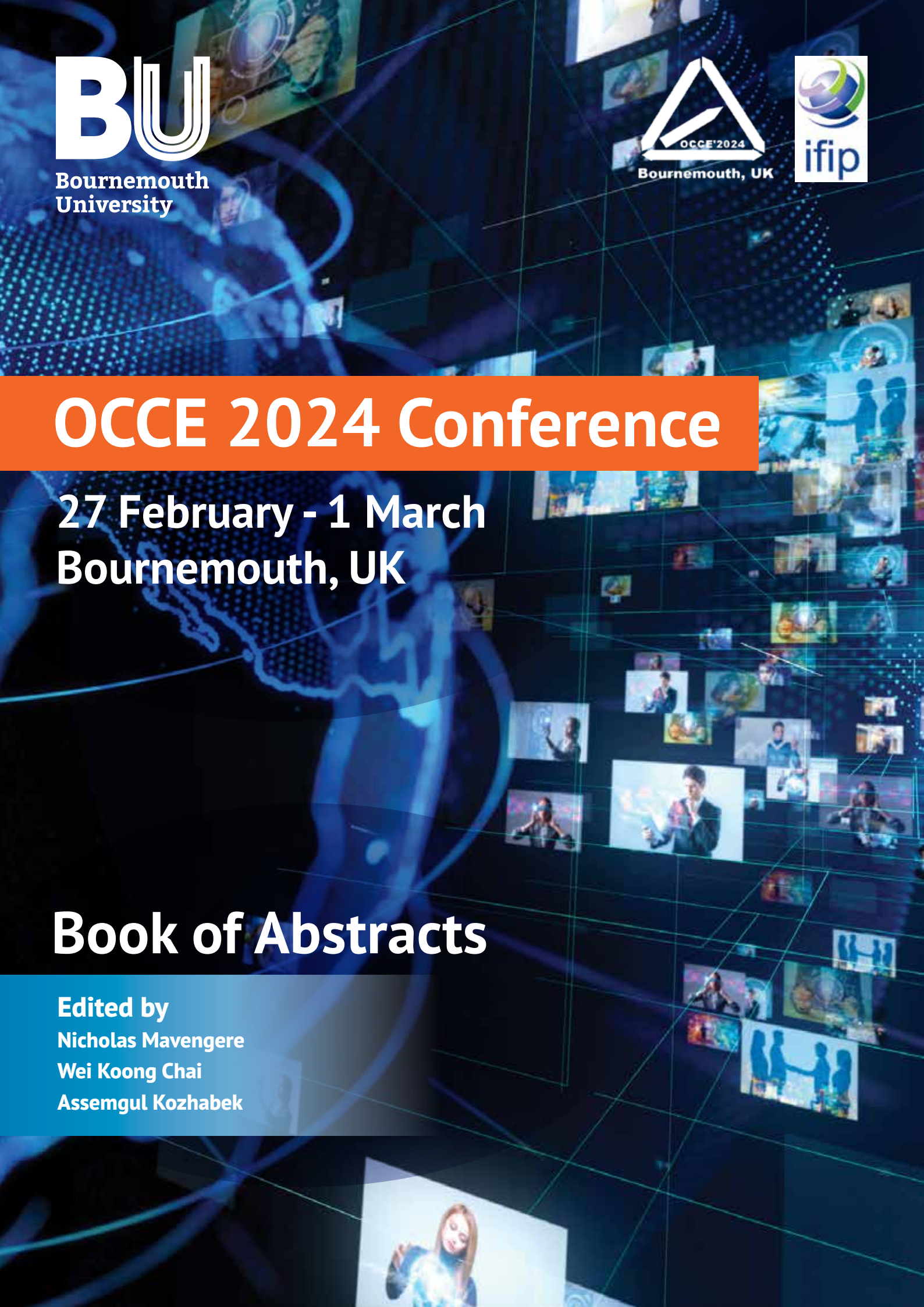

OCCE 2024 Conference

27 February - 1 March
Bournemouth, UK

Book of Abstracts

Edited by
Nicholas Mavengere
Wei Koong Chai
Assemgul Kozhabek

Digitally Transformed Education: Are We There Yet?

IFIP TC3 OCCE 2024, Bournemouth, UK,

27 February 2024 – 1 March 2024

BOOK OF ABSTRACTS

Edited by

Nicholas Mavengere

Wei Koong Chai

Assemgul Kozhabek

Tables of Contents

1. Welcome Note

		
Prof. Don Passey, IFIP TC3 Chair	**Dr. Nicholas Mavengere, LOC Chair**	**Christophe Reffay, IPC Chair**

Dear participants,

I am delighted that IFIP TC3 is holding its next Open Conference on Computers in Education (OCCE) in 2024. IFIP TC3 OCCE 2024 is our fourth OCCE conference. While we have successfully run conferences throughout the Covid-19 pandemic period, this will be the first conference since that time when we can be more confident that we should be able to meet onsite! I am sure that we all look forward to that – and I am pleased to say that IFIP TC3 OCCE 2024 will be held in Bournemouth, UK.

I am indebted to those that have made this conference possible, and particularly to those who have needed to consider running this conference face-to-face, but with opportunity to allow those who cannot easily make the journey in person to have chance to join online. I know that this involves considerable commitment, effort and ingenuity on the part of those involved in setting this up, not only prior to the conference, but also for those who need to handle the hybrid situation during the period of the conference itself. I am grateful to the enormous efforts of the local organising committee in making the conference facilities possible, enabling us to work together on the important topic of this conference.

My thanks to the support and devotion of the chairs of the IPC and the LOC, and to the members of the international programme committee and the local organising committee of this event, enabling us all to benefit from the chances to meet again. I have no doubt that coming to Bournemouth in the UK will offer a wonderful range of opportunities for sharing, discussion and challenge!

Don Passey, Chair of IFIP TC3, Vice-chair of IFIP TA

2. Local Organising Committee (LOC)

- Nan Jiang, Honorary Chair
- Melanie Coles, Honorary Chair
- Huseyin Dogan, Honorary Chair
- Nicholas Mavengere, LOC Chair
- Lai Xu, Business Partnership
- Paul De Vrieze, Finance
- Deniz Cetinkaya, Student Volunteers and Internal Promotion
- Wei Koong Chai, Publicity
- Gernot Liebchen, Volunteers and Internal Promotion
- Avleen Malhi and Mohammad Naiseh, Social Events
- Marcin Budka, Digital Chair

3. International Programme Committee (IPC)

- Christophe Reffay, IPC Chair, University of Franche-Comté, France
- Margaret Leahy, Editor, Dublin City University, Ireland
- Don Passey, IFIP TC3 Chair, Lancaster University, UK
- Mikko Ruohonen,Tampere University, Finland
- Javier Osorio Acosta, The University of Las Palmas de Gran Canaria, Spain
- Ivan Kalaš, Comenius University in Bratislava, Slovakia

4. Registration and Assistance

Registration and reception desk

On-site registration desk will be open on the following dates and times in EBC second floor.

- 8:00 – 14:00 on February 27
- 9:00 – 15:00 on February 28
- 9:00 – 15:00 on February 29
- 9:00 – 12:00 on March 1

Name badge

Please wear your badge at all times during the conference.

Smoking policy

Smoking is not allowed inside Executive Business Centre, the conference venue.

5. Location Guide

All the conference sessions for the IFIP OCCE 2024 conference will be held at the Bournemouth University's Executive Business Centre.

Please follow **this link** for directions to our Lansdowne Campus, which includes the **Executive Business Centre**. Upon your arrival, please check in at reception.

The address to the Executive Business Centre is:
89 Holdenhurst Rd
Bournemouth
BH8 8EB

Why Bournemouth?

GOLDEN SANDY BEACHES

Bournemouth is widely recognised for its exquisite, sandy beaches. Stretching from Hengistbury Head in the east to Sandbanks in the west, the combined areas of Bournemouth and Poole boast a remarkable 10-mile coastline, featuring twelve beaches that have been honoured with the internationally acclaimed Blue Flag award.

The Beatles

Bournemouth held a special place in the hearts of the legendary band, The Beatles. Besides Liverpool and London, Bournemouth stands as the town in the UK that saw the most concerts by this fab four. Interestingly, their second studio album, "With the Beatles", showcased a black and white photograph of the band taken by photographer Robert Freeman at the Palace Court Hotel in 1963. Today, this location is known as the Premier Inn on Westover Road. During their time in Bournemouth, the band performed at the Gaumont cinema, which is now known as the Odeon.

Famous literary ties

Bournemouth has been associated with numerous renowned writers. J.R.R. Tolkien, the author of The Hobbit and the Lord of the Rings trilogy, frequently visited the town for his vacations and always stayed in the same room at the Hotel Miramar. Following the publication success of his books, Tolkien made Bournemouth his home in 1968. Notably, Mary Shelley, the writer of Frankenstein, rests in peace at St Peter's Church located in the town. Additionally, Robert Louis Stevenson crafted his famous work, The Strange Case of Dr Jekyll and Mr Hyde, while residing at 'Skerryvore' house in Westbourne, a residential area of Bournemouth.

6. Local Information

- **BCP public transport links**
- **Taxi advice including informing that UBER is available**
- **BCP tourism office**

6.1 Public transport links

Most bus services in the area are provided on a commercial basis by private bus companies:

- Morebus - serving Bournemouth, Christchurch, Poole, Dorset and Wiltshire
- First Bus - serving Hampshire and Dorset
- Damory Coaches - serving Dorset
- Transpora- serving Dorset
- UNIBUS - the official bus service for Bournemouth University. Providing frequent links between halls and campus. Unibuses can be used by everyone.

6.2 Taxi

Airport taxi transfers

Taxi transfer is available from the airport to Bournemouth. BU has a good relationship with two local airport taxi companies – Travel Link and Bournemouth Airport Transfers.

UBER

UberX operates 24/7 with the app.

6.3 Bournemouth Tourist Information Centre

Conveniently located at Pier Approach on Bournemouth's seafront the staff at Bournemouth's tourist information centre pride themselves on having the knowledge and expertise to make your visit a truly unforgettable. They can provide you with information on places to visit, walks, activities, entertainment, events or simply just a postcard to send back home – so why not pop in and see them!

Opening Hours: Monday to Sunday, 9.00am to 4.00pm.

7. Keynotes

5.1 The UK computing education landscape: next steps

By Julia Adamson MBE FBCS

Managing Director, Education and Public Benefit at BCS, The Chartered Institute for IT.

Julia's mission at BCS, The Chartered Institute for IT, is to give every young person the digital skills they need to succeed in life and work. Under her leadership, the Computing at School (CAS) teachers' network has grown in influence and now has over 25,000 teacher members. BCS's Barefoot scheme, which supports primary teachers with learning materials and lesson plans, has so far reached 3.3 million children across the UK. Julia played a lead role in establishing and managing the National Centre for Computing Education (NCCE), an £84 million government-funded programme to upskill teachers to deliver world-class education in computing in schools. In 2023, Julia was awarded an MBE, for Services to Education.

Julia is a Trustee of The Blackdown Education Partnership, a Multi Academy Trust, in Mid-Devon. Julia began her career in education 26 years ago as a teacher in Cheshire. In 2006, she joined the Liverpool-based company, MGL, developing her vision for technology in schools, and how it could transform outcomes for learners. She joined the Exeter-based South-West Grid for Learning (SWGfL) in 2009, supporting its work on online safety and education. Later, joining the BCS, The Chartered Institute for IT in 2017, and after holding a number of leadership roles, she is now Managing Director, Education and Public Benefit.

5.2 AI in Education – Watershed or Quagmire

By Professor Deirdre Butler, Institute of Education, Dublin City University

Deirdre Butler is a Full Professor at the Institute of Education, Dublin City University (DCU). Her passion in life is exploring what being digital in learning can mean and what skills or competencies are needed to live and thrive in today's complex globally connected world.

