Editorial: EAIT 21 – 7 (August 2022)

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Education and Information Technologies (EAIT) is a research journal that covers the complex relationships between information and Communication Technologies and Education. EAIT is the official journal of the International Federation for Information Processing (IFIP), Technical Committee on Education (TC3)

The journal is embedded in the research and practice of professionals and is accepted into the Social Science Citation Index (SSCI) in the category ‘Education & Educational Research’, with an Impact Factor (2021) of 3.666. EAIT is now in the top quartile (Q1) of journals in Education & Educational Research.

To begin this issue comes an article from: Yonghai Zhu (Capital Normal University, Beijing, China), Shengmei Xu and Wenguang Wang (Chizhou University, Chizhou, China), Di Liu, Ziling Liu and Yingying Xu (Capital Normal University, Beijing, China): The impact of Online and Offline Learning motivation on learning performance: the mediating role of positive academic emotion. Learning performance is an important indicator of online learning, say the authors. It is related to the quality of online education and the performance of students. This study explored the mediating effect of positive academic emotions on college students’ online learning motivation and online learning performance, as well as the differences in mediating effects under online learning and offline learning methods.

Adoption, use and enhancement of virtual learning during COVID19 is an article by Munyaradzi Zhou (Midlands State University, Gweru, Zimbabwe), Canicio Dzingirai and Kudakwashe Hove (University of Namibia, Windhoek, Namibia), Tavengwa Chitata and Raymond Mugandani (Midlands State University, Gweru, Zimbabwe). This study focuses on the uses of digital technology during teaching and learning. It considers the preparedness, adoption, and use of virtual learning. Performance Expectancy, Effort Expectancy, and Social Influence were confirmed to be
positive predictors of the Behavioural Intention (BI) to use technology. Facilitating Conditions is a non-significant construct of BI.

A sustainable University: Digital Transformation and Beyond is by Mohamed Ashmel Mohamed Hashim (Westford University College, Sharjah, UAE), Issam Tlemsani (The Centre for International Business, London, UK) and Robin Duncan Matthews (Kingston University London, RANPA Moscow, LSC, UK). Universities focus on digital transformation strategy to stay competitive in global education. Staying competitive is taking on quite a different meaning in the 21st century: it includes the long-term implications of Covid-19, the interaction of politics and economics, the emergence of China as a superpower, the end of neoliberalism, the emergence of distributed autonomous organisations particularly in the area of research and education. This paper critically examines the need and the association between sustainable digital transformation and its impact in the universities.

Renli Li (Zhengzhou Sias University, Zhengzhou, China) then offers: Chinese folk music: Study and dissemination through online learning courses. The use of online learning courses can have a positive effect for the study and dissemination of Chinese folk music. The purpose of this study was to investigate the effectiveness of an innovative teaching model of massive open online courses (MOOC) to assess the possibility of changes in the approaches to the study of Chinese folk music in higher education. The students noted that working on MOOC platforms helped them better master performance skills. They also appreciated the fact that online courses with developed curricula can be an effective means of popularizing Chinese culture.

Knowledge of university teachers on the use of digital resources to assist people with disabilities. The case of Spain describes work by José María Fernández Batanero, Julio Cabero Almenara, Pedro Román Graván and Antonio Palacios Rodríguez (University of Seville, Spain). They point out that integration of ICT in the context of higher education and in the framework of an education in equality and equity requires a competent teaching staff both from a technological and pedagogical point of view. In this context, and with the aim of going deeper into one of these theoretical premises, this study aimed to identify the degree of training and technological knowledge of university teaching staff in the faculties of education in Spain regarding use of ICT to support people with disabilities.

Annually in Mauritius, only a few Special Educational Needs (SEN) and especially Deaf and Hard of Hearing (DHH) students manage to get a passing mark in French language at elementary level, and Gwendoline Laurissa Chan and Mohammad Issack Santally (University of Mauritius, Moka, Mauritius) and Jack Whitehead (University of Cumbria, Carlisle, UK) elaborate on this in: Gamification as technology enabler in SEN and DHH education. Literature suggests that there are few French language learning tools connected with pedagogical knowledge and technological tools suitable for those children. The rationale behind this paper is to show how gamification of French learning resources can positively affect SEN and especially DHH students’ understanding and level of achievement in the language.

A multidimensional perspective on instructional design-based ICT integration: A case study is a paper by Denizer Yildirim (Ankara University, Ankara, Turkey), Hatice Çıralı Sarica and Yasemin Usluel (Hacettepe University, Ankara, Turkey), that aims to implement an exemplary instructional design-based ICT integration to
allow students to acquire both course achievement and knowledge society skills. The participants were students of the Science and Technology course at 7th grade in a state school, along with a teacher and two mentor researchers. During the application process, the researchers asked to prepare a video from students. Video content was associated with course outcomes. The findings showed that students’ course achievement had improved significantly.

