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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.

With the educational importance internationally of coping with the COVID-19 pandemic, this issue contains eight articles dealing with this topic. In looking at this though one must realise that, because of the large number of articles this journal receives, and their subsequent delay in publication, many of the articles in this issue were written in 2021 or early 2022 when the pandemic was at its height.

To begin this issue, Factors influencing undergraduate education in an expanding virtual world during COVID-19 comes from Brinda Desai Bradaric and Dina Batlivala Tresselt (Rush University, Chicago, USA). Moving to a virtual platform can introduce barriers beyond access and stability of technology, which may influence students’ academic performance and the aim of their study was to identify factors, both personal and technology-related, that students and faculty perceived as contributors to academic performance. Analysis of survey results indicated that mental health and finances hindered students’ performance, whereas faculty reported that technology accessibility and stability was the greatest contributor to students’ performance.

Using Mobile gamified quizzing for active learning: the effect of reflective class feedback on undergraduates’ achievement by Abderrahim Mimouni (Ibn Zohr University, Agadir, Morocco) investigates whether reflective class feedback (RCF) boosts the effectiveness of mobile gamified quizzing in enhancing active learning in

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higher education. Two intact groups of English as a Foreign Language (EFL) first-year undergraduates in a Grammar course at Ibn Zohr University participated, with one group playing the mobile gamified quizzes with RCF, while the other played the same mobile gamified quizzes without RCF. The findings showed that the students who played the mobile gamified quizzes with RCF scored significantly higher than those who played the same gamified quizzes without RCF.

Xiaodi Liu, Jingying Chen, Kun Zhang and Xuan Wang (Central China Normal University, Wuhan), Guangshuai Wang (Wuhan University) and Rujing Zhang (Central China Normal University, Wuhan, and Liaocheng University), People’s Republic of China then present: The evaluation of the cognitive and language abilities of autistic children with interactive game technology based on the PEP3 scale. Evaluation is crucial in the treatment of autistic children and the Psychoeducational Profile – Third Edition (PEP-3) is a standardized scale used to evaluate the development of children with autism spectrum disorder (ASD), but as a traditional scale, the PEP-3 relies highly on the experience of the evaluator and the evaluation process is complicated and time-consuming. This study aimed to use touchscreen and speech recognition technology to develop a set of human-computer interaction (HCI) games for the evaluation of the cognitive and language abilities of children with ASD.

In today’s ICT-based learning environment, students are expected to evaluate the structure of their courses and associated teaching methods, say Asad Abbas (Tecnológico de Monterrey, Mexico), Hussein Haruna (Tecnológico de Monterrey, Mexico and University of Hong Kong), Arturo ArronaPalacios (Tecnológico de Monterrey, Mexico; Brigham and Women’s Hospital, Boston, USA and Harvard Medical School, Boston, USA), Claudia CamachoZuñiga, Sandra NúñezDaruich, Jose Francisco Enríquez de la O, Raquel CastañoGonzalez, Jose Escamilla and Samira Hosseini (Tecnológico de Monterrey, Mexico) in their article: Students’ evaluations of teachers and recommendation based on course structure or teaching approaches: An empirical study based on the institutional dataset of student opinion survey. The expectation is that these evaluations will provide valuable feedback to teaching staff, and this quantitative study explores the impact of students’ evaluations of teaching (SETs) and is based on the students’ perceptions of course structure and teaching approaches. The study utilised institutional data related to SETs and teachers’ recommendations.

The use of eLearning platforms has made it possible to continue the learning process in universities, and other educational institutions, during the COVID pandemic, and the next article discusses this. Factors predicting University students’ behavioural intention to use eLearning platforms in the post-pandemic normal: an UTAUT2 approach with ‘Learning Value’ was contributed by Georgios Zacharis (Aristotle University of Thessaloniki, Greece) and Kleopatra Nikolopoulou (National and Kapodistrian University of Athens, Greece). Students’ acceptance of eLearning is important because it is associated with their engagement in the online teaching–learning environment. This study used the Unified Theory of Acceptance and Use of Technology (UTAUT2) to determine the factors predicting the behavioural intention of university students to use eLearning platforms in the post-pandemic era. UTAUT2 was extended to include the constructs ‘Learning Value’ and ‘Empowerment in Learning’.
Goal-oriented student motivation in learning analytics: How can a requirements-driven approach help? is by Omar Talbi and Abdelkader Ouared (Ibn Khaldoun University, Tiaret, Algeria). They point out that determining student motivation within the context of Learning Analytics is fundamental for academic students to realize their educational goals. Their research aimed to perceive the student’s motivation state at a high level of abstraction and act accordingly to deal with motivation issues. They propose a Conceptual Modelling Approach that provides a unified environment in which all dimensions of students’ motivation are explicitly defined, a guideline that allows educational stakeholders to perceive the states of change in students’ motivation. The issue of student motivation is addressed by making a mechanism that stimulates students.

