

## INVITED SESSION SUMMARY

**Title of Session:** Education in Computer Science in the era of Artificial Intelligence

**Name, Title and Affiliation of Chair:**

Hamna Aslam, University of Lincoln, UK

Paolo Ciancarini, University of Bologna

Munir Makhmutov, Innopolis University, Russia

Rabab Marouf, Innopolis University, Russia

Manuel Mazzara, Innopolis University, Russia

Marko Pezer, Innopolis University, Russia

Giancarlo Succi, University of Bologna

**Details of Session (including aim and scope):**

The fast development in Artificial Intelligence, together with the fast changes dictated by the COVID-19 pandemic, caught by surprise some teachers, who got used to the traditional modes of education. Even more, some educators ended up scared by the changes and the development brought by technology, even in the Computer Science teaching domain.

Other than focusing on the problem of how to avoid students cheating using AI, which is too often a point of endless discussion, this session would like to focus on the potential that innovative technology can bring to enhance the educational process and relieve professors from repetitive tasks.

The pandemic has seen the reluctance of some teachers to indulge in new educational formats, and the same situation is appearing again with the use of Large Language Models (LLMs), i.e. machine learning models using deep learning algorithms to process and understand natural language. The future will see a sharp separation between those educational institutions able to catch up with the fast changes and those left behind, both in terms of new pedagogical methods and supporting ICT infrastructure.

The changes of recent years showed some distinctive emerging traits that we believe can be generalised to any educational organisation worldwide and be a subject of research. This research may make the difference between the rise and the fall of educational organisations. Our involvement in Computer Science education allows us to focus more effectively on this specific subfield of technical pedagogy; however, most of the consideration can be extended more broadly.

The education process is based on the 'trinity' pillars: learners, teachers, and target knowledge. The context in which this process takes place plays a crucial role in providing the participants, i.e., learners and teachers, with the tools required to make their interaction more effective and profound. Computer science educational contexts have, by default, a well-equipped AI environment that can sensibly utilise the AI presence. The advanced versions of AI aim to create toolkits that can address some challenges faced in education, such as insufficiency of time, burnout, lack or fluctuation of teachers' and/or students' motivation, etc. Therefore, the evolving presence of AI, and in particular in Computer science as a target context in our case, has had the potential to support teachers and learners. On the one hand, AI assists in 'gifting' more time to teachers in their educational responsibilities such as grading, providing feedback, conducting meetings, supervising, etc. On the other hand, AI provides students with more tools to enhance their learning and results. The metrics in measuring the success of any AI tools in education can go beyond what succeeds to investigate on how to avoid what has not. At this

stage, we as educators in Computer science can assist in taking a new role that can help in new approaches at which AI performs more efficiently in education. AI has required modifying certain roles of the 'trinity' pillars used to play in the educational process. We hope to attract to this session especially educators embracing and evaluating with their students the new technologies in their Computer Science classes.

**Main Contributing Researchers / Research Centres (tentative, if known at this stage):**

University of Belgrade, Serbia

University of Bologna, Italy

Innopolis University, Russia

**Website URL of Call for Papers (if any):**

Not yet available

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