**Prediction of an educational institute learning environment using machine learning and data mining.** This article comes from: Muhammad Shoaib (CECOS University of IT and Emerging Sciences, Khyber Pakhtunkhwa, Pakistan), Nasir Sayed (Islamia College Peshawar, Khyber Pakhtunkhwa, Pakistan), Nedra Amara (Higher Education Department, Peshawar, Khyber Pakhtunkhwa, Pakistan), Abdul Latif (Islamia College Peshawar, Khyber Pakhtunkhwa, Pakistan), Sikandar Azam (Higher Education Department, Peshawar, Khyber Pakhtunkhwa, Pakistan) and Sajjad Muhammad (University of Agriculture, Peshawar, Pakistan). They point out that technology and data analysis have evolved into a resource-rich tool for collecting, researching, and comparing student achievement levels in the classroom, and that there are sufficient resources to discover student success through data analysis by routinely collecting extensive data on student behaviour and curriculum structure. This study looks at how technology and data mining are used in the Educational Data Mining (EDM) environment and compare the results.

Shenghuan Zhao, Qiang Pan, Deyuan Gao and Jiqiu Cheng (Suzhou University of Science and Technology, Jiangsu, China): **Integrating internet of things and mixed reality to teach performance-based architectural design: a case study of shading devices.** Performance-based architectural design pursues building performance objectives like energy efficiency to guide design decisions, but these informed decisions are usually made according to performance simulation software results, which are quite effort-consuming and tedious. The authors have developed a digital platform by coupling Internet of Things (IoT) and Mixed Reality (MR) which enables students to intuitively observe spatio-temporal illuminance fluctuation when manually modifying the physical shading device model.

The next study, **Unplugged versus pluggedin: examining basic programming achievement and computational thinking of 6th grade students**, by Elif Polat (Middle East Technical University, Ankara, Turkey) and Rabia Meryem Yilmaz (Ataturk University, Erzurum, Turkey), aimed to compare the effects of unplugged and plugged-in activities on academic achievement and computational thinking (CT) skills of sixth-grade students. An intervention was designed on a selection/construction of activities from seven different basic programming web platforms for the plugged-in group and the proposed national curriculum unplugged activities for the other group. The results showed significant differences between groups in academic achievement favouring the unplugged activities, but not in CT skills. Development in CT skills contributed to the unplugged group’s academic achievement. In addition, qualitative results showed that the plugged-in group perceived their activities as fun and entertaining, but not exactly like a lesson. In contrast, the unplugged group did not experience anxiety or boredom since they perceived the activities as educational.

Training through simulation in neonatology relies on sophisticated simulation devices that give realistic feedback to trainees during simulated scenarios. It aims
at training highly specialised medical teams in established operational skills, timely clinical manoeuvres, and successful synergy with other professionals, say Gianpaolo Coro (Istituto di Scienza e Tecnologie dell’Informazione “A. Faedo”, Consiglio Nazionale delle Ricerche, Italy), Serena Bardelli and Armando Cuttano (Centro di Formazione e Simulazione Neonatale, Azienda Ospedaliero Universitaria Pisana, Italy) and Nicoletta Fossati (St George’s University Hospitals, London, UK) in their article: Automatic detection of potentially ineffective verbal communication for training through simulation in neonatology. For effective teaching, it is essential to tailor simulation to trainees’ emotional status and communication abilities (human factors), which in turn affect their interaction with the equipment, the environment, and the rest of the team. In this study, they present an automatic workflow that supports training through simulation in neonatology by automatically detecting dialogue segments of a simulation session with potentially ineffective communication between team members due to anger, stress, fear, or misunderstandings.

Analyzing student aspirations factors affecting elearning system success using a structural equation model is from Adel Bessadok (King Abdulaziz University, Jeddah, Saudi Arabia). E-learning system success factors identification is of major interest in higher education and understanding the role of students’ aspirations factor affecting the success of the e-learning system is a challenge for most educational institutions. This study aimed to analyse the effects of students’ aspirations factors in ensuring the success of the e-learning system through a developed research model extended from the integrated updated Unified Theory of Acceptance and Use of Technology and the DeLone and McLean Information System Success Model.

Valdemar Švábenský, Jan Vykopal, Pavel Čeleda, Kristián Tkáčik and Daniel Popovič (Masaryk University, Czech Republic) then present: Student assessment in cybersecurity training automated by pattern mining and clustering. Hands-on cybersecurity training allows students and professionals to practice various tools and improve their technical skills, and training occurs in an interactive learning environment that enables completing sophisticated tasks in full-fledged operating systems, networks, and applications. During the training, the learning environment allows collecting data about trainees’ interactions with the environment, such as their usage of command-line tools. This paper explores a dataset from cybersecurity training sessions using data mining and machine learning techniques.

Distance Education among Italian Teachers: Differences and Experiences was contributed by Laura Menabò (University of Bologna, Italy), Grace Skrzypiec (Flinders University, Adelaide, Australia), Alessandra Sansavini (University of Bologna, Italy), Antonella Brighi (Free University of Bozen-Bolzano, Italy) and Annalisa Guarini (University of Bologna, Italy). The successful integration of technology in teaching is a key component of education. Although prior research highlighted factors fostering the use of technology by teachers, few studies focused on whether these factors vary among teachers of different grade levels and subjects. To address these gaps, this mixed-method study sought to examine whether factors promoting distance education varied among Italian teachers of different grade levels and subjects.