Integrating augmented reality in language learning: preservice teachers’ digital competence and attitudes through the TPACK framework is an article by Jose Belda Medina and José Ramón Calvo Ferrer (University of Alicante, Spain) who suggest that although the use of Augmented Reality (AR) in language learning has increased over the last two decades, there is still little research on the preparation of pre-service teachers as AR content creators. This paper focuses on analysing the digital competence and attitudes of teacher candidates to integrate AR in the foreign language classroom. The teacher candidates employed several software-development kits (SDKs) to construct collaborative AR projects in a five-week period, including discursive and illustrative representations of the learning content.

In the next article: Hands-on activity vs. high-tech tools in the higher education classroom to improve student satisfaction and loyalty in professional programs, Minseong Kim, Tami L. Knotts and Nancy D. Albers (Louisiana State University Shreveport, USA) note that engaging activities are becoming increasingly a staple in higher education and professional programs (including business, engineering, and healthcare), rely on engaging activities to better prepare students for their future careers. Experiential learning can be achieved through a wide variety of approaches that can generally be classified as hands-on activities, such as internships, practicums, and medical practice models, or as high-tech tools, such as simulations, games, and exercises delivered via an electronic medium. The purpose of this study was to specifically compare a computer-based simulation to hands-on based activities.

Valdemar Švábenský, Jan Vykopal, Pavel Čeleda and Lydia Kraus (Masaryk University, Brno, Czech Republic) then offer: Applications of educational data mining and learning analytics on data from cybersecurity training. Cybersecurity professionals need hands-on training to prepare for managing the current advanced cyber threats and to practice cybersecurity skills. Training participants use numerous software tools in computer-supported interactive learning environments to perform offensive or defensive actions. This research area is not yet well-understood and this paper surveys publications that enhance cybersecurity education by leveraging trainee-generated data from interactive learning environments.

In Saudi Arabia, the COVID-19 pandemic forced students with dyslexia to complete their learning through online applications, like their peers without dyslexia. This study explores the influence of assistive technology (AT) on improving the visual perception (VP) and phonological processing (PhP) abilities of students with dyslexia. Influence of assistive technology applications on dyslexic students: The
case of Saudi Arabia during the COVID-19 pandemic comes from: Amany Ahmed AlDokhny (Ain Shams University, Cairo, Egypt). Amani Mohammed Bukhamseen (King Faisal University, Al-Ahsa, Saudi Arabia) and Amr Mohammed Drwish (Helwan University, Cairo, Egypt). Fourteen students with dyslexia were selected as participants and divided into two experimental groups based on gender. The results showed that AT influenced the VP, PhP, and FA in both experimental groups.

Rubric-based formative assessment to support students’ learning of organic chemistry in the selected secondary schools in Rwanda: A technology-based learning is an article by Ezechiel Nsabayezu, Janvier Mukiza, Aloys Iyamuremye, Odile Umuhire Mukamanzi and Agnes Mbonyiryivuze (University of Rwanda, Kigali, Rwanda). A significant number of instructors, researchers and students have claimed that chemistry is a challenging subject to teach and learn at all education levels. Its main learning difficulties are that it is abstract, and some chemistry teachers do not specify what to be learned and assessed in chemistry lesson. This paper investigates the use of formative assessment rubrics for supporting secondary school students’ progressive learning in organic chemistry through a technology-based learning project approach in Rwanda.

WuYuin Hwang and VanGiap Nguyen (National Central University, Taoyuan City, Taiwan) and Siska Wati Dewi Purba (Universitas Pelita Harapan, Tangerang, Indonesia) next offer: Systematic survey of anything-to-text recognition and constructing its framework in language learning. Since recognition technology has been widely used to support learners’ language learning, it is necessary to have a framework that can support the implementation of anything-to-text recognition technology, such as speech-to-text recognition, image to-text recognition, body movement-to-text recognition, emotion-to-text recognition, and location-to-text recognition, into learning designs. This study aimed to review published articles related to anything-to-text recognition in language learning and to propose an anything-to-text recognition framework.

University students’ views regarding gender in STEM studies: Design and validation of an instrument report research by Sonia VerdugoCastro, Mª Cruz Sánchez Gómez and Alicia García Holgado (Universidad de Salamanca, Salamanca, Spain). They point out that differences in the representation of diversity in higher education, emphasising the gender gap in some areas, are issues addressed from different research domains. Socially, gender roles have been constructed and are also related to professions. In this context, the Social Cognitive Career Theory explores the possible causes of segregation. This segregation is evident in Europe and Spain, as indicated by the European Institute for Gender Equality. This paper describes the design and validation process of an instrument to find out what opinions university students have about higher education studies in science, technology, engineering and mathematics (STEM), according to gender.