Deirdre is internationally recognised in the field of digital learning, particularly for the design and development of sustainable, scalable models of teacher professional learning. This is demonstrated through her work with the Innovative Schools Evaluation, TeachNet, Innovative Teaching and Learning Research, New Pedagogies for Deep Learning, STInt (STEM Teacher Internship) and ATS-STEM. She consistently works across a broad range of stakeholders in education, technology, government, corporate and non-profit sectors.

From 2015 to 2020, Deirdre played a key role in developing the Digital Strategy for Schools, as well as the Digital Strategy for Schools to 2027. She is currently an advisor to the Irish Department of Education and Skills as they implement the Digital Strategy for Schools to 2027 and was a member of the EU Expert Group on AI in Education that recently launched the "Ethical guidelines on the use of artificial intelligence and data in teaching and learning for Educators."

She is currently involved in the European AI4T (AI for Teachers) project involving 5 countries (France, Ireland, Italy, Luxemburg and Slovenia) as part of the evaluation team.

5.3 Privacy and information security in the education world

By Professor Kai Rannenberg, Rannenberg, Chair of Mobile Business & Multilateral Security, Goethe University Frankfurt, Germany

Kai Rannenberg has held the Chair of Mobile Business & Multilateral Security at Goethe University Frankfurt since 2002 and a Visiting Professor at the National Institute for Informatics (Tokyo, Japan) since 2012. Until 2002, he was working with the System Security Group at Microsoft Research Cambridge on „Personal Security Devices & Privacy Technologies".

Since September 2021 Kai has been the IFIP Honorary Treasurer; since 2015 he was an IFIP Vice President and an IFIP Councillor since 2009. Since 2014 he has been Chair of the IFIP Publications Committee and Editor-in-chief of the IFIP Advances in Information and Communication Technology. From 2007 until 2013 Kai chaired IFIP TC-11 "Security and Privacy Protection in Information Processing Systems", after having been its Vice-Chair since 2001.

Kai has been coordinating several leading EU research projects, e.g., the Network of Excellence "Future of Identity in the Information Society" and the Integrated Project "Attribute based Credentials for Trust" (ABC4Trust) and is coordinating CyberSec4Europe, a pilot for the European Cybersecurity Competence Network the EU is aiming for.

8. Workshops, Symposiums and Doctoral Consortium

8.1 Tutorial: Writing research papers in LaTeX A brief introduction for authors and editors.

Matthias Kramer and Torsten Brinda, Computing Education Research Group, University of Duisburg-Essen, Schützenbahn 70, 450127 Essen, Germany matthias.kramer@uni-due.de

Abstract. This tutorial is directed to anyone who is interested in using the LaTeX environment to produce documents such as conference papers and journal articles. If you have already used LaTeX for this purpose you will not learn anything new in this tutorial. Even though knowing about the differences between WYSIWYG (What You See Is What You Get) and WYSIWYM (What You See Is What You Mean) principles might be beneficial, you don't need any prior knowledge to participate in the tutorial. We will cover the basic workflow in the LaTeX environment, the document structure of LaTeX documents, bibliography management with BibTeX and finally using the Springer template to produce an example paper.

This tutorial will have two parts in the OCCE2024 programme. The first will cover the main principles and show some examples; the second will give you the opportunity to build your first LaTeX scientific document.

Keywords**:** LaTeX document, Production, Edition.

8.2 The Sniff Programming Language, and Physical Computing for KS3/4 Science by Ian Stephenson and colleagues, Bournemouth University UK

Abstract. The Sniff programming language has been developed to create a natural progression from Scratch in KS2 to a text based language in KS3, as it retains all of the syntax and vocabulary of Scratch in a text based format. Sniff supports a large range of hardware, including the Arduino, and PicoBoard. This makes it well suited to use within the K3 and KS4 science curriculum. Integrating programming in this way creates real tasks which students can write code to complete, and develops a problem-solving approach to science

Keywords**:** Programming Languages, Physical Computing, Science.

8.3 Exploring the Synthesis of an Immersive 360* Webinar Design and an AI Chat-bot for a Socratic Discussion: Or the case of the artificial intelligence presenter Anthony Basiel, Mike Howarth, Louise Morrell, Steve Humphrey, Bournemouth University UK

In our conference presentation, 'User Experience Analysis of Online Healthcare Learning Simulations' we investigated the blend of a Socratic discussion circle using a 360* augmented reality camera for an immersive experience. In this workshop we invite participants to engage in this blended learning model with an added in-person audience to create an interactive fishbowl discussion. Workshops participants are required to bring their laptops and/or smartphones to log into the worshop and contribute to the discourse. This workshop adds an exciting AI element to the discussion model. One of the key 'experts'

starting the discussion is actually an AI Chat-bot. Since the key experts debating the controversial issue are represented as avatars the audience will not be able to easily detect the AI agent. Through listening to the narrative of the argument the participants need to analyse the discourse to decide who is human and who is a chat-bot. This Turing Test will be conducted online for the stakeholders to vote. The concluding denouement reveals the solution to the 'case of the artificial intelligence presenter'. Join the workshop to hone your Turing deduction capabilities. Time: 45 minutes, Participant numbers: 30 maximum.

8.4 Playable Data Pedagogies: An interactive Workshop

Anna Feigenbaum, Bournemouth University

From creating 'human data visualisations' to building multi-scenario data-based narratives using open-source software, we share some of our favourite 'playable pedagogies' for teaching data literacy and building digital skills for working with data in this workshop. We will kick off the session with a short presentation on our approach to 'playable pedagogies' and why we think it is important to bring creative writing, performance, games and other arts and humanities-based practices into data skills education. Drawing from literature on collaborative learning, problem-based learning and data literacy education, we will introduce our framework and methods for bringing together technical competencies with critical practice through play-based learning. In the interactive part of the workshop, depending on our given timeframe, we will play between one-three short games with participants: (1) creating a human data visualisation, (2) 'spot the anomaly' and (2) 'choose your own data adventure'. We will then have time for reflection and feedback on how the games work to build data literacy. Finally, we will open the floor to participants, asking them to share their own experiences of or ideas for playable data pedagogies.
Infrastructure needs: A room big enough for people to move around in and ideally with easily moveable furniture Time frame: The workshop can be scaled between 60-120 minutes. Each game takes roughly 30 minutes with the feedback and reflection. We'll adapt the number of games to the given time slot.

Max number: 50 (with large enough room for movement)

8.5 Strategies towards supporting the use of Generative AI within Higher Education

Muntadher Sallal, Benjamin M. Gorman, Nicholas Mavengere, Huseyin Dogan, Gelareh Roushan, Holly Henderson, Wei Chai, Tim Orman, and Marcin Budka, Bournemouth University UK

Abstract. Generative Artificial intelligence(GAI)is an innovative technology which enables the generation of human-like text and facilitating automated conversations through making use of machine learning and deep learning techniques. GAI tools have been widely adopted in education practises by both students and staff at the higher education level to assist them achieving variety of education tasks such as training, generating ideas, assignment checking, and revision. Despite their capabilities and

benefits, GAI tools present significant concerns in relation to their impact on academic integrity, education quality, and learning outcomes. This workshop aims to bring together academics and education practitioners with the goal of highlighting the current challenges and issues of GAI tools within higher education domains. Furthermore, this workshop focuses on how to shape clear GAI policy and regulation frameworks which prevent GAI tools misuse in higher education. **Keywords:** Generative AI · Artificial Intelligence · Education.

8.6 Invited session: Developing Teaching and Learning Innovations in the context of Indo-Nordic Collaboration for Smart Agriculture and Entrepreneurship Education

Mikko Ruohonen, Gururaj Mahajan, Mikko Ahonen and Katriina Vartiainen, Tampere University, Finland

Rationale and motivation. The objective of this session is to present and outline the results and future activities of the Indo-Finnish-Nordic collaborative work between Tampere University (TAU), Finland, and the University of Agricultural Sciences Dharwad (UASD) and other agricultural universities in In-dia. This initial research and development work has been done under the umbrella of Global Innovation Network for Teaching and Learning (GINTL) funded by the Ministry of Education and Culture Finland. Developing teaching and learning innovations in smart agriculture, bioeconomy, circular economy and entrepreneurship topics are crucial for rapidly developing large countries such as India.

Background. Smart agriculture plays a greater role in building a digital ecosystem for next-generation agriculture and food systems, entrepreneurship, and collaborative learning across the modern collaborative, interconnected and globalized world. We are strengthening collaboration in fields such as Future ICT, Future Mobile Technologies and Digital Education, Bioeconomy, Circular Economy in the context of entrepreneurship and start-up activities. The Government of India has given prime importance to the entrepreneurship and the startup ecosystem in Agricultural Universities.

Results. The UAS Dharwad and other Indian agricultural universities are doing joint development work with Tampere University and Nordic Centre in India (NCI) to get the best global experience for faculty people and students. Four 3-10 credits programmes have been implemented with total 90 students and almost 30 faculty members from Indian agricultural universities have had a training pro-grammes and stakeholder meetings in Finland and Sweden.

Future. In the future, we are looking forward to connecting and enlarging networks of Nordic and European stakeholders and also foster inter-Indian collaboration of higher education institutes in with agriculture universities, information technology institutes (IITs), and business schools, in India.

Participants and the connection to OCCE2024 objectives. Indian, Nordic and European teachers, researchers and experts will be invited to share their views and experiences in this

emerging field of teaching and learning innovations. OCCE2024 conference provides an excellent platform for sharing these views internationally.

Keywords: ICT, Emerging technologies, Developing countries, Teaching, Learning, Innovations, Smart agriculture, Entrepreneurship, India, Nordics

8.7 Symposium - Developing Informatics Competencies of In-Service Teachers: Analyses of Success Factors by Matthias Kramer and Torsten Brinda

The integration of digitalization-related competences is currently a big challenge for the teacher education system in many countries worldwide. This is reflected by the publication of various competency frameworks, such as DigCompEdu, as well as by reports about development and implementation projects, such as ComeIn. Many frameworks and reports focus on using digital media for various educational purposes in learning and teaching scenarios; however, the integration of digitalization-related competences should always take into account an informatics perspective when teaching with or about digital technologies or when using digital technologies for other profession-related activities as a school teacher. This includes but is not limited to: staying in contact with colleagues, students, parents or external institutions, organizing data about ones students (grades, missed classes etc.), protecting the data from unauthorized access, preparing teaching material and so on. Most of these tasks today involve data processing systems, so called informatics systems, like smartphones or laptops. Therefore, all teachers need competences to engage competently with these systems to fulfil the necessary tasks. However, it cannot be assumed that all teachers had the chance to develop the necessary informatics competences during their school education. Hence, they have to develop these competences in later stages of their educational process, either in universities, during their work as pre-service teachers or on the side of their full time job as in-service teachers. Recently, a working group of the German Informatics Society (GI) compiled recommendations for informatics competencies for all teachers (especially non-informatics teachers), which will be published later in 2023, see https://ak-lk-bildung.gi.de. To address the development of such competencies in the teacher education system, during several funded pilot projects educational concepts and material were developed, tested and published. Depending on several factors such as the funding, the reported success and the willingness to guarantee sustainable use, the resources of these projects were in some cases included in the teaching portfolio of institutions, e. g. as lectures or seminars at universities or as in-service training offers at other teacher training institutions. The latter case is of specific importance: while universities often have an informatics department, which can ensure the needed informatics competence of lecturers and other success conditions, in-service teacher training offers based on available open educational resources which are presented by available educators can be a challenge. Therefore, it is crucial for the success of such offers to determine, to describe and to control relevant success factors, from general factors to domain-specific factors. In the symposium, the presenters will give an overview of general success factors of in-service teacher-training offers based on literature analyses and own concepts and empirical research in the informatics field. They will also show, how informatics teacher training offers were revised based on such results. A very important aspect, which was identified and elaborated during community of practice

work, seems to be the orientation of such training offers not at content or process structures of the informatics domain, but at everyday work processes of school teachers. This approach was chosen as the guiding principle for the development of the recommendations of the German Informatics Society, which will also be presented in the symposium.