The perceptions of social media users of digital detox apps considering personality traits is from Vinh T. Nguyen (TNU - University of Information and Communication Technology and FPT University, Vietnam) whose aim was to investigate the
perceptions of users about using digital detox applications and to display relationships among personality traits and technology-related variables. The study was designed using survey approach and employed Generalized Structured Component Analysis (GSCA). The results of the study indicated that behavioural intention predicted usage behaviour significantly. Performance expectancy, effort expectancy, and social influence positively affected behavioural intention; in turn, agreeableness and extroversion positively influenced performance expectancy, and extroversion affected effort expectancy; finally, neuroticism had a statistically significant and negatively associated with effort expectancy of using social media detox apps.

**Serious game design model for language learning in the cultural context** is by Kashif Ishaq, Fadhilah Rosdi and Nor Azan Mat Zin (Universiti Kebangsaan Malaysia, Bangi, Malaysia) and Adnan Abid (University of Management and Technology, Lahore, Pakistan). Mobile applications and games have been developed for learning languages like many other domains. This research presents a theoretical model for designing language learning games in a cultural context. The proposed model combines the elements of sociocultural theory with the concepts and elements of gamification, keeping in view the requirements and educational settings, including level and mode of education, etc., to ensure the effectiveness and usability of the developed game.

**Determinants affecting teachers’ adoption of AI-based applications in EFL context: An analysis of analytic hierarchy process** is by Yunfei Du and Han Gao (Chongqing University of Technology, China) who note that artificial Intelligence (AI) has been exerting a revolutionary and profound impact on the teaching of English as a Foreign Language (EFL) for decades. To facilitate the proper use and produce an instrument in AI-based applications selection for EFL teachers, this study attempts to identify and assess factors affecting teachers’ adoption based on technology acceptance theories. It proposes a multi-criteria decision-making model under the framework of the value-based adoption model (VAM), which comprises four main factors and ten sub-factors adopted from prior studies.

Baranova Tatiana, Aleksandra Kobicheva, Elena Tokareva and Dmitriy Mokhorov (Peter the Great Saint-Petersburg Polytechnic University, St. Petersburg, Russia) then offer: **The relationship between students’ psychological security level, academic engagement and performance variables in the digital educational environment.** In connection with the situation with COVID-19 almost all universities in the world were transferred to e-learning format, therefore new factors started to influence academic engagement and performance. Psychological security is one of these factors. Many researchers have studied the importance of psychological security level among students, some of them proposing a methodology for assessing the indicator. Nevertheless, there are few studies that demonstrate the relationship between psychological security level of students and their academic engagement and performance. The aim of this study was to close this scientific gap.

Learners’ satisfaction with Massive Open Online Courses (MOOCs) has been evaluated through quantitative approaches focusing on survey-based methods in several studies, and Mehrbakhsh Nilashi (Universiti Sains Malaysia, Penang, Malaysia and UCSI University, Kuala Lumpur, Malaysia), Rabab Ali Abumalloh (Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia), Masoumeh Zibarzani
(Alzahra University, Tehran, Iran), Sarminah Samad (Princess Nourah bint Abdulrahman University, Riyadh, Saudi Arabia), Waleed Abdu Zogaan (Jazan University, Saudi Arabia), Muhammed Yousoof Ismail (Dhofar University, Salalah, Oman), Saidatulakmal Mohd (Universiti Sains Malaysia, Penang, Malaysia and Dhofar University, Salalah, Oman) and Noor Adelyna Mohammed Akib (Universiti Sains Malaysia, Penang, Malaysia) elaborate on this in: What Factors Influence Students Satisfaction in Massive Open Online Courses? Findings from User-Generated Content Using Educational Data Mining. User-Generated Content (UGC) has been an effective approach to assess users’ interactions with e-learning systems. This study aimed to explore learners’ levels of satisfaction with MOOCs by presenting a new hybrid approach for Educational Data Mining (EDM) that combines both machine learning and survey-based methodologies.

Examining academic performance through ANT towards RPA-based system in South Africa is by Denise Lakay and Tiko Iyamu (Cape peninsula University of Technology, Cape Town, South Africa). Despite the numerous support systems, academic performances in many South African higher institutions continue to experience challenges while some are declining in throughputs. Some of the support mechanisms seem to be black boxed, notwithstanding the deteriorating situation. The factors that influence dwindling performance are unknown. This study, therefore, explores the effect of black boxing the support provided in the institutions, towards finding a long-lasting remedy to the challenges, through information technology solutions such as the robotic automated process (RPA). The relationship and interaction between human and non-human actors over ten years were traced. Despite the declining rate of academic performance, supports are stable and reliable in many institutions. Such stability is associated with black boxing from an actor-network theory (ANT) perspective.

