It aims to encourage discussions, sharing of best practices, and personal experiences regarding the latest teaching methodologies that promote inclusion in higher education. This track puts emphasis on the use of new technological tools that support truly inclusive teaching.

Special Track 10 is focused on *"Beyond borders: exploring immersive environments and new didactic approaches in higher education"*. The aim and scope of this track are to identify the key elements that arise from studying immersive reality in higher educational contexts. Additionally, it aims to develop innovative teaching models and approaches for higher education students and lifelong learners, while exploring theoretical and practical settings for the construction and management of knowledge. Finally, the track aims to stimulate interdisciplinary discussions on the topic.

Finally, *Special Track 11* is focused on *"Learning technologies and faculty development in the digital framework"*. It addresses two main areas of interest, namely: online or blended approaches to academic/faculty development, and how faculty development can enhance teachers' skills to design, implement, and assess learning in a higher education digital environment. The track features research, best practices, and experiences related to online or blended initiatives for faculty development, as well as papers on topics such as the promotion of academic staff profiles and skills development in the digital environment. These topics include learning design, curriculum design, teaching methodologies, assessment, digital publishing, open science, online learning, e-mentoring, e-tutoring, digital skills, and related topics.

In summary, this book of abstracts provides a comprehensive overview of the methodologies and technologies used in online learning in higher education. This has been the focus of HELMeTO since its first edition. The book brings together

theoretical concepts and practical experiences related to online technologies and learning. It is a valuable resource for anyone interested in this field.

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SPECIAL TRACK 7

“THE FUTURE OF LEARNING: EXPLORING THE INTERSECTION OF POSTHUMANISM, E-HEALTH TECHNOLOGIES AND ARTIFICIAL INTELLIGENCE IN EDUCATION INNOVATIONS”

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Facilitating feedback at university using AI-based techniques

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1 Introduction

Many recent studies highlighted the importance of feedback on the quality of learning [1; 2; 3]. It empowers students to take ownership of their learning, guides institutions in making informed decisions, ensures continuous improvement, fosters engagement and motivation, facilitates open communication, and enables personalized learning experiences [4]. However, despite its relevance, the use of feedback processes in everyday teaching often becomes unsustainable, due to the number of students and the timing of the courses. On the other hand, the expansion of ubiquitous learning in digital environments has led to an exponential growth of significant data for tracking learning. Although the use of these data can be beneficial, tools and technologies are needed for automated data collection and analysis [5].

In this direction, significant support can be provided by technologies incorporating Artificial Intelligence (AI), which include a wide collection of different technologies and algorithms [6]. Notably, Learning Analytics (LA) [7] and Educational Data Mining (EDM) [8] can be useful in developing a student-focused strategy [6; 9]. The systematic use of AI techniques and algorithms could enable new scenarios for educators, profiling and predicting learning outcomes and supporting the creation of sustainable patterns of assessment [10]. However, even though several studies aimed at integrating EDM and LA techniques in online learning environments [11], only few of them focused on applying them to real-world physical learning environments to support teachers in providing timely and quality feedback based on minimally invasive measurements [12; 13].

The present paper presents an approach aimed at addressing the feedback problem in real university classes, laying the groundwork for the development of an intelligent system that can inform and support the university teacher in delivering personalized feedback to a large group of students.

2 Context

In the training of future teachers, the ability to develop a professional vision and analyze different teaching interactions, observed through videos, is considered a key competence of teacher professionalism [14; 15]. Whenever the student makes an analysis of a teaching interaction, it is important for the teacher to provide timely and effective feedback. This could be very complex when the number of students is large. During the academic course of "Didattica Generale" at the University of Macerata in Spring 2021, 220 students attending the first year of the Master's Degree course in Primary Education Sciences participated in the lectures and took six tests. Each test required students to watch and analyze a video (10-15 minutes) which was recorded in an Italian primary school showing teacher-student interactions. After watching each video, the students filled in a questionnaire administered via Google forms (five open-ended questions related to meaning, organization, and management of the teaching action).

3 Methods

Students' understanding and learning were tested during the course at six different times thanks to the open-ended questions about the videos. This textual information was further processed by a team of researchers using a rubric, purposefully developed by the team. The team rated each indicator of the rubric by assigning a level on a rating scale from 1 to 5. The final numeric dataset was comprised of 220 cases, each of which included 13 numerical values related to the variables of the five dimensions of the rubric. The subsequent analysis was carried out using RStudio. Raw data were processed deleting incomplete or missing answers. Then, based on the evaluation provided by the team of researchers, the analysis aimed at discovering the main features and patterns in students' answers. Notably, the analysis employed the traditional methods of descriptive statistics (e.g. analysis of the distributions of the total scores), as well as correlation analysis and clustering techniques using the kmeans algorithm ('cluster' package [16]).

4 Preliminary results and conclusions

Preliminary results suggested that the use of students' answers to open-ended questions evaluated by means of rubrics can be an effective way to collect data from the process. The preliminary results showed the possibility of clustering students' behaviors. However, since the analysis is based on the researchers' assessment of a text, the results are not automated yet and may be influenced by the observers' bias. Since the ultimate goal is the development of an intelligent system to support teachers in delivering personalized feedback related to groups of students who show the same model of behavior, further developments will be needed including reducing the observer bias, exploring other descriptors of students' achievement and applying other machine learning techniques.

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