8.8 Symposium - Digital pedagogy in a post-pandemic world: moving forward or turning back? Claire Goodley, Mar Camacho, Therese Keane

This symposium reviews digital pedagogy in school contexts in a post-pandemic world from teacher education to classroom practices and school leadership. The pandemic acted as a catalyst with many schools across the globe pivoting to remote education. Many teachers who had not previously been keen to use digital pedagogies in their classrooms were pleasantly sur-prised despite steep learning curves, discovering the potential benefits of technology uses in the classroom and beyond. Many working practices outside education changed as a result of the pandemic. However, in many cases schools and teachers have returned to previous practices for various reasons. Bringing together researchers with interests in different aspects of schooling, this symposium considers whether or not any long term changes in pedagogies have taken place and if not, why not.

Keywords: Digital pedagogy, teacher, professional development

8.9 BCS and BU Teachers workshop – Teachers Workshop on AI in Education Tig Williams, Hari Pandey

This is a practical workshop for secondary school teachers on 'fun ways to engage young people with computing', including focuses on AI and VR. The workshop is organised by BCS, The Chartered Institute for IT, in collaboration with Bournemouth University. Local secondary teachers have been invited to attend this session. Conference participants are also welcome.

8.10 Doctorial Consortium – Presenters: Fatima Ahmad Muazu (Bournemouth University, UK), Jayanti S Nayak (La Trobe University, Australia), Neil Rickus (King's College London, UK) – coordinators Christine Bescherer, Javier Osorio and Huseyin Dogan

The OCCE 2024 Doctoral Symposium aims to provide a supportive environment that will enable doctoral students to get constructive feedback on their research. Students will have

the opportunity to discuss their work with experienced members, offering expert feedback, as well as peer feedback from fellow PhD students.

9. Panel discussion sessions

9.1 Four Nations Panel

Chaired by Professor Alastair Irons (Deputy Principal and Deputy Vice-Chancellor, Abertay University).

Panel members:

- Dr Parveen Samra (Associate Dean, Quality and Accreditation, Coventry University, England)
- Dr Fiona McNeil (Reader in Computing Education, University of Edinburgh, Scotland)
- Dr Ian McChesney (Senior Lecturer, Ulster University, Northern Ireland)
- Professor Tom Crick (Deputy Pro-Vice-Chancellor (Civic Mission), Swansea University, Wales)

The development of the computing and computing science curriculum in and across schools, colleges and universities is an interesting, challenging and complex issue. There are many drivers, from developing the digital skill set for digital citizens to providing advanced capabilities for the technical innovators and systems developers of the future. There is a complex body of knowledge to be covered and an ever-expanding set of topics to understand and apply as computing continuously evolves.

The challenges in teaching computing and computer science are many and varied, from ensuring grounding in the subject through topic relevance and student interest in the school curriculum through to embedding up-to-date advanced theory, knowledge and practice in university curriculum. Added into this complex environment is the role of the computing professional bodies in supporting skills development of teachers, creating curriculum structures and accrediting programmes of study.

It is not just a case of creating an interesting and practical curriculum; there is the need to consider who is going to own the curriculum, develop the learning and teaching materials and actually teach the students and pupils. Additionally, there are challenges in staffing in schools, colleges and universities.

The situation in the UK is not uniform, with differences at school, college and university levels across England and the devolved nations (Scotland, Northern Ireland and Wales). There is significant work happening in all four countries in the UK – some in collaboration, for example, degree accreditation, and some devolved, such as the school curriculum.

In this workshop, the panel of colleagues across the four nations in the UK will discuss the opportunities and challenges from each country, particularly in Higher Education, and discuss the aspirations for the future from the perspective of each nation. We will explore the different policy and implementation approaches of the HE sector in the four nations in the UK with regard to the computing and computer science curriculum and digital technology transformation.

We will also discuss the role of the British Computer Society (BCS), The Chartered Institute for IT in the computing curriculum environment, and the activities of the BCS Academy Board in ensuring that the national dots are joined together in operational and strategic developments.

Biographies for BCS Panel at IFIP

Alastair Irons

Alastair Irons is Professor of Computer Science, Deputy Principal and Deputy Vice Chancellor at Abertay University in Scotland. Before coming to Abertay in July 2022, he was Academic Director for Digital Education at the University of Sunderland, having previously been the Dean for the Faculty of Technology. Prior to joining the University of Sunderland in 2008, he worked at ONE North East, Northumbria University and ICI.

Alastair became a National Teaching Fellow in 2010. He was a visiting scholar at the University of Cape Town, South Africa from 2013–2017 and is currently a visiting professor at the University of Johannesburg. Alastair is Vice President (academic) of the British Computer Society (BCS) and is chair of the BCS Academy Board (recently re-elected for a second three-year term). He also sits on BCS Council and BCS Trustees, is a member of the BCS Academic Accreditation Committe, a founding trustee of the BCS Foundation. Plus, he is the UK representative for IFIP and serves on the IFIP Board.

Parveen Samra

With over 20 years' experience in higher education, both in the UK and internationally, Parveen is a goal-oriented leader who excels at driving high-quality programmes, ensuring exceptional student experiences, fostering innovation and creativity, and effectively managing change. Parveen started her career working in industry as a database developer and completed her PhD entitled "A systematic method to develop work-based learning" in 2009.

Parveen currently works at Coventry University as the Associate Dean for the College of Engineering, Environment and Science. She is an assessor and Vice-Chair for the British Computing Society Academic Accreditation Committee and holds co-opted membership for the Council of Professors and Heads of Computing (CPHC). She is an Assessor – an Independent Committee Member of the Office For Student's Quality Investigations Committee – providing a comprehensive grasp of higher education and the discipline of computing in a broader context.

Fiona McNeil

Fiona McNeill is a Reader of Computing Education at the University of Edinburgh, where her research focuses primarily on access to computer science (CS) education for typically excluded groups, especially women and young people from socio-economically deprived backgrounds, and transitions into higher education.

She is a founding co-chair of the BCS Scottish Computing Education Committee and is a member of the BCS Academy. She represents the BCS on the RSE's Learned Society Group on STEM education in Scottish schools.

Tom Crick

Tom Crick is Professor of Digital Policy and Deputy Pro-Vice-Chancellor at Swansea University and has recently been appointed Chief Scientific Adviser at the UK Government's Department of Culture, Media and Sport. His academic interests sit at the research-policy-practice interface, identifying and addressing domain problems with broad digital, data-driven and computational themes: CS/STEM education, AI, data science, technology governance/regulation, and skills/infrastructure for the digital/data economy.

Tom has been heavily involved in education and digital policy in the UK since 2013, especially national curriculum and qualifications reform in Wales. He chaired the Welsh Government's independent review of the ICT curriculum (2013), the development of an innovative bilingual cross-curricular Digital Competence Framework (2015-2016), and led the development of the Science and Technology area (2017-2020) in the new Curriculum for Wales, which has been phased in since September 2022. He was also chair of the National Network for Excellence in Science and Technology (2017-2019), a £4m strategic investment by the Welsh Government.

Alongside his academic roles, Tom holds various board-level and senior advisory roles; he is a non-executive director of Welsh Water, Swansea Bay University Health Board, Ofcom's Advisory Committee for Wales, and Industry Wales. He has previously been an inaugural Commissioner of the National Infrastructure Commission for Wales (2018-2022) and a Vice-President of BCS, The Chartered Institute for IT (2017-2020).

Michael McEnery

Dr Michael McEnery is Programme Manager, Digital and Assessment Sector for the Council for Curriculum, Examinations and Assessment (CCEA) in Northern Ireland. Michael is originally from County Kerry and his first teaching post was in London where he taught mathematics, computing/IT in both public and private schools leading to roles as head of department before returning with his family to County Armagh to work in a senior school leadership role with responsibility for curriculum.

Michael joined CCEA in 2015 as Education Manager with responsibility for a suite of STEM qualifications before becoming Programme Manager in 2019. Alongside his team, he was responsible for digital and technology specifications. He also led a project to develop a computer adaptive test solution for literacy and numeracy across Key Stages 1 to 3 (for 5 to 14 year old pupils).

Michael holds a Doctorate in Education from Queens University, Belfast and held a position as Chair of Governors in a 900-pupil primary school for 12 years. He is currently the CCEA representative on the Joint Council for Qualifications AI in Assessments, Private Candidates, and Digital Assessments working groups.

7.2 Expert Panel Opportunities and challenges for AI in Education: One year after ChatGPT?"

Abstract

The sudden availability of generative AI to everybody via ChatGPT alerted everyone to AI's rapidly developing capabilities and massive potential. While generative AI, as one type of AI application, can create and edit a range of different media very efficiently, other AI functionalities that are useful to education include: conversational AI, predictive AI, speech recognition, robotics, computer vision, learning and assessment analytics and personalised feedback. These functionalities can be combined with each other and with other technologies such as virtual reality and augmented reality to create a wide range of opportunities. Typically AI functionalities are being embedded in most applications going forward. It is difficult to think of any human endeavour that could not be supported, enhanced or transformed through use of AI.

Education is certainly a prime candidate for transformation through the use of AI. At the same time AI is creating challenges for education. The wide availability of generative AI challenges all teachers to consider how they can increase their own productivity through its use. At the same time, generative AI comes with warnings regarding inaccuracies, hallucinations, bias, et cetera. More fundamentally perhaps, interacting with a large language model, could be a disconcerting or potentially damaging experience if the person does not realise the nature of that technology and just responds naïvely to its human-like characteristics. So teachers and schools also need to think about how they can mitigate these problems and limitations and how they should educate their students to understand and make best use of such tools.

Members of this expert panel will address the opportunities and challenges for AI in education considering some of the following questions.

- What do teachers and students need to understand about machine learning and AI in order to evaluate its potential?
- Which are likely to be the most important areas of education for AI to make a difference? – management, learning, assessment?
- What are currently the most promising areas of AI application for learning that schools can make immediate use of?
- Where should a teacher or school start in establishing its approach to developing the use of AI?
- What safeguards to schools need to put in place to ensure that AI does not harm students or teachers?
- Are safeguards needed for generative AI different from those needed for AI more generally? I.e. does generative AI pose a specific set of risks?

Dr Mary Webb (chair)

Mary Webb is Reader in IT and Education at King's College London. Mary is internationally recognised for her research on pedagogy across both Computer Science as a subject and the uses of new technologies for learning. Mary's research has resulted in over 180 publications. Mary's research on AI in education started in the 1990s with her PhD on children building expert systems. Recent research has focused on analysing computing curricula, pedagogy for learning computing especially programming and for using digital technologies for learning especially in science education but also in other subjects, immersive learning environments including the use of haptics, chatbots for learning and formative assessment. Mary's international collaborations have focused particularly on her work on the IFIP education committee executive and as a member of the Steering Committee of Informatics For All (I4ALL) Coalition For Europe https://www.informaticsforall.org/. Mary also teaches on the Computing PGCE, teaches on MA education programmes about recent developments in digital technologies in education, and supervises PhD students on AI in education and aspects of learning computing. Previously Mary taught science and computing in both primary and secondary schools.

Julia Adamson

Julia Adamson is Managing Director, Education and Public Benefit at BCS, The Chartered Institute for IT Julia's mission at BCS is to give every young person the digital skills they need to succeed in life and work. Under her leadership, the Computing at School (CAS) teachers' network has grown in influence and now has over 25,000 teacher members. BCS's Barefoot scheme, which supports primary teachers with learning materials and lesson plans, has so far reached 3.3 million children across the UK. Julia played a lead role in establishing and managing the National Centre for Computing Education (NCCE), an £84 million government-funded programme to upskill teachers to deliver world-class education in computing in schools. In 2023, Julia was awarded an MBE, for Services to Education. Julia is a Trustee of The Blackdown Education Partnership, a Multi Academy Trust, in Mid-Devon. Julia began her career in education 26 years ago as a teacher in Cheshire. In 2006, she joined the Liverpool-based company, MGL, developing her vision for technology in schools, and how it could transform outcomes for learners. She joined the Exeter-based South-West Grid for Learning (SWGfL) in 2009, supporting its work on online safety and education. Later, joining the BCS, The Chartered Institute for IT in 2017, and after holding a number of leadership roles, she is now Managing Director, Education and Public Benefit.