Ünal Çakiroğlu and İsak Çevik (Trabzon University, SöğütlüAkçaabat, Trabzon, Turkey) next offer: A framework for measuring abstraction as a subskill of computational thinking in blockbased programming environments. To teach Computational Thinking (CT) skills to young students, BlockBased Programming Environments (BBPEs) are integrated into secondary school computer science (CS) education curricula. As a CT skill, abstraction is one of the prominent skills which is difficult to enhance and measure. Researchers developed some scales for measuring abstraction in BBPEs; however, it is still quite difficult to measure abstraction and understand students’ abstraction behaviours. The aim of this study was to suggest tasks that could help enhance students’ abstraction skills while teaching CT via block-based programming.

In the next article, the researchers Mohd Fadzil Abdul Hanid (Johor State Education Department, Johor Bahru, Malaysia), Mohd Nihra Haruzuan Mohamad Said, Norafandy Yahaya and Zaleha Abdullah (Universiti Teknologi Malaysia, Johor, Malaysia) conducted a study that considers: Effects of augmented reality application integration with computational thinking in geometry topics. Three variables were measured, Computational Thinking, Visualisation Skills and Geometry Topic achievement. The results showed that there is a positive effect of teaching methods using Augmented Reality applications with Computational Thinking for students.
in the improvement of Computational Thinking, Visualisation Skills and Geometry Topic achievement.

Design of an instrument to assess students’ perception of learning objects in statistics is an article by Ricardo Monge-Rogel, Guillermo Durán-González and Mónica Panes-Martínez (Universidad de Las Américas, Santiago, Chile and Centro Universitario CIFE, Cuernavaca, Morelos, México) and Luis Gibran Juárez-Hernández (Centro Universitario CIFE, Cuernavaca, Morelos, México). Digital Learning Resources (DLR) are tools that allow a better understanding of the contents for students. It is therefore necessary to have an instrument that allows to assess the perception on this type of learning object and identify the contribution they have in the teaching-learning process in higher education students. In their study an instrument consisting of 32 items and three dimensions, was constructed to evaluate the perception of the DLR used in a statistics subject.

Nomophobia among Preservice Teachers: a descriptive correlational study at Ghanaian Colleges of Education comes from Harry Barton Essel (Kwame Nkrumah University of Science and Technology, Ghana), Dimitrios Vlachopoulos (Amsterdam University of Applied Sciences, Netherlands), Akosua Tachie-Menson, Francis Kofi Nimo Nunoo and Esi Eduafua Johnson (Kwame Nkrumah University of Science and Technology, Ghana). This study aimed at investigating nomophobia prevalence, thus, recurrence of anxiety without a smartphone, with preservice teachers in the Colleges of Education, Ghana. The results evidenced that the vast majority of preservice teachers had mild to severe nomophobia, and their most significant anxiety was related to access to information and communication.

Nadine Mandran (Grenoble Alpes Université, France), Mathieu Vermeulen and Estelle Prior (IMT Lille Douai, France) then present: THEDRE’s Framework: Empowering PhD Candidates to Efficiently Implement DesignBased Research. This article presents a method to help PhD candidates in the implementation of Design-Based Research (DBR). It focuses on a process and a set of guides designed to accompany doctoral candidates in the different stages of their thesis. It also proposes a tenth principle concerning the definition of indicators used to drive the thesis. The results obtained showed that the guides allow doctoral students to structure their reflections and better manage their thesis work.

The need for a knowledge-based society has perpetuated an increasing demand for higher education around the globe, say Mohammed Naseem, Kaylash Chaudhary and Bibhya Sharma (The University of the South Pacific, Suva, Fiji) in their article: Predicting Freshmen Attrition in Computing Science using Data Mining. The enrolment numbers in Computer Science undergraduate programmes are usually high, but unfortunately, many of these students drop out from, or abscond these programmes, leading to a shortage of Computer Science professionals in the job market. In this paper, data mining techniques were used to build predictive models that can identify student dropout in Computer Science programmes, more specifically focusing on freshmen attrition since a significant number of dropouts occur in the first year of university studies.

Effect of interactive multimedia e-books on lower secondary school students’ curiosity in a Science course was written by: Herianto, Insih Wilujeng and Diah Puji Lestari (Yogyakarta State University, Indonesia). Curiosity is a form of intrinsic
motivation that plays an important role in student success in school. This study examined the effect of using interactive multimedia e-books on lower-secondary school students’ curiosity in a science course. The results showed that there was a significant difference in student curiosity between students who used interactive multimedia e-books and students who used printed textbooks.

Alanood Abdulaziz, Makhmoor Bashir and Abdulaziz Abdulmohsen Alfalih (Qassim University, Buraydah, Saudi Arabia) then offer: The impact of work-life balance and work overload on teacher’s organizational commitment: do Job Engagement and Perceived Organizational support matter? The purpose of this study is to determine the influence of work-life balance and work overload on teacher’s organizational commitment, noting the mediating role of job engagement and the moderating effect of perceived organizational support.