Effectiveness of blended learning to develop learner autonomy in a Chinese university translation course by Juan Chen (Zhejiang Wanli University, Ningbo, Zhejiang Province, China) presents a study of training learner autonomy by applying blended learning in a university translation course in China. The study constructed this course and conducted a survey to determine the effectiveness of blended learning to improve learner autonomy. The study focuses on various aspects: students’ view
of blended learning to develop learner autonomy, teachers’ construction of a blended course, and the influence of blended learning on students’ learning responsibility, learning motivation, learning involvement, and learning independence.

Fahad Alblehai (King Saud University, Riyadh, Saudi Arabia) next offers: **Can avatar homophily influence flow and exploratory behaviour of online users?** saying that virtual learning environments have been recognised as an area of particular importance which educators can use to improve desirable learning behaviours. Investigating the impact of different virtual environments on learners’ behaviours has become the centre of attention of researchers, especially during COVID-19. The homophily effect of avatar-identity on individuals’ perceptions of an environment can be a key for understanding their learning behaviours. This study examined the relationship between key constructs related to avatar homophily (background and attitude) and learners’ flow and exploratory behaviour.

**Application of logistic regression to predict the failure of students in subjects of a mathematics undergraduate course** comes from Stella F. Costa and Michael M. Diniz (Instituto Federal de Educação, Ciência e Tecnologia de São Paulo – IFSP, Brazil). The large rate of student failure is a frequent problem in undergraduate courses, being even more evident in exact sciences. Pointing out the reasons this is a paramount research topic, though not an easy task. An alternative is to use Educational Data Mining techniques (EDM), which enables one to convert data from an educational database into useful information to understand and improve teaching and learning processes. The objective of this paper was to propose mathematical models based on EDM techniques to estimate the probability of a student in a mathematics degree course to fail in exact sciences disciplines, and later on, indicate which aspects contribute significantly for the student failure rates.

The next study: **The potentially counterproductive effects on learning achievement, intrinsic motivation, and extrinsic motivation for ludicization employing Habitica** investigated the actual efficiency of ludic metaphorization of educational contexts, by identifying whether it exerted counterproductive effects on learning achievement, intrinsic motivation, and extrinsic motivation. The author is Qi Zhang (Beijing Language and Culture University, China). In the study seventy participants were divided into ludicization and traditional didactic groups. It found that ludicization exerted counterproductive effects on extrinsic motivation that restrained intrinsic motivation and learning achievement.

**Student readiness for e-learning co-production in developing countries higher education institutions** reports research by Andrews Agya Yalley (University of Cape Coast, Ghana). This study set out to conceptualise and empirically establish the determinants and consequences of student readiness for e-learning co-production in the context of higher education institutions in developing countries. Data were collected and analysed from university students in Ghana. An analysis of the findings identified resource commitment, student resource commitment, task socialisation, self-efficacy, motivation, and effective communication as the determinants of student readiness for e-learning co-production and student satisfaction as its consequence.

**Towards a sustainable online peer learning model based on student’s perspectives** comes from Yuk Ming Tang (The Hong Kong Polytechnic University, Hong Kong and City University of Macau, SAR, China), Yuuyip Lau (The Hong Kong
Polytechnic University, Hong Kong) and Ka Yin Chau (City University of Macau, SAR, China). They note that the outbreak of the COVID-19 pandemic has fundamentally shifted learning from the traditional classroom approach to online learning. Their study used a revision centre as a case study to develop the factors that contribute to the theoretical framework of online peer learning in the higher education sector due to COVID-19. This study also explores the integrated effects of online peer learning on students and investigates whether advanced information technology creates new opportunities or additional burdens for students in adopting online peer learning environments.

Li Yang, Fernando Martínez-Abad and Alicia García-Holgado (University of Salamanca, Spain) then offer: *Exploring factors influencing pre-service and in-service teachers’ perception of digital competencies in the Chinese region of Anhui*. They argue that the emergence of the COVID-19 pandemic has accelerated the wave of digital social transformation worldwide and pushed the “Accelerator Key” for the digital transformation of education. Taking Anhui province as a case study, this research explores socio-demographic factors influencing digital competence level of pre- and in-service teachers of primary and secondary education in China. The research emphasises the study subjects’ perception of their digital competencies in three factors: basic technology literacy, technical support learning, and technical support teaching.