Dr Caitlin Bentley

Caitlin Bentley is a Lecturer in AI Education, actively shaping the future of responsible AI through education. She is a member of the Delivery Team on the UKRI Responsible Artificial Intelligence UK (RAI UK) programme and co-director of the UKRI Safe and Trusted AI Centre for Doctoral Training. She also serves on the UKRI Trustworthy Autonomous Hub Skills Committee, Syllabus Lab, and EDI working group, the UK Cybernetics Society council, and is a member of the IMarEST Maritime Autonomous Surface Ship SIG. Caitlin's multi-disciplinary academic background includes includes a PhD in Human Geography, ICT4D, from Royal Holloway, University of London, a Masters in Educational Technology from Concordia University, and a BA in Computer Science from McGill University. Caitlin is currently researching AI in the context of education for sustainable development, and is working to transform learning with and about AI in higher education.

Professor Angelos Stefanidis

Professor Angelos Stefanidis is the founding Dean of the School of AI and Advanced Computing at Xi'an Jiaotong-Liverpool University, Entrepreneur College (Taicang). He is the former Head of the Department of Computing & Informatics at Bournemouth University (BU), UK. Before that, he was BU's Associate Dean for Global Engagement. He is a member of the European Association of International Education (EAIE), a Member of the British Computer Society and a Chartered IT Professional, a Fellow of the Higher Education Academy (UK), and a Member of the Association for Computing Machinery (ACM).

Part of Angelos' research interests lie in the educational aspects of computer science, focusing on the issue of the alignment of academic curricula with industry needs. Recently, his interests have also included the development of frameworks to support the integration of AI into education. He is also keen to explore the growing need to integrate AI tools and learning outcomes into non-STEM subjects and the development of guidelines for Generative AI (GAI) from a learning and teaching perspective by looking at several areas of work: integration of GAI into the curriculum, project-based learning, industry collaboration, ethical considerations; and continuous learning and adaptation.

10. OCCE Program

Please access the link on our conference website.

11. Social Activities and Conference Dinner

Please also The conference social activities includes a visit to the museum, please see https://russellcotes.com/ and a bus tour.

We have 2 groups as noted below and the visiting times for the Russel Cotes on Tuesday 27 February 2024:
Group 1: 2pm - 3.15pm
Group 2: 3.30pm - 5pm

Bus tour will be the on same day on Tuesday 27 February 2024:
Group 2: 2pm - 3.15pm
Group 1: 3.30pm - 5pm

Please make sure you are allocated a group when you register at the conference reception desk.

Russell-Cotes Art Gallery & Museum

The Russell-Cotes House Gallery Garden stands out as one of England's most captivating historical residences. This was the home of Sir Merton and Lady Annie Russell-Cotes, avid collectors and enthusiasts of art and travel during the Victorian era. The lavish house provides a stunning backdrop for a diverse array of artwork from different corners of the world. Unlike modern museums, the Russell-Cotes Museum is unique in that it was the private residence of these passionate art collectors. The impressive collection mainly consists of pieces acquired by Merton Russell-Cotes during his global travels, with a particular interest in Japanese culture and art.

Bus tour

Enjoy a guided tour around Bournemouth's town centre and seafront.

Conference dinner

The conference dinner is held on 28 February 2024 soon after the conference ends at 7pm
The conference venue is Key West Restaurant.

Located in: Bournemouth Pier

Address: Pier Approach, Bournemouth BH2 5AA

Please note that the venue is on Bournemouth Pier. As you will walk to the restaurant it is recommended that you wear flat shoes. Should you wish to wear high heeled shoes, we advise that you bring them with you and put them on at the restaurant. so please flat shoes are appropriate to walk to the venue. If you prefer to put on high heels shoes, we advise to do so at the venue.

12. Abstracts

The abstracts are arranged based on the conference days and related sessions.

Conference day 1 - Tuesday 27 February 2024

- **Session 4.1 Digital technology for inclusion or sustainability – Chair: Toshinori Saito**

EduAbility: An Assistive Technology Awareness and Training Package

Paul Whittington[0000-0002-4401-3503] and Huseyin Dogan[0000-0002-9138-9319]

Bournemouth University, Poole, UK

{whittingtonp, hdogan}@bournemouth.ac.uk

Abstract. Assistive Technologies are designed to increase, maintain or improve the functioning of people with disabilities. These products can consider hardware, software or mechanical devices, such as wheelchairs. People with disabilities can have varying levels of ability and there cannot be a single technology solution to suit everyone. This paper presents EduAbility, an Android application that provides assistive technology recommendations and training. The application has two functions; (1) providing recommendations based on the physical and cognitive abilities of users and (2) delivering assistive technology training for teachers, support staff, parents and carers. The application is connected to a database currently with 50 assistive technologies that are used for recommendations. The qualitative findings from the preliminary evaluations, consisting of a usability questionnaire and focus group are discussed, including suggested improvements. An outline of future work and subsequent usability evaluations is provided. It is anticipated that EduAbility will maximize the awareness and uptake of assistive technology to improve inclusion and quality of life for people with disabilities.

Keywords: Accessibility, Android, Assistive Technology, Education, Focus group, Questionnaire, Training, Usability.

Assessing the Level of E-learning Utilization at State University of Zanzibar (SUZA)

Said Yunus, Siti Abdalla, Philipo Sanga
University of Zanzibar (SUZA), Tanzania
said.yunus@suza.ac.tz

Abstract. The purpose of this study was to assess the level of e-learning utilization at the State University of Zanzibar. Specifically, the study examined the extent of e-learning utilization and the benefit at the SUZA. The study used a mixed-method research design approach whereby quantitative and qualitative data were collected. A questionnaire, Interview, and checklist were used as research instruments for data collection. Two hundred and fifty-two (252) out of 340 students who were randomly selected respond-ed to an online survey. Five lecturers and administrative staff were selected for inter-view. Also, the checklist was given to lecturers on assessing e-learning utilization in their teaching. The quantitative data were analyzed using SPSS 20 version and Microsoft Excel while qualitative data were analyzed using thematic analysis. The findings revealed that majority of the lecturers are in a good position on utilizing e-learning in their courses. Also, the results indicated that the instructors use different social media tools like WhatsApp, blogs, students' collaborative works, and YouTube. Moreover, majority of students indicated that e-learning helps collaboration in learning and interaction between lecturers and students. It is recommended that the institutions should offer more training for both lecturers and students for better utilization of e-learning technology.

Keywords: e-Learning, utilization, SUZA, Social Media, Mixed method

UNIVERSAL DESIGN FOR LEARNING (UDL) AND ASSESSMENT REDESIGN IN THE FURTHER EDUCATION AND TRAINING SECTOR (FET)

Marie Collins

City of Dublin ETB, Dublin, Ireland
mcollin1@tcd.ie

Abstract. The Universal Design for Learning (UDL) framework was developed by the Centre for Applied Special Technology (CAST). In Ireland, the Further Education and Training Sector (FET) has recommended the CAST model. This paper examines a Post Leaving Certificate (PLC) Level 5, Business course in term one of an academic year. The learners studied eight components to achieve the Quality and Qualifications Ireland (QQI) Business Studies Certificate Award. Learners encountered problems due to the volume of written assessments prescribed on the course. In most cases, the assessment submissions were in written format. The adoption of the UDL framework supported the redesign of assessment submissions. A methodological research analysis of the educational design of assessment submissions was conducted. Formative assessment organisation and cross moderation methods were implemented in the project. The research was the first stage of a long-term project. The findings demonstrated that a high percentage of learners' advocate alternatives to written assessments for academic submissions.

Keywords: Universal Design for Learning, Cross Moderation, Formative Assessment

- **Session 2.1 Digital technologies in education: use, ethics and security – Chair: Barbara Tatnall**

The Use of Artificial Intelligence and Emerging Technologies in Mobile Learning: State of the Art in Adaptive, Intelligent and Expert Systems

Fatima Ahmad Muazu[1 [0009-0007-2317-773X]], Festus Fatai Adedoyin[2*[0000-0002-3586-2570]], Huseyin Dogan[3[0000-0002-9138-9319]], Paul Whittington[4[0000-0002-4401-3503]] and Nicholas Mavengere[5]

[12345] Department of Computing and Informatics, Bournemouth University, United Kingdom, BH12 5BB
[1]fahmad@bournemouth.ac.uk

Abstract. Artificial Intelligence (AI) has revolutionized education as it has many other aspects of our lives, it enabled the integration of robots, wearables and adaptivity to education. In mobile learning, Artificial Intelligence could be used to solve the challenges of the small size and limited processing power of mobile devices, distinct environmental factors, emotional needs, and learning styles of

learners. This study attempted to carry out a systematic review of the research on the application of AI to mobile learning to determine state-of-the-art as well as understand gaps in the studies. This review focused on articles published between 2012 and 2023 and then further classified the studies based on the application of AI and emerging technologies in mobile learning that include the delivery of adaptive learning experience and context awareness, Immersive teaching and learning, emotional conversational agents, Intelligent tutoring systems, Robots, Expert systems, Augmented, Mixed and Virtual reality. The findings revealed that there are no exhaustive studies that were concerned with the direct application of these technologies in mobile learning and special education, there is a paucity of studies that investigated the willingness to use of these emerging technologies when incorporated into mobile learning platforms by students and teachers.
Keywords: Artificial Intelligence, Mobile Learning, Adaptive Mobile Learning, Intelligent Tutoring System, Expert Systems

THE MODERATING ROLE OF INFORMATION ACCURACY ON STUDENTS' INTENTION TO USE CHATGPT IN HIGHER EDUCATION

Surya Bahadur G.C[1] [0000-0001-7216-8759], Pooja Bhandari[2] [0000-0002-9678-4561], Santosh Kumar Gurung[1] [0000-0003-2203-8520], Ekta Srivastava[3] [0000-0002-1021-6310], Deepak Ojha[1] [0000-0001-8575-5530]

[1]School of Business, Pokhara University, Pokhara, Nepal, suryagc@gmail.com

[2]School of Health and Allied Sciences, Pokhara University, Pokhara, Nepal, poojabhandari061@gmail.com,

[3]Government Girls PG College, Sirsaganj, Firozabad, India, ektasri95@gmail.com

Abstract. The current transformation in the teaching and learning processes is experiencing an unprecedented shift owing to the widespread adoption of ChatGPT. Using the UTAUT2 model, this study examines how seven factors impact ChatGPT use in higher education and considers the role of information accuracy. This study used PLS-SEM to analyze data from 578 students at Pokhara University in Nepal who use free version of ChatGPT 3.5. The results demonstrated a significant relationship between social influence, learning value, and habit and intention to use ChatGPT. However, no significant correlations were found between performance expectancy, effort expectancy, facilitating conditions, hedonic motivation, and the intention to use ChatGPT. Furthermore, the moderating effect of information accuracy, as proposed by the UTAUT2 model was not empirically supported. These findings hold practical significance for educational institutions and policymakers,

suggesting the need for interventions that guide the appropriate utilization of AI-based platforms in higher education.

Keywords: ChatGPT, UTAUT2 model, Intention to use, Higher education, Nepal

Improving Transparency in School Admission Web Forms Through User-Centric Privacy Notices – A Privacy by Design Perspective.