Mobile-assisted language learning in Chinese higher education context: a systematic review from the perspective of the situated learning theory comes from Fan Li, Si Fan and Yanjun Wang (University of Tasmania, Australia). Recent years have witnessed numerous systematic investigations on mobile-assisted language learning (MALL). However, very few research synthesis studies focused on the higher education context in mainland China. This paper provides a systematic review of the findings of 23 studies published between 2015 and 2020 in mainland China.

Potential predictors of student attainment: A longitudinal study at global level is by: Funda Erdogdu (Kutahya Dumlupinar University, Turkey). In the reported study, using panel data from the last five PISA cycles and data on various institutional variables, the role of ICT resources, parents’ occupation, school characteristics, and institutions in student attainment was explored. The data were collected from 2.5 million students in 94 countries/economies representing more than 140 million students worldwide.

The online remote learning revolution in the era of the pandemic has resulted in the massive explosion of videoconferencing technologies, and Ryan Michael F. Oducado, Ma. Asuncion Christine V. Dequilla and Joselito F. Villaruz (West Visayas State University, Iloilo City, La Paz, Philippines) discuss this in: Factors predicting videoconferencing fatigue among higher education faculty. This study examined this among higher education faculty in the Philippines. For better videoconferencing experience among faculty, mechanisms to ease fatigue during virtual meetings are proposed based on the study result.

Educational Technology Adoption: A systematic review is from Andrina Granić (University of Split, Croatia), who notes that during the past decades a number and variety of theoretical perspectives and practical approaches have been advanced for studying determinants for prediction and explanation of user’s behaviour towards acceptance and adoption of educational technology. Aiming to identify the most prominent factors affecting and reliably predicting successful educational technology adoption, this systematic review offers succinct account of technology adoption and acceptance theories and models related to and widely applied in educational research.

An exploration into the impact of augmented reality on EFL learners’ Reading comprehension. This next study, by Saman Ebadi and Fateme Ashrafabadi (Razi University, Kermanshah, Iran) investigated how Augmented Reality (AR) impacted EFL (English as a Foreign Language) learners’ reading comprehension and attitudes.
toward utilizing AR. The findings indicated that the experimental group (utilizing AR) showed a significantly higher reading comprehension level than the control group.

Learners can interact and connect with one another in new ways thanks to social media says Nasser Alalwan (King Saud University, Riyadh, Saudi Arabia) in *Actual use of social media for engagement to enhance students’ learning*. The reported study employs two models to investigate the factors that contribute to students’ involvement in order to improve their learning: constructivism and the technology acceptance model (TAM). The research objective was to create a model of real use of social media for engagement by conducting an empirical examination into students’ adoption of actual use of social media for education.

Jessica R. Simon (Florida State University, Tallahassee, USA) and Jason G. Randal (University at Albany, NY, USA) then present: *Predictors and consequences of typical and “addictive” LMS use*. Today’s learners rely heavily on learning management systems (LMS) to access and submit coursework, receive feedback, interact with others, and track progress and this study moves past the question of whether to use LMS, to uncover how LMS use affects learners. They drew on motivational theories of goal orientation to predict how frequently learners check their LMS, and to examine whether the use of LMS, including addictive cognitive and behavioural tendencies, would affect learning and stress outcomes.

*Facebook/Meta usage in higher education: A deep learningbased dualstage SEMANN analysis* describes an investigation by Yakup Akgül and Ali Osman Uymaz (Alanya Alaaddin Keykubat University, Kestel, Turkey). The main aim of the research was to investigate and predict major factors in students’ behavioural intentions toward academic use of Facebook/Meta as a virtual classroom, taking into account its adoption level, purpose, and education usage. In contrast to earlier social network research, this one utilized a novel technique that comprised a two-phase analysis and an upcoming Artificial Neural Network (ANN) analysis approach known as deep learning was engaged to sort out relatively significant predictors acquired from Structural Equation Modelling (SEM).

Kate Tzu Ching Chen (Chaoyang University of Technology, Taiwan) then presents: *Speech-to-text recognition in University English as a Foreign Language Learning*. This study explored the potential of adopting speech-to-text recognition (STR) technology for English as a foreign language (EFL) oral training in class at the university level. The results indicated that the STR app tasks were effective in increasing students’ English-speaking ability and students expressed positive attitudes toward the use of the tasks in the STR app.

*Comprehensive evaluation of the use of technology in education – validation with a cohort of global open online learners* comes from Jennifer W. M. Lai, John De Nobile, Matt Bower and Yvonne Breyer (Macquarie University, Sydney, Australia). They note that although a large variety of methodologies, contexts and perspectives have been used to examine educational application of technology, there is a paucity of instruments that are designed to comprehensively evaluate this. This paper presents a Confirmatory Factor Analysis (CFA) of an instrument that incorporates eight key dimensions: learning, affective, behavioural, technology, design, pedagogy, presence/community, and institutional environment.
The purpose of the next study: A machine learning enabled affective Elearning system model by Xinyang Liu and Saeid Pourroostaei Ardakani (University of Nottingham Ningbo China, Zhejiang, China) is to propose an e-learning system model for learning content personalisation based on students’ emotions. The proposed system collects learners’ brainwaves using a portable Electroencephalogram and processes them via a supervised machine learning algorithm, named K-nearest neighbours (KNN), to recognise real-time emotional status.

Education worldwide has emphasized 21st century competencies, including language competence, computer competence, and thinking skills says Amber Yayin Wang (National Taichung University of Education, Taiwan) in: Understanding levels of technology integration: A TPACK scale for EFL teachers to promote 21st century learning. Research on Technological Pedagogical Content Knowledge (TPACK) and essential teacher knowledge, has attempted to address the need for technology integration to support thinking skills. Existing TPACK assessments have not intended to help teachers understand the levels of technology integration in teaching English as a foreign language (EFL). This study proposed a two-dimensional TPACK scale, allowing EFL teachers to assess their TPACK in integrating technology and thinking skills.

Assessment of students’ digital competences in primary school: a systematic review is an article by Eline Godaert (Ghent University, Belgium), Koen Aesaert (Educational Effectiveness and Evaluation, KU Leuven, Belgium), Joke Voogt (University of Amsterdam, Netherlands) and Johan van Braak (Ghent University, Belgium). Although there is a growing body of literature that recognizes the importance of being digitally competent today, there have been few empirical investigations into the assessment of primary school students’ digital competences. This study presents a systematic review of the empirical research on the assessment of primary school students’ digital competences.

In search of a measure to address different sources of cognitive load in computer-based learning environments, is by: Onur Dönmez (Ege University, İzmir, Turkey), Yavuz Akbulut (Erzincan Binali Yıldırım University, Ankara, Turkey), Esra Telli (Erzincan Binali Yıldırım University, Ankara, Turkey), Miray Kaptan and İbrahim H. Özdemir (Ege University, İzmir, Turkey) and Mukaddes Erdem (Hacettepe University, Ankara, Turkey). In this study, the researchers aimed to develop a reliable and valid scale to address individual cognitive load types. Through a multistep correlational study, they propose a three-factor scale with 13 items to address intrinsic, extraneous and germane cognitive load in computer-based learning environments.

Blended learning combines face-to-face instruction and online learning experiences, and Mohialdeen Alotumi (Sana’a University, Yemen) discusses this in: Factors influencing graduate students’ behavioural intention to use Google Classroom: Case study mixed methods research. Blended learning capitalises on online learning management systems, one of which is Google Classroom (GC), but empirical investigations have mirrored literature gaps in understanding how the GC platform affects students’ behavioural intention to harness it for web-based learning. This case study applied a modified version of the extended unified theory of acceptance and use of technology (UTAUT2) as a theoretical underpinning to examine factors influencing graduate students’ behavioural intention to utilize the GC platform.
Remediating textbook deficiencies by leveraging community question answers

by Krishnendu Ghosh (Siksha ‘O’ Anusandhan University, Bhubaneswar, India) presents a method for recommending augmentations against conceptual gaps in textbooks. Question Answer (QA) pairs from community question-answering (cQA) forums are noted to offer precise and comprehensive illustrations of concepts. Their proposed method retrieves QA pairs for a target concept to suggest two types of augmentations: basic and supplementary.

Livinus Obiora Nweke (Norwegian University of Science and Technology, Trondheim, Norway and Norof Accelerate, Oslo, Norway), Anthony Jnr Bokolo (Institute for Energy Technology (IFE), Halden, Norway), Gibson Mba (Foretrust Digital Consulting, Enugu, Nigeria) and Emeka Nwigwe (Assiniboine Credit Union, Winnipeg, Canada) present: Investigating the effectiveness of a HyFlex cyber security training in a developing country: A case study. HyFlex termed as hybrid-flexibility is a teaching approach where teachers and students have the alternative to participate in planned courses either remotely or face-to-face. This study examines the effectiveness of the HyFlex pedagogical method to teach highly interactive digital and face-to-face cyber security training in Nigeria amidst the pandemic.

Trends and Issues in MOOC Learning Analytics Empirical Research: A Systematic Literature Review (2011–2021) from Meina Zhu (Wayne State University, Detroit, USA), Annisa R. Sari (Yogyakarta State University, Indonesia and Indiana University, Bloomington, USA) and Mimi Miyoung Lee (University of Houston, TX, USA) notes that learning analytics (LA) is a growing research trend and has recently been used in research and practices in massive open online courses (MOOCs). This systematic review of 166 articles from 2011 to 2021 synthesizes the trends and critical issues of LA in MOOCs. The eight-step process proposed by Okoli and Schabram was used to guide this systematic review in analysing: publication outlets, research purposes and methods, stakeholders, and researchers’ geographic locations, and subjects.