Esther Akinlade[0009-0000-1088-2332] , Andrew M'manga [1111-2222-3333-4444]

Bournemouth University, Fern Barrow, Poole Dorset, BH12 5BB, United Kingdom
Estheroakinlade@gmail.com

Abstract. This paper introduces a Privacy-by-Design (PbD) approach to enhance data protection, transparency, trust, explicit consent, and adherence to privacy regulations in school admission web form. At its core is the prototype Privacy Notice Generator (PNG) tool, which generates tailored and concise privacy notices for each web form data field. Feedback from two participant groups, web form designers and end users, informs the design of the prototype tool and the integration of the privacy notices into a sample school admission web form using an easily recognised privacy symbol, to provide users with a clear, and concise privacy information regarding data usage and data practices at the point of interaction. The prototype tool and the generated privacy notices are evaluated through user testing, with feedback analysis guiding further refinements. Beyond just school admissions, this study offers insights that could enhance data privacy and transparency in web forms across various sectors, paving the way for future advancements.

Keywords: Privacy by Design, Web Forms, Privacy Notices, GDPR, UK School Admissions, Transparency, Data Privacy.

- **Session 3.1 Learning with digital technologies – Chair: Jaana Holvikki**

Co.LAB, a Web Platform Dedicated to the Design and Evaluation of Learning Games

Eric Sanchez[1][0000-0002-3819-6681] Estelle Prior[1][0000-0002-2895-2690], Nadine Mandran[2][0000-0002-8660-3827], Sandra Monnier[3][0000-0002-5438-1182] and Dominique Jaccard[3] [0000-0002-4037-2322]

[1]Université de Genève, LIP/TECFA Genève, Suisse

surname.name@unige.ch
[2]Université de Grenoble Alpes, LIG Grenoble, France
nadine.mandran@univ-grenoble-alpes.fr
[3]Haute Ecole d'Ingénierie et de Gestion du Canton de Vaud, MIE ALBASIM, Yverdon, Suisse
surname.name @heig-vd.ch

Abstract. This study delves into the collaborative design and evaluation of learning games. Initially, the paper offers an overview of the challenges commonly faced in this endeavor. Subsequently, it introduces a specially developed web platform called co.LAB, dedicated to assisting a multi-disciplinary team in both designing and evaluating a learning game. Specifically, it prompts us to view the design of learning games as a complex systemic process that necessitates a comprehensive understanding of the activities involved, the required skills and team members, and the progression of these activities. An evaluation of this platform was undertaken with 15 Master's degree students specializing in instructional design, all coming from varied backgrounds. Usability testing of the platform's prototype revealed its strengths and areas needing enhancement. Further insights from a focus group conducted with the students underscored the platform's benefits and potential. co.LAB seems adaptable to the conduct of any research and development project. The platform's key advantage lies in the ability to define a generic formalism that allows for the description of all stages of a Design-Based Research.

Keywords: Learning Game, Game Design, Collaborative Design, Game Evaluation, Design-Based Research.

Designing a Learning Environment to Foster Competencies in Information Systems through Business Games

Yoshiaki Matsuzawa, Yuji Ohsu, HIroyuki Miyagawa

Kinki University, Aoyama Gakuin University Japan

Abstract. In the field of information systems, the primary theme has been on understanding the "information systems that include human activities" and designing information systems that harmonize with human activities. This paper introduces an educational method that utilizes a business game, developed to nurture the analytical and design competencies integral to information systems education, especially those involving human activities. Students engage in designing and developing information systems that support the management of the virtual companies they manage within the business game. The aim of this educational environment is to give students a deep understanding based on experiential learning by creating a context where analyzing and describing human activities has a valuable to design an information system. A pilot class was conducted targeting undergraduate students in non-CS, social informatics department. A qualitative analysis of student reports, aligned with the IS2020 curriculum standards, suggested potential deep

insights into competencies in both the "Systems Analysis and Design" and "Business Process Management" areas.

Drafting an Educational Game for the Data Science Life Cycle

Simone Opel[1][0000-0002-9697-9887], Andrea Linxen[2], Christian Quast[3] and Christian Beecks[4]

[1] FernUniversität in Hagen, Department of Mathematics and Computer Science; Universitätsstraße 11; 58097 Hagen; Germany
simone.opel@fernuni-hagen.de
[2] FernUniversität in Hagen, Chair of Data Science; Universitätsstraße 11; 58097 Hagen, Germany
andrea.linxen@fernuni-hagen.de
[3] FernUniversität in Hagen, Department of Mathematics and Computer Science; Universitätsstraße 11; 58097 Hagen, Germany
christian.quast@outlook.com
[4] FernUniversität in Hagen, Chair of Data Science; Universitätsstraße 11; 58097 Hagen, Germany
christian.beecks@fernuni-hagen.de

Abstract. Data Science consists of a wide range of competencies and methods which challenge learners with the appropriate selection of procedures for investigation. Digital tools supporting students to deepen their competencies are helpful but still missing up to now. Therefore, we developed a preliminary prototype of an educational game that allows students to gain a better understanding of the different steps of a Data Science Life Cycle. Although the game is still in an early stage of development, the results of our preliminary evaluation indicate that such a game can help to motivate students and improve their understanding of the topics. Based on our first proposal, we aim to enhance the game design by including more realistic tasks of varying complexity and different scenarios.

Keywords: Data Science, Educational Game, Data Science Life Cycle, Serious Game, CRISP-DM, Concept.

- **Session 1.1 Learning about digital technologies & computing– Chair: Therese Keane**

Towards Professional Development for Teachers in Artificial Intelligence and Data Literacy

Viktoriya Olari[1][0000-0002-5113-6624], Till Zoppke[1][0000-0002-8921-8350], Martin Reger[2][0000-0003-0828-926X], Evgenia Samoilova[2][0000-0003-3858-901X], Martin Kandlhofer[3][0000-0001-6410-2071], Valentina Dagienė[4][0000-0002-3955-4751], Ulrike Lucke[2][0000-0003-4049-8088], Ralf Romeike[1][0000-0002-2941-4288]

[1] Freie Universität Berlin, Königin-Luise-Str. 24-26, 14195 Berlin, Germany
[2] Universität Potsdam, An der Bahn 2, 14476 Potsdam-Golm, Germany
[3] Österreichische Computer Gesellschaft, Wollzeile 1, 1010 Vienna, Austria
[4] Vilnius University, Universiteto 9, 01513 Vilnius, Lithuania
{viktoriya.olari,till.zoppke,ralf.romeike}@fu-berlin.de
{mareger,evgenia.samoilova,ulrike.lucke}@uni-potsdam.de
martin.kandlhofer@ocg.at
valentina.dagiene@mif.vu.lt

Abstract. Artificial Intelligence (AI) is gaining ground in school curricula worldwide, leading to an urgent need to train teachers in AI and data literacy. However, according to recent literature reviews, there is a lack of research-based professional development for teachers in these areas. In the following paper, we take steps to fill this gap by developing a 7-hour teacher training using the action research approach and evaluating it with 70 computer science teachers in three training sessions using a mixed methods approach. Results show that the program increased teachers' perceived competence to introduce students to AI, as well as their understanding of AI concepts. However, there is no clear evidence that a 7-hour training is sufficient for teachers to teach AI and data literacy in their classes.

Keywords: data literacy, Artificial Intelligence literacy, teacher education, action research, mixed methods.

Professors' Perceptions Regarding AI Competencies for Non-Computer Science Students in Undergraduate Education

Kamilla Tenório[1][0000-0002-8088-7507], Ricardo Knauer[2], Raphael Wallsberger[2], Erik Rodner[2], and Ralf Romeike[1][0000-0002-2941-4288]

[1] Computing Education Research, Freie Universität Berlin, Berlin, Germany
[2] KI-Werkstatt, University of Applied Sciences Berlin, Berlin, Germany

Abstract. Artificial intelligence (AI) systems, due to their ability to save time, reduce costs, and ease human efforts, have found increased adoption in many fields, such as education, healthcare, law, and journalism. The growing relevance of AI brings a need to prepare undergraduate students from diverse backgrounds to understand and use AI technologies productively and responsibly in their professional careers. However, to effectively introduce AI to non-computer science undergraduates, it is essential to investigate the necessary AI competencies these students must acquire. Therefore, we have conducted semi-structured interviews with multidisciplinary higher education professors with AI knowledge about which AI competencies should be included in undergraduate curricula for non-computer science students. This article presents the findings of these interviews as well as the acquired list of competencies. The list covers various aspects of AI, ranging from introductory topics, such as the capabilities of AI systems, to more advanced theoretical knowledge and practical skills in data management and machine learning. Moreover, the list contains competencies related to responsible AI, including the ethical and social implications of AI. Our list extends prior work on AI competencies for non-computer science undergraduates and lays the groundwork for a planned Delphi to reach a consensus on the core AI competencies this target audience should acquire.

Keywords: Computer Science Education, Competency-based Education, Artificial Intelligence, Undergraduate Level.

- **Session 1.2 Learning about digital technologies & computing– Chair: Andreas Schwill**

A New Compulsory Subject "Digitale Grundbildung" in Austria - Genesis, Status Quo and Challenges

Peter Micheuz[1] and Stefan Pasterk[2]

[1] Alpen-Adria-University, Department of Informatics Didactics, 9020 Klagenfurt, Austria
peter.micheuz@aau.at
[2] Alpen-Adria-University, Department of Informatics Didactics, 9020 Klagenfurt, Austria
stefan pasterk@aau.at

Abstract. This paper is an attempt to describe briefly the recent and surprising introduction of "Digitale Grundbildung" (basic digital education) as a compulsory subject. This school policy measure represents a tentative and necessary endpoint in a long pre-history of the digitization of lower secondary education in Austria. With this compulsory subject, a new chapter in Austrian school history is

being written. After a review of this dynamic development, insights into the genesis of the new curriculum are provided. Finally, future challenges in the context of the new compulsory subject are critically reflected.

Keywords: digital school, digital education, digital basic education, education policy, curriculum.

A System for Programming Examination with Block Components

Yoshinori Tanabe

Tsurumi University, Japan

tanabe-y@tsurumi-u.ac.jp

Abstract. This study proposes an examination administration system for beginners in programming and reports on its prototype. A distinctive feature of the system is that examinees build programs by combining blocks. It is assumed, however, that the examinees learn text-based programming languages in their regular studies. In addition to basic blocks provided by the system, examiners can define their own blocks. Adopting block programming offers benefits such as the ability to assess programming skills regardless of the programming language the examinee is proficient in. This system also helps adjust the difficulty of problems by modifying the set of blocks provided to the examinee. We also report on experimental results that confirm these advantages.

Keywords. programming examination, block-based programming

Teachers' Notions of Computing-Related Concepts in Digital Games Popular among Secondary School Students

Fatma Batur[1][0000-0002-7377-6585] and Torsten Brinda[1][0000-0001-6137-4258]

[1] University Duisburg-Essen, Computing Education Research Group,
45127 Essen, Germany
fatma.batur@uni-due.de,
torsten.brinda@uni-due.de

Abstract. This paper presents an investigation into teachers' perceptions and understanding of computing-related concepts within digital games popular among secondary school students, namely FIFA, Fortnite, and Minecraft. The study is grounded in the framework of Educational Reconstruction for Computer Science Education. The educators' perspectives on specific game scenes of the

popular games are explored through an open-ended questionnaire. By examining how teachers conceptualize computing concepts in these games, it is possible to evaluate the extent to which popular games can be used in the computer science classroom. Educators can promote holistic learning experiences by aligning curricula with teachers' perceptions and providing necessary training to harness the educational potential of popular games. The findings reveal varying degrees of awareness among educators. Teachers connect the game scenes to many computer science topics. Most of the surveyed teachers link the game scenes to concepts of programming, such as algorithms and loops, and object-orientation, such as abstraction and objects.

Keywords: Teachers, Beliefs, Conceptions, Digital Games, Computing Concepts, K12, Educational Reconstruction.