Xiaodong Zhang (Beijing Foreign Studies University, China) then writes on: Demystifying the challenges of university students’ web-based learning: A qualitative case study. Many studies have reported the affordances of students’ engagement in web-based learning, but few have used a qualitative approach to investigating students’ challenges with this type of learning over time. This study used the qualitative case study method to explore the challenges of university students with web-based learning in one semester. The data were collected from interviews with and reflections and field notes of students in an English reading class in a university in China.

Teachers’ beliefs and practices of technology integration at a school for students with dyslexia: A mixed methods study by Holli Bice and Hengtao Tang (University of South Carolina, Columbia, USA) begins by noting that the amount of technology available in schools has increased steadily over the past two decades, but higher-level uses have not followed, and many teachers continue to struggle integrating technology in their classrooms. The purpose of this study was to describe teachers’ beliefs about technology in the classroom and identify whether their beliefs are reflected in practices of integrating technology at a small, private school for students with dyslexia.
The next study: **Gamification in education: A scientometric, content and co-occurrence analysis of systematic review and metaanalysis articles** is by Somayyeh NadiRavandi and Zahra Batooli (Kashan University of Medical Sciences, Iran). Scientometrics is the field of study which concerns itself with measuring and analysing scholarly literature. This article seeks scientometric, content and co-occurrence analysis of systematic review and Meta-analysis articles in the field of gamification in education.

This paper: **An appraisal of students’ adoption of e-learning communication tools: a SEM analysis** examined the adoption and usage of e-learning communication tools by Mass Communication students at selected privately-owned Nigerian universities. The unified theory of acceptance and use of technology (UTAUT) was the theoretical lens that guided the study. The authors were: Eze Ogemdi Uchenna and Nwabunze Uzoma Oluchukwu (University of Nigeria, Nsukka, Nigeria). The results of the study supported the original UTAUT theory where performance expectancy, effort expectancy and social influence significantly predicted behavioural intentions.

**Exploring factors affecting the adoption of MOOC in Generation Z using extended UTAUT2 model** is an article by: Rakesh Kumar Meet (Doon Business School, Dehradun, India and University of Petroleum and Energy Studies, Dehradun, India), Devkant Kala (University of Petroleum and Energy Studies, Dehradun, India) and Ahmad Samed AlAdwan (Al-Ahliyya Amman University, Jordan). The advent of the Internet heralded the rise of scalable educational technology dubbed as massive open online course (MOOC). Easy to use, access, and economical as well as flexible, these provide students the advantage of self-paced learning. Despite all these merits, MOOC adoption is low in the higher educational institutions (HEIs) of India. The aim of this study was to explore the factors affecting the behavioural intention to adopt MOOCs among Generation Z enrolled in the Indian HEIs. The study used the extended UTAUT2 model with additional constructs of language competency and teacher influence to explore this MOOC adoption.

Zhang Yuting, Donnie Adams and Kenny Cheah Soon Lee (University of Malaya, Kuala Lumpur, Malaysia) next present: **The relationship between technology leadership and teacher ICT competency in higher education**. Ever-changing educational technology brings new challenges and opportunities in higher education and to keep up with the trends of the digital era when technology integration is emphasized as one key feature, university leaders should take technology-related responsibilities on motivating and cooperating with teachers to achieve effective technology integration. This study applies descriptive-correlational design to investigate the relationship between university leaders’ and teachers’ technological behaviours and practices.

Realistic visualizations are abundantly used in digital education, but the use of realism is still thought to risk a cognitive overload due to excessive details says Alexander Skulmowski (Karlsruhe University of Education, Germany) in: **Is there an optimum of realism in computergenerated instructional visualizations?** It is still not precisely known, however, whether there is an optimal level of realism that most benefits learners. In two experimental studies, different versions of anatomical visualizations were compared regarding their effects on retention performance and the subjective cognitive load experienced during learning.
The contribution of distress factors and Coping Resources to the motivation to use ICT among adults with intellectual disability during COVID-19 is from the following researchers in Israel: Hefziba Lifshitz (Bar-Ilan University, Ramat Gan, Israel), Ayelet Gur (Tel-Hai College, Kiryat Shemona, Israel), Shlomit Shnitzer-Meirovitz (Leviski College of Education, Tel-Aviv, Israel) and Sigal Eden (Bar-Ilan University, Ramat Gan, Israel). Their study focused on people with intellectual disability (ID), who have unique disadvantages that place them at greater risk for negative outcomes due to COVID-19. The study goals were three-fold: (a) To examine whether differences in distress factors (loneliness and stress) would be found between adults with ID who used the Zoom application during the pandemic, and those who did not; (b) To examine whether differences in psychological and coping resources (psychological capital), and practical-technological resources (attitudes and motivation to use information communication technology) would be found between the groups; (c) To examine the contribution of background variables (gender, type of residence, Zoom use), distress factors and psychological and practical technological coping resources on the motivation to use technology.