- **Session 6 Teaching & Learning with digital technologies– Chair: Deniz Cetinkaya and Marcin Budka**

Turning Technophobia into Technophilia: A Study on Academic Staff at the University of Latvia

Hasan Selcuk[1][0000-0001-8098-1088], Daiga Kalnina[2][0000-0003-0938-201X] , Linda Daniela[3][0000-0002-0712-2276]

[1 1,2,3] University of Latvia, Faculty of Education, Psychology and Art, Riga, Latvia

hasan.selcuk@lu.lv

Abstract. In today's digital age, it is crucial for higher education educators to embrace technology and overcome any challenges. This mixed-methods study explores technophobia among academic staff (N=60) at the University of Latvia, aiming to identify the challenges that deter technology adoption and propose practical solutions. The primary form of technophobia observed among respondents stems from anxiety rather than an outright avoidance of technology. This research used an online survey and a virtual focus group discussion to gather insights. Common barriers to technology use identified include lack of motivation, the perception of high effort required, inadequate training, and time constraints. The study also highlights specific reasons for technophobia, such as the perceived complexity of technology and setup challenges. Based on these findings, recommendations include allocating extra workload for self-learning, making technology use mandatory with adequate support, and encouraging independent learning and peer support. These suggestions aim to improve technology integration in academic settings.

Keywords: Technophobia, Academics, Higher Education.

Understanding Relevance and Impact of an Online Teacher Professional Development Course in South Asian Context

Sohini Sen[1] and Amina Charania[2]

Tata Institute of Social Sciences, Mumbai, India
[1]sohini.sen@tiss.edu
[2]amina.charania@tiss.edu

Abstract. This study aims to understand the relevance and impact of an online teacher professional development (TPD) course on 'Constructive Teaching and Learning with Technology' (CTLT) within the context of South Asian teacher educators. The course enabled teachers to explore and adopt project and problem-based learning using variety of technologies and use of distance technologies for active learning in classrooms, providing scope to learners to connect the theories through practice-based activities. Since 2017, this course, offered in blended and online modes reached 5,000+ teachers in secondary government-run-schools in India, and was reshaped based on the experiences of teachers in Technology Enabled Learning for Teachers & Adolescents for 21st Century (TELTA-21) project in schools in one of the ghettos in Mumbai. For the very first time, the course was extended to international teachers (44) from Afghanistan, Maldives, and Nepal. This adapted course was for four weeks and digital badges were awarded for completing it. Pre (29) and post course (36) surveys conducted with teachers studied their perceived usefulness of the course content in their context and value around usage of technology in classroom. Findings showed a significant (statistical) increase in the agreement of teachers on it is worthwhile to make more investments in computers and accessories in schools and spending substantial time in integrating technology in classrooms. Compared to pre-test, teachers' post-test had more nuanced understanding of integrating technology. Majority of teachers agreed that course activities were relevant to their current teaching practices and prepared them for activity-based learning using technology.

Keywords: online teacher professional development, constructive use of technology.

Development of Chatbot Models for Learning Management Systems in Higher Institutions

SNOW NGOZI MONYE
Department of Information Communication Technology, University of Delta Agbor. Delta State. Nigeria
ngozi.monye@unidel.edu.ng

Abstract

This paper is a part of PhD thesis that presents the development of chatbot models aimed at predicting students' performance and, providing personalized learning support to students and educators in higher institutions. The proposed models intends to (1) Utilize machining learning techniques to analyze various factors that influence academic success and provide personalized recommendations to enhance students' learning outcomes. In order to realize this aim, this paper intends to adopt the methodology of data collection, feature extraction, model development, chatbot functionality, performance prediction, personalized recommendations, and evaluation and validation. (2) Explore various Natural language processing techniques that can be employed to develop effective chatbot model for the provision of personalized assistance to students. In order to realize this aim, the paper further seeks to adopt the methodology of text preprocessing, named entity recognition, sentiment analysis and, intent recognition for the enhancement of learning experience in learning management systems.

Keywords: chatbot, learning management system, machine learning techniques, natural language processing, model

The Perspective of Microsoft Innovate Expert Educators on Automated Assessment Task

Maina WaGioko[1] and Mavis Adwoa Donkor Mavis Adwoa [2]

[1] Aga Khan Schools, Academy Mombasa gioko@Agakhanacademies.org

[2] Presbyterian College of Education, Ghana adwoaboatemaa084@gmail.com

Abstract. The number of learners in the class is as many as 100 learners and over 70% of the teachers interviewed s have reported and observed. Making learners' scripts on time has been an issue because of the numbers. At the same time, some of the schools are equipped with digital literacy devices, which are targeted for early years. This creates an opportunity to leverage the design and utilization of automated assessment tasks (AAT). A descriptive survey approach was implemented to explore the teacher's perspective on e-assessments through their comfort in designing, personal experiences, and knowledge of the skill set required. The target group was Microsoft Innovative Expert Educators (MIEE) whose perspective on e-assessment was explored to determine how they use MS Forms to design automated self-marking assessments. The qualitative analysis established common thematic areas on comfort in designing, skills required, personal experiences, and perspectives. The analysis found that the functional benefits of e-assessment were critical in determining the design and this was

influenced by personal experiences of taking automated assessment. The skill set for designing such assessments was informed by personal use experiences as well as access to the software. The embracing of automated assessments which are comprehensive with feedback requires a thorough preparation of the teachers. The utilization of such assessment responds to the challenges of traditional approaches. The knowledge of the perception will go a long way in decision-making on how to support the MIEE in embracing ATT.

Keywords: Perceptions, Automation, MIEE

Conference day 2 – Wednesday 28 February 2024

- **Session 3.2 Learning with digital technologies – Chair: Simone Opel**

MOOC Entrepreneurs - An Institutional Entrepreneurship Perspective on Massive Open Online Courses in Higher Education Institutions

Halvdan Haugsbakken
Østfold University College, Norway

Abstract. Higher Education Institutions (HEIs) have been slow to adopt new technologies and face significant challenges in integrating them into educational and learning frameworks. Traditional campus-based pedagogy remains the dominant approach among university educators. However, this has not deterred certain individuals within HEIs, referred to in this paper as "MOOC Entrepreneurs," from taking the initiative to establish separate digital institutions. These new entities operate in emerging fields where the more established institutional frameworks of HEIs are not yet present. In fact, over the past decade, interest in online education and courses has surged, leading to the rise of Massive Open Online Courses (MOOCs). By 2022, it is estimated that more than 200 million people were registered on the largest MOOC platforms. The COVID-19 pandemic further accelerated this trend, with some MOOC platforms experiencing a 600% increase in the number of registered users. In this context, it's worth noting that MOOCs have evolved to become institutions in their own right. In the field of organizational research, little is known about MOOCs. This paper employs a specific concept from new institutional theory, known as "institutional entrepreneurship", to better understand the aforementioned changes.

A MOOC About MOOC Making

Halvdan Haugsbakken
Østfold University College, Norway

Abstract. Despite 2020 estimates indicating 16,000 Massive Open Online Courses (MOOCs) on leading platforms, a significant knowledge gap exists regarding how MOOCs

are made. Current research mainly outlines learning design frameworks and evaluates course performance, rarely delving into the complexities of MOOC making. This neglect leaves the academic community with an incomplete understanding of MOOC making. It is a multifaceted endeavor that requires addressing numerous challenges and making critical decisions. The objective is to transform a vague concept for online teaching into a tangible online course. This involves key design decisions such as defining learning objectives, choosing relevant activities and assessments, and mastering content production. These elements are then harmonized on a digital platform, balancing pedagogical approaches such as active learning and formative assessment. This research paper discusses a project that sought to fill this research gap by developing pedagogies for MOOC making. A team of specialized teacher educators and researchers designed two online courses to address these issues. The first course imparted foundational knowledge and skills in online education, while the second offered practical application by enabling participants to create their own online courses. In this way, participants gained theoretical and practical understanding in MOOC making. The paper presents key insights from the implementation of the first online course. Based on the survey results, students reported high levels of satisfaction, perceived learning outcomes, and engagement with learning materials. They also expressed positive views on portfolio assessment and quiz usage. However, there was minimal learning observed from student interactions.

Keywords. MOOC, Learning design, teacher education.

Exploring Collaborative Learning through a Virtual Software Engineering Course

Erika Quintero-Rivas

[1] Technological University of Panama, Panama
erika.quintero@utp.ac.pa

Abstract. Collaborative learning is an educational approach to teaching and learning that involves an interdependence between success of the individual and success of the group, requiring both personal preparation and teamwork. Learners work asynchronous in combination with group interaction to complete tasks from interactive teaching methods. As an exploratory study, implementation of active learning approaches was exanimated through a virtual Software Engineering course in a virtual learning environment to stimulate collaborative learning in the course. Collaborative learning is not simply a synonym for students working in groups, there are basic elements to qualify it which are considered as criteria in this experience. There are elements involved in collaborative learning based in cooperative learning which are criteria considered in this experience. The main results are the development and validation of some active learning approaches which data were obtained through

questionnaire for measuring the collaborative learning in the course from students 'perspective.

Keywords: Collaborative Learning, Cooperative Learning, Active Learning, Virtual learning environment, Software Engineering.

- **Session 2.2 Digital technologies in education: use, ethics and security – Chair: Christine Bescherer**

Teachers' Insight: Digital Threats that Imperil Children and Teenagers

Julian Taupe[0000-0002-9148-835X], Verena Knapp[0009-0005-0982-0472], and

Andreas Bollin[0000-0003-4031-5982]

Universität Klagenfurt, Universitätsstraße 65/67, 9020 Klagenfurt am Wörthersee, Austria
jutaupe@edu.aau.at, andreas.bollin@aau.at

Abstract. As technology becomes increasingly integrated into daily life, the importance of digital security has become a pressing concern. Children in primary and secondary school are especially vulnerable to digital security threats, as they frequently use digital devices for learning and leisure. The number of cybercrime-related crimes has risen in the past decade, while it is not known which threats are most relevant to children and teenagers. To address this issue, this paper reports on a study to identify relevant digital security competencies among young people and prioritize known threats by gathering teacher data. The study classified and prioritized digital security threats and documented the frequency of personal experiences with such threats to establish a basis for future improvements, yielding a structured approach to addressing digital security concerns for pupils. With this knowledge, teachers can understand potential threats children and teenagers have to cope with in their environment and know about missing skills to be acquired through further training. An interesting finding of this study is that a noticeable number of teachers have already experienced incidents of digital threats among pupils, which emphasizes the urgency of dealing with this topic.

Keywords: Digital Threats, Research in Informatics Education, Curriculum Gaps, Competencies

Ethical Dilemma Judgment Education and Generative AI for Preparing Students for the Digital Age: A New Approach to Computer Ethics Education in Japan

Takeo Tatsumi, Yuko Murakami
Rikkyo University, Japan

Abstract. Current computer ethics education in Japan focuses on compliance with laws and regulations, which is insufficient to prepare students for the challenges of the digital age. The authors propose a shift towards ethical dilemma judgment education, which presents students with a variety of ethical dilemmas and challenges them to critically think about the best way to resolve them. This type of education can help students develop the skills they need to make informed decisions in complex and rapidly changing situations so called "policy vacuum". The authors also discuss the potential of generative AI to be used to create more engaging and realistic ethical dilemma scenarios for students to practice on. Generative AI can help to create learning experiences that are more tailored to the individual needs of each student. The paper makes a significant contribution to the academic field of computer ethics education by providing a comprehensive review of the current state of computer ethics education in Japan, introducing the concept of ethical dilemma judgment education, and discussing the potential of generative AI to be used in this type of education.

Keywords: Computer Ethics Education, Dilemma, generative AI

An approach to Generative AI use within a Computing & Informatics Department

Benjamin Gorman, Huseyin Dogan, Nicholas Mavengere, Nan Jiang, Marios Angelopoulos, Wei Koong Chai, Cagatay Yucel, Edward Apeh, Gernot Liebchen, Hari Pandey, Marcin Budka, Melanie Coles, Muntadher Sallal, Suzy Atfield-Cutts, Tim Orman

Bournemouth University, UK
bgorman@bournemouth.ac.uk

Abstract. Generative Artificial Intelligence (AI) is a powerful technology that enables the creation of human-like content, including text and images. This paper describes how our Computing & Informatics Department is approaching the use Generative AI within teaching and assessment while considering ethical and academic integrity concerns. We outline the formation of an internal working group, comprising of faculty members, to examine the benefits and challenges of Generative AI's role in our education provision. Drawing from academic literature, faculty feedback, and student experiences, we provide insights into its potential. We present two outcomes of our approach 1) Recommended actions to non-academic and academic departments within higher education institutions, and 2) The development of standardised wording to be used in assessment briefs, defining acceptable Generative AI usage with proper citation while upholding academic integrity. Finally, we discuss our vision for the future, emphasising ongoing adaptation and expansion of

Generative AI usage within our department. This paper serves as a practical guide for other institutions considering similar initiatives.

Keywords: Education, Generative AI, Artificial Intelligence

- **Session 1.3 Learning about digital technologies and computing – Chair: Matthias Kramer**

Pedagogical Patterns in Constructionist Programming Books

Michael Weigend[1]

[1] University of Münster, Schlossplatz 2, 48149 Münster, Germany
mw@creative-informatics.de

Abstract. This contribution presents a framework of pedagogical patterns, which are solutions to educational problems within a given context, for designing constructionist programming books tailored for beginners. In this article, the term 'constructionist programming book' refers to literature that supports novices in creating relevant digital artifacts, with necessary programming concepts introduced along the way.
The framework of patterns is two-dimensional. The first dimension delineates the context within the book or book chapter (before programming, during programming, after programming). The second dimension categorizes the type of skills related to the educational problem addressed by each pattern (cognitive, emotional, metacognitive).

Keywords: Pedagogical Pattern, Informatics Education, Programming.

The role of tables in computational thinking and mathematical thinking

Maria Cujdikova and Ivan Kalas
Comenius University, Bratislava, Slovakia
{maria.cujdikova, ivan.kalas}@fmph.uniba.sk

Abstract. Tables are one of the fundamental methods for organising and presenting data, making them crucial for the development of computational thinking and mathematical thinking. Despite this, they have not received enough attention in the research literature. In our broader enquiry, we are specifically examining the use of tables in programming at the lower primary level. Our aim is to better understand how pupils think and act when creating tables and interpreting data from them and how this enhances their understanding of data

structure and processes. To contextualise our research and substantiate our ideas regarding the importance of tables, we also opted to investigate how others perceive their potential in foster-ing computational and mathematical thinking. In this paper, we present the findings from this particular part of the research.

With a few open-ended questions, we approached a group of experts in the field of mathematics and informatics education, several experienced primary informatics teachers and a group of future teachers. Through qualitative analysis of their responses, we obtained a comprehensive understanding of tables and their role in developing computational and mathematical thinking. We have also con-firmed that modern school informatics and its programming can effectively connect some of its learning objectives with those of other subjects, particularly mathematics, in primary education.

Keywords: Tables, Computing, Programming in primary, Informatics with Emil

Exploring Computational Thinking as a Predictor to Identify Conceptual Understanding of Programming

Jayanti Nayak [1][0000-0001-6943-1130] Therese Keane[1] [0000-0002-1939-7955] Tanya Linden[2][0000-0003-2645-5671] and Milorad Cerovac[1][0000-0002-3400-5323]

[1] La Trobe University, Melbourne 3084, Australia
{j.nayak, t.keane, m.cerovac}@latrobe.edu.au
[2] University of Melbourne, Melbourne 3000, Australia
lindent@unimelb.edu.au

Abstract. Pedagogy-focused computing research has shown that learning computer programming can place heavy cognitive demands on children. Increasingly classroom teachers are looking for ways of assessing their students' programming abilities to engage them better. Given a synergetic relationship between programming ability and computational thinking, this pilot study explores whether measuring computational thinking could provide markers to predict programming proficiency and to assess students' ability to design and implement digital solutions. A standardised *Computational Thinking* test and a Programming Task were administered to 43 high school students. It adopted interpretive qualitative research methodology, and the result revealed a common theme around the difficulty level of attempted programming task, programming proficiency and *Computational Thinking* test response. The findings are significant as this can help teachers differentiate student levels of abilities and help them make informed decisions when choosing developmentally appropriate learning activities, scaffolding learning activities and as well as deciding the best learning sequence.

Keywords: Programming, Computational Thinking, Assessments, Computational Thinking Test, High School

- **Session 4.2 Digital technology for inclusion or sustainability – Chair: Javier Osorio**

Towards Digital Competency: A Comparative Simulation Analysis of Education Spending and Human Development Policies Using Machine Learning

Aliu. A. Adebiyi[1][0000-0002-6340-098X], Festus. F. Adedoyin[2][0000-0002-3586-2570], Victor Ogunbiyi[3][0009-0007-2966-0941] and E. Oluokun[4][0009-0008-5391-4048]

[1]Department of Statistics, University of Ibadan, Nigeria
aadebiyio83@stu.ui.edu.ng
[2]Department of Computing and Informatics, Bournemouth University, United Kingdom.
fadedoyin@bournemouth.ac.uk
[3]School of Leadership, Management and Marketing, Leicester Castle Business School, Faculty of Business and Law, De Montfort University, Leicester LE1 9BH.
victor.ogunbiyi@dmu.ac.uk
[4]Department of Computing and Informatics, Bournemouth University, United Kingdom.
eoluokun@bournemouth.ac.uk

Abstract. This paper conducts two simulation experiments to test directions for national policies on digital competence, tertiary education enrolment, and education spending in Ireland. While the literature suggests that human development is largely driven by health, education, and income indices, little is known about the alternative policy directions when total national expenditures on education institutions are low amidst competitive digital competencies. This paper uses historical data between 1990 to 2022 on the Kernel Regularized Least Square model to test alternative policy mix and their impact on human development. Results show that that digital competence, measured by internet use, positively influences HDI. However, public spending on education has a negative impact on HDI. The findings suggest the importance of prioritizing digital literacy and prudent education spending. Bridging the digital divide, enhancing digital skills, and promoting economic growth are crucial for improving Ireland's HDI. Emphasis on the need for informed policy decisions to enhance human development and economic prosperity in Ireland is also addressed.

Keywords: Digital Competency. Simulation Analysis. Education Spending. Human Development Index.

Empowering Marginalized Communities through Digital Education: Building a Research Framework based on the Capability Approach

Toshinori Saito [1][0000-0003-4262-9707]

[1] Seisa University, Yokohama/Kanagawa, Japan
t-saito@gred.seisa.ac.jp

Abstract. This paper introduces the Capability-Driven Digital Education Framework (CDDEF), a robust framework designed to empower marginalized rural communities through digital education, grounded in Sen and Nussbaum's Capability Approach (CA). Developed using the KJ method, a methodology for idea generation developed by Jiro Kawakita, the CDDEF synthesizes findings from 68 CA-based educational articles, offering a methodologically sound tool for identifying and overcoming barriers in digital education. It bridges the gap between empowerment strategies and community-centric digital education, serving as a critical research benchmark. This framework emphasizes the integration and evaluation of digital education within specific socio-cultural contexts of rural communities, underlining the importance of inclusivity in digital education as a key strategy for community development and empowerment. The CDDEF is a comprehensive, reliable guide for scholars in digital empowerment research, addressing both practical and theoretical aspects of digital education in marginalized settings and highlighting the author's commitment to empowering local communities.

Keywords: Empowerment, Digital Education, Capability Approach.

Conference day 3 - Thursday 29 February 2024

- **Session 5 National policies and plans for digital competence– Chair: Mary Webb**

Examining the Subtlety of Gender Bias in the Australian Digital Technologies Curriculum

Milorad Cerovac[1][0000-0002-3400-5323] and Therese Keane[2][0000-0002-1939-7955]

[1] La Trobe University, Melbourne, VIC 3086, Australia, m.cerovac@latrobe.edu.au
[2] La Trobe University, Melbourne, VIC 3086, Australia, t.keane@latrobe.edu.au

Abstract. Across the world, nations collectively embrace the perspective of ensuring a future workforce skilled with the cognitive abilities required to support and sustain the evolving technological and innovation landscape. Of the STEM disciplines, the Technologies curriculum should be considered fundamental to addressing the perceived shortage of specialists to solve the world's most complex problems. However, student enrolment numbers in Digital Technologies subjects in particular, remain stubbornly low compared to other subject areas such as Science and Mathematics. Adding to the perceived lack of interest in Digital Technologies subjects is the continued issue of gender disparity. Sadly, gender disparity is not a problem that is unique to Australia, but one that is often reported across many other international educational jurisdictions. This paper presents an analysis undertaken of the Australian senior secondary school Digital Technologies curriculum, focusing on the final year of secondary school education, with insights gained from the learning areas of Biology (where girls dominate) and Physics (where boys dominate), in relation to student enrolment numbers. This analysis was complemented with a review of the literature, which includes input from findings from other educational jurisdictions around the world. The findings of this investigation lend credence to the authors' views that the Digital Technologies curriculum needs to eliminate the hidden bias, where it is principally seen as a business-focused subject and aligned to the interests of boys.

Keywords: Secondary education, Computer science, Digital Technologies, Gender disparity, Curriculum bias.

Aligning Educational Policies with the New Realities of Schooling:…

Margaret Leahy, Deirdre Butler, Stefania Bocconi, Amina Charania, Peiris Meda Gedara, Boyan Jekov, Therese Keane, Therese Laferriere, Kohei Nakamura, Hiroshi Ueda

Abstract. Although the experiences of schooling that occurred during the periods of school closures are well documented, much less has been documented about the realities of schooling in the aftermath of the COVID-19 pandemic. Undoubtedly, remote education brought the enormous potential for innovation to the fore, but it also revealed and amplified the weaknesses of current systems, highlighting existing and growing equity gaps (OECD, 2020). Emerging from the COVID-19 pandemic, society and education systems are faced with a new set of realities. Based on the emerging work of a group of 12 academics rep-resenting nine different nationalities (America, Australia, Bulgaria, Canada, India, Ireland, Italy, Japan and Sri-Lanka), the focus of this short paper is to discuss policy and policy implementation in respect of the use of digital technologies in the new realities of schooling. .

Keywords: Policy, practice, new realities of education, digital technologies for learning

Does programming matter in Japanese high schools? - An Analysis of 12 High School Textbooks of "Informatics I" -

Tanaka, Ema[1], Tohyama, Sayaka[2] and Jitsuzumi, Toshiya[3]

[1] Meiji University, 4-21-1 Nakano, Nakano-ku, Tokyo, 164-8525, Japan
[2] Shizuoka University, 836 Ohya, Suruga-ku, Shizuoka-shi, Shizuoka-ken, Japan
[3] Chuo University, 742-1 Higashinakano, Hachioji-shi, Tokyo, 192-0393, Japan

Abstract. In Japan, programming studies were introduced in elementary schools in 2020 and junior high schools in 2021. In high schools, programming became compulsory in 2022. Though "Informatics" related subjects existed before 2022, programming was not mandatory. Twelve high school textbooks of "Informatics I" are certified by the Ministry of Education, Culture, Sports, Science and Technology, but they differ in difficulty level and emphasis on learning items, allowing high schools to choose the textbook that best meets their needs. This short paper analyzed those textbooks based on the number of indexed terms, not just the number of pages, allocated to four learning items: a) Solving the problems of the information society, b) Communication and information design, c) Computers and Programming, and d) Utilization of information communication networks and data. The analysis shows the impact of introducing the "Informatics I" subject into the Common Test for university admission from 2025. In the past, courses related to informatics were elective required ones but were not a subject of the Common Test. The Common Test is mandatory for students who wish to enter public universities. Prior research has indicated that some textbooks need more knowledge to answer all sample test questions of the common test. This short paper shows that the number of indexed terms in each textbook varied, with substantial differences in terms related to programming. This indicates that programming education in Japanese high schools is in its infancy, and still searching for the appropriate difficulty level for learning programming.