The roles of mobile app perceived usefulness and perceived ease of use in appbased Chinese and English learning flow and satisfaction describes research by Aitao Lu and Ruchen Deng (Ministry of Education, Guangzhou, China and South China Normal University, Guangzhou, China), Yingshi Huang (South China Normal University, Guangzhou, China), Tianhua Song and Yunhong Shen (Ministry of Education, Guangzhou, China and South China Normal University, Guangzhou, China), Zhiling Fan (South China University of Technology, Guangzhou, China) and Jijia Zhang (Guangxi Normal University, Guilin, China). With the popularity of mobile devices, people are increasingly trying to learn a second language using mobile applications (apps), and this study examined language learners’ perceptions of the usefulness and ease of use of mobile learning apps in relation to language learning flow and satisfaction.

The following article comes from a large number of researchers from Japan. A webbased survey of educational opportunities of medical professionals based on changes in conference design during the COVID19 pandemic was authored by: Kenta Yagi, Yasutaka Sato and Satoshi Sakaguchi (Tokushima University Hospital, Japan), Mitsuhiro Goda (Tokushima University Hospital, Japan and University of Tokushima Graduate School of Biomedical Sciences, Japan), Hirofumi Hamano and Fuka Aizawa (Tokushima University Hospital, Japan), Mayuko Shimizu (University of Tokushima Graduate School of Biomedical Sciences, Japan), Arisa InoueHamano (Tokushima University Graduate School, Tokushima, Japan), Toshihide Nishimori (Tokushima University Hospital, Japan), Masato Tagi (Tokushima University Graduate School of Biomedical Sciences, Japan), Marina Kanno, Rie MatsuokaAndo, Toshihiko Yoshioka and Yoshiko Matstubara (Tokushima University Hospital, Japan), Yuki Izawalshizawa (University of Tokushima Graduate School of Biomedical Sciences, Japan), Rieko Shimizu (Kagawa Prefectural Central Hospital, Japan), Akinori Maruo (Okayama University Hospital, Japan), Yurika Kuniki, Yoshika Sakamoto and Sayuri Itoyayashi (University of Tokushima Graduate School of Biomedical Sciences, Japan), Yoshito Zamami (University of Tokushima Graduate School of Biomedical Sciences, Japan and Okayama University Hospital, Okayama, Japan),
Hiroaki Yanagawa (Tokushima University Hospital, Japan) and Keisuke Ishizawa (Tokushima University Hospital, Japan and University of Tokushima Graduate School of Biomedical Sciences, Japan). They point out that owing to the coronavirus disease pandemic, understanding how to hold future online academic conferences effectively has become imperative. The authors assessed the impact of COVID-19 on academic conferences, including facilities and settings for attendance, participation status, cost burden, and preferences for future styles of holding conferences through a web-based questionnaire survey of 2,739 Japanese medical professionals, from December 2020 to February 2021.

Learning with the interactive whiteboard in the classroom: Its impact on vocabulary acquisition, motivation and the role of foreign language anxiety comes from Tim Kühl (University of Mannheim and University of Potsdam, Germany) and Patrizia Wohninsland (Lithuanian High School, Lampertheim, Germany). When used in a sensible way, Interactive Whiteboards (IWB) are supposed to motivate and engage students in learning in the classroom and perhaps also stimulate students who are usually more restrained, such as more anxious students. The body of research on the impact of IWB lessons is, however, small. This study investigated whether a 45-minute lesson with the IWB compared to a conceptual identical 45-minute lesson without the IWB would support learning and motivation within the subject English as a foreign language for German students.

Marion Händel, Svenja Bedenlier, Bärbel Kopp, Michaela GläserZikuda, Rudolf Kammerl and Albert Ziegler (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany) then write on: The webcam and student engagement in synchronous online learning: visually or verbally? Given that video conferencing serves as a crucial means for remote teaching, their study investigated higher education students’ (non)use of webcams and engagement in synchronous online courses. Three phases were studied: (1) A state of engagement; (2) antecedents that influence it; and (3) consequences of engagement.

The last paper in this issue is by Osman Aktan (Duzce University, Turkey) and Çetin Toraman (Çanakkale Onsekiz Mart University, Turkey): The relationship between Technostress levels and job satisfaction of Teachers within the COVID-19 period. Their research aimed to determine the technostress levels experienced by teachers in distance education during the COVID-19 period and examine the relationship between this technostress level and job satisfaction. The research was structured in relational comparison type. The attendees comprised 525 teachers working at different echelons of education, determined in accordance with the purposive sampling method. Technostress Scale, job satisfaction scale, and open-ended questions form were used as data collection tools during the research.

Articles in this issue come from researchers in: Australia, Belgium, Canada, Chile, China, Croatia, Czech Republic, Fiji, France, Germany, Ghana, India, Indonesia, Iran, Israel, Italy, Japan, Jordan, Malaysia, Mauritius, México, Netherlands, Nigeria, Norway, Oman, Pakistan, Philippines, Russia, Saudi Arabia, South Africa, Spain, Taiwan, Turkey, UK, United Arab Emirates, USA, Vietnam, Yemen and Zimbabwe.

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Editor-in-Chief.
Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.