Keywords: Informatics education, programming, Japanese high schools, textbooks, indexed terms

- **Session 2.3 Digital technologies in education: use, ethics and security – Chair: Estelle Prior**

The Contribution of the Official TC3 Journal (EAIT) to Digital Education and Learning during the Global Health Emergency

Arthur Tatnall
Victoria University, Melbourne, Australia
Arthur.Tatnall@vu.edu.au

Javier Osorio
Universidad de Las Palmas de Gran Canaria, Spain
javier.osorio@ulpgc.es

Abstract

Educators worldwide searched for references and best practice recommendations to tackle the difficulties of the abrupt mass implementation of online training during the recent global health emergency. Academic journals that focus on digital technologies in education proved to be a useful means of communication to address this demand. The objective of this research is to outline the role of the Education and Information Technologies (EAIT) journal towards this aim. The study methodology utilised international scientific databases to evaluate publication impact. The findings indicate that EAIT has published numerous articles on the implementation of digital technologies in online learning which have earned a considerable number of citations by other scientific publications. EAIT's significant contribution in imparting current, pertinent and valuable information to the global research and practitioner community is confirmed.

Keywords

Journal, digital technologies, online learning, citations, COVID-19

The Contribution IFIP WG3.4 has made over 40 Years to Developments in Higher, Vocational, and Lifelong Learning

Arthur Tatnall
Victoria University, Melbourne, Australia
Arthur.Tatnall@vu.edu.au

Mikko Ruohonen
Tampere University, Finland
mikko.ruohonen@tuni.fi

J. Barrie Thompson
Newcastle, UK
jbarriethompson@gmail.com

Abstract: IFIP working group WG3.4 – Professional, Higher and Vocational Education in ICT was established in 1971. This paper describes the group's contribution to achieving *Digitally Transformed Education* in Higher, Vocational, and Lifelong Learning over the last 40 years. WG3.4 is focused on education leading towards careers or professional development in some form of computing. IFIP runs several different types of conference that are relevant to the goals of WG3.4 – its World Computer Congress (WCC), the World Conference on Computers in Education (WCCE), involving all TC3 working groups, and individual TC3 working group conferences. This paper deals primarily with papers presented at WG3.4 working conferences. We list the important topics covered at each conference and provide a grouping of papers on specific topics. We then investigate how these topics have changed over the years. To do this, we make use of Historical Research methodology to identify important article topics and trends.

Keywords: IFIP, Working Groups, WG3.4, Working Conferences, Papers, Professional, Higher, Vocational, Education, ICT.

Media Literacy Learning with Social Media Simulators and the Formation of Learner's Attitudes

Atsushi Hikita[1], Tomohiro Inagaki[1], Marcos Sadao Maekawa[2], Shota Tajima[3], and Emi Nagasawa[3]

[1] School of Integrated Arts and Sciences, Hiroshima University, Hiroshima, 739-8521, JAPAN

[2] Graduate School of Media Design, Keio University, Yokohama, Japan

[3] SmartNews Media Research Institute, Tokyo, Japan
hikita@hiroshima-u.ac.jp

Abstract. Social network media (social media), represented by Facebook and x (Twitter), have become popular. On the other hand, opportunities to learn about social media are limited and often people are only informed about its dangers. Teenagers in particular are thought to be overconfident and use social media on a daily basis.

The aim of this study was to change and reconstruct learners' attitudes towards social media through learning with our simulator.

Our social media simulator, To Share or Not to Share, provides learners with an objective view of how their own interpretation and representation of information in social media differs from that of others. We used this simulator to teach media literacy to university students.

We analysed whether learners' attitudes towards social media changed based on pre- and post-learning confidence questionnaires and changes in judgements and behaviour in the simulator, which were shown to be particularly effective in shaping attitudes of learners who were confident in their use.

Keywords: Media Literacy, Social Media Simulator, Attitude formation

- **Session 1.3 Learning about digital technologies and computing – Chair: Torsten Brinda**

Shapes of Data Literacy in Germany's Higher Educational Landscape - An Empirical Snapshot of an Emergent Subject

Martin Lechner[1][0009-0001-7656-3681] and Christian Zinke-Wehlmann[2][0000-0002-7440-3270]

[1] Institute for Applied Computer Science e. V., Leipzig, Germany, Lechner@infai.org
[2] Institute for Applied Computer Science e. V., Leipzig, Germany, Zinke@infai.org

Abstract. This empirical study examines the manifestation of Data Literacy on the example of educational institutions of higher education in Germany. By employing a qualitative content analysis approach supported by the in Germany widely acknowledged "Future Skills: A Framework for Data Literacy", this study considers primary content of course descriptions from educational offers provide by those institutions. We analysed 62 out of 101 offers found and investigated the balance between productive ("coding") and receptive ("decoding") competencies as well as what their content includes. We further investigated the offers' structural aspects. Results suggest that although course contents vary to meet specific needs of disciplines, the term was nevertheless mainly understood and designed to foster productive competencies. Critical thinking in this regard seemed to be understood to be part of these very productive processes. Receptive competencies and the ability to critically consider data detached from a singular productive process received little or no (direct) attention. Regarding the content it was observed that with the change and spread of DL to different disciplines, content has become more diverse, which highlights the adaptability of the term and questions its interoperability at the same time. With a few online available exceptions, offers remain "data literacy islands" with limited access.

Keywords: Data Literacy, Higher Education, Qualitative Content Analysis, Coding vs Decoding

Computer Science for All: Teacher Training for In-service Teachers

Anika Cichalla[1], Luisa Gebhardt[2], Ralf Romeike[1] and Tilman Michaeli[2]

[1] Freie Universität Berlin, 14 195 Berlin, Germany
{anika.cichalla, ralf.romeike}@fu-berlin.de
[2] Technische Universität München, 80 333 München, Germany
{luisa.gebhardt, tilman.michaeli}@tum.de

Abstract. The rapid digital transformation in education challenges not only teachers in training but also teacher education in all phases. While the use of both subject-specific and generic digital tools for teaching is part of most teacher training in all subjects nowadays, reliable and adaptable computer science (CS) knowledge is not. Especially for in-service teachers, there are few to no training courses that keep their demands in mind: The teachers' limited resources and the necessary basic knowledge of computer science. These basic computer science skills allow teachers to adapt existing teaching skills to the changing digital environment in schools.
For this reason, in this paper, we conduct a literature review to propose both the basic computer science competencies necessary for teaching in the ever-changing digitized world, selected and adapted to suit the needs and challenges of in-service teachers, as well as design principles for successful teacher training courses in this field.

Keywords: In-service training, Teacher Education, CS competencies.

Computational Thinking and Mathematics Education

Christine Bescherer[1][0000-0003-4745-6964]

[1] University of Education Ludwigsburg, Reuteallee 46, 71638 Ludwigsburg, Germany
bescherer@ph-ludwigsburg.de

Abstract. In the German state of Baden-Württemberg computer science is not a significant part of the middle school curriculum. So, students are supposed to acquire the computational thinking competencies in other subjects' classrooms. Traditionally mathematics is one of the subjects, which uses digital tools regularly and even programming (i.e. Logo or Scratch) as a cognitive tool to learn mathematics. This mixed methods study analyzes free text statements of 96 future mathematics teachers at Ludwigsburg University of Education regarding the connection of computational thinking and mathematics (classrooms) and the results of a 14 items questionnaire with 5-point Likert scales to self-evaluate their

computational thinking competencies. Further, the results of different groups (BA vs. MA students, primary vs. secondary future teachers, males vs females) are discussed. The statements will be used to develop a questionnaire on the connection between computational thinking and mathematics (classrooms).

Keywords: Computational Thinking, Mathematics Education, Teacher Education.

- **Session 3.3 Learning with digital technologies – Chair: Don Passey**

Virtual Dental Simulators: Diversifying the Technologies to Enhance Learning and Training in Higher Education

Margaret Cox, Chris Louca, Jennie Haywood-Hull, Sara Barber, Beth Hallisey, Debbie Withers

Abstract. This paper draws on the extensive empirical studies conducted to date into the uses of virtual haptic simulators (VHSD) in dental education and training informed by well-established educational models of the impact of new technologies on pedagogies and integration into practice. The rapidly growing number of new technologies being produced in the health sciences and those already embedded into higher education courses are providing new opportunities but also many challenges for dental and other higher education educators, trainers and practitioners. The extensive research evidence to date provides a robust foundation and framework to identify what challenges and opportunities we currently face for digitally enhancing higher education (TEL) at the same time as revealing the limitations to transforming teaching and learning. This research evidence to-date, using Entwistle and Peterson's model of factors influencing students' learning shows great opportunities for using VHSD within both undergraduate and postgraduate programmes as well as for CPD and assessing professionals' skills and competencies. The main challenges for successful uptake and integration identified include: reluctance to take up new technologies because of the anticipated changes and likeliness of obseleteness; resistance to change in one's teaching; insufficient time to learn new technologies and unwillingness to adopt innovations imposed from 'above' by learning leaders.

Keywords: Virtual Dental Simulations, Haptics, Higher Education, Pedagogies, Institutionalisation, Models of Adoption

Teachers' Technological Knowledge Influencing Integration of Information and Communication Technology in Teaching and Learning in Public Secondary School in Nairobi City County, Kenya.

Samuel Kigumi, Lucy Njagi

Abstract. In the 21st Century, the world has experienced rapid expansion of Information and Communication Technology in all sectors including education. ICT has taken learning outside the traditional four walled-classrooms; and this requires teachers to integrate technology in their pedagogical approaches. Therefore, teachers must possess relevant technological knowledge and skills to effectively facilitate learning. This study investigated teachers' technological knowledge and skills, using available resources for integration of ICT in teaching and learning in public secondary school in Nairobi City County. A descriptive survey research design was used. A stratified random sampling method was used to select a sample of 32 schools from a target population of 110 schools. The study used questionnaires for teachers, students, and interview guides for the principals for data collection. Descriptive statistics was analyzed using frequency distributions and percentages using SPSS version 25.The findings revealed that majority 302 (76.8%) of the teachers could use Microsoft office skills to prepare learning materials, improving classroom teaching and learning. A majority 319 (81.1%) of the teachers could navigate online platforms in blended learning and research making teaching and learning motivating. However, teachers were not fully integrating ICT in teaching and learning and they attributed this to lack of interest, skills, technophobia, and negative attitude towards ICT in teaching and learning. The study findings suggests that schools should devise ways of motivating teachers to embrace use of ICT in teaching and learning. One such way is use of continuous training through seminars and workshops on integration of ICT in teaching and learning.

Keywords: Information Communication and Technology, Technological knowledge, Pedagogy, Teaching learning

Towards an Analysis of the Information Practices of Actors Involved in the Field of Educational Serious Games

Mamoudou Ndiaye[1][0009-0009-3944-8746], Fabrice Pirolli [2][0000-0002-7083-3126] and Raphaëlle Crétin-Pirolli[3][0000-0002-7083-3126]

[1,2,3] Le Mans Université, CREN, EA 2661 Le Mans, France
{mamoudou.ndiaye,fabrice.pirolli,raphaelle.pirolli}@univ-lemans.fr

Abstract. The integration of digital technologies in education has highlighted the transformative potential of Serious Games (SGs). This research offers a comprehensive analysis of informational practices among key actors involved in the design, implementation, and utilization of SGs. Adopting a qualitative methodology, the study explores how these stakeholders navigate, interpret, and share information, and assesses the potential for enhancing existing classification models for SGs, focusing on their integration into educational strategies. Fieldwork includes workshops with teachers and institutional actors, and game experimentation at the National Library of France (BnF), providing a cross-examination of diverse perspectives. Additionally, the study addresses the

challenges of SG preservation, emphasizing the role of institutions like the BnF. This multifaceted exploration seeks to connect theoretical models with real-world practices, offering insights to inform future educational and archival methodologies in the digital era.

Keywords: Serious Games, Information Practices, Game Classification.

12103-02/24