Do school reputation and price matter? *The choice for continuing education in acquiring digital skills by adult learners* ask Adam Wong, Daisy Lee and Catherine Chan (The Hong Kong Polytechnic University, Hong Kong) in the following article. They note that taking courses by continuing education (CE) providers is one of the main ways for adults to learn digital skills. CE is provided in either face-to-face (F2F) or online distance learning (ODL) mode. While F2F courses are natural and well understood, ODL is flexible and less expensive. However, ODL lacks the natural teacher-student and student-student interaction. It is important to find out the factors that affect the adult learner’s preferred learning mode for gaining digital skills. This study examined these factors by modifying the Unified Theory of Acceptance and Use of Technology (UTAUT) by adding the reputation of the provider (RP) and price perception (PP) as moderators. Interestingly, the adult learners perceive the price as an indicator of facilitating conditions.

The ability to formulate problems is an important part of computational thinking (CT) development for nurturing creative problem solvers say Siu-Cheung Kong (The Education University of Hong Kong, Hong Kong) in their article: *Problem formulation in computational thinking development for nurturing creative problem solvers in primary School*. As problem formulation is inadequately addressed in primary school education, their study aimed to investigate the problem formulation processes of primary school students. Students from eight winning teams in a primary school CT competition in Hong Kong participated in the study. Findings suggest that CT curriculum should be designed to allocate sufficient project time and learning space for students to develop their problem formulation ability.

Also from Hong Kong, Daniel Y. Mo (Hang Seng University of Hong Kong), Yuk Ming Tang (The Hong Kong Polytechnic University, Hong Kong and City University of Macau, China), Edmund Y. Wu and Valerie Tang (Hang Seng University of Hong Kong...
Kong) then offer: *Theoretical model of investigating determinants for a successful Electronic Assessment System (EAS) in higher education*. They point out that electronic assessment (e-assessment) is an essential part of higher education, used to manage a large class size with students’ learning performance and particularly in assessing the learning outcomes of students. In this study they propose development of a theoretical model based on students’ perceptions of EAS. Based on the Technology Acceptance Model (TAM) and a major successor of TAM, an electronic assessment system acceptance model (EASA model) is developed with key measures including system adoption anxiety, e-assessment facilitation, and risk reduction.

*Rigid class scheduling and its value for online learning in higher education* is from Aleksandr Grigorkevich (The Karaganda University of the name of Academician E.A. Buketov, Karagandy, Kazakhstan), Ekaterina Savelyeva (I. M. Sechenov First Moscow State Medical University – Sechenov University, Moscow, Russian Federation), Natalya Gaifullina (Yelabuga Institute of Kazan Federal University, Russian Federation) and Elena Kolomoets (Moscow Aviation Institute – National Research University, Russian Federation). The spread of coronavirus infection brought changes to all spheres of activity, including education, which is increasingly moving to a distance learning format. The goal of this study was to investigate the effectiveness of the recommendations for developing a rigid class scheduling method in the framework of online learning using advanced approaches updating traditional learning mechanisms.

*A systematic review of primary school teachers’ experiences with digital technologies curricula* is from Lynley Rose Stringer, Kerry Maree Lee, Sean Sturm and Nasser Giacaman (University of Auckland, New Zealand). Many countries around the world have now introduced Digital Technology concepts and pedagogical practices to their primary school curricula to ensure students develop the understanding, competences and values that will enable them to contribute to and benefit from their future labour market and society. This study aimed to explore teachers’ experiences with these curricula in order to understand how teachers can be supported to raise their implementation efforts.

Sara Ekström (University West, Trollhättan, Sweden) and Lena Pareto (University West, Trollhättan, Sweden and University of Gothenburg, Sweden) then offer: *The dual role of humanoid robots in education: As didactic tools and social actors*. The idea of using social robots for teaching and learning has become increasingly prevalent, and robots are assigned various roles in different educational settings. This study explores teachers’ perceptions of a learning activity in which a child plays a digital mathematics game together with a humanoid robot. The activity is based on the idea of learning-by-teaching where the robot is designed to act as a tutee while the child is assigned the role of a tutor. The question is how teachers perceive and talk about the robot in this collaborative child-robot learning activity? The study shows that teachers had, and frequently switched between, both robot-perspectives, and their perception changed during the process.

*Supporting schools to use face recognition systems: a continuance intention perspective of elementary school parents in China* describes work done by: Jon-Chao Hong (National Taiwan Normal University, Taipei, Taiwan), Yushun Li (Beijing Normal University & Engineering Research Centre for E-learning and Lifelong
Learning of Ministry of Education of the People’s Republic of China), Shuo-Ying Kuo (National Taiwan Normal University, Taipei, Taiwan) and Xin An (Beijing Normal University & Engineering Research Centre for E-learning and Lifelong Learning of Ministry of Education of the People’s Republic of China). A great deal of attention has been focused on technological innovation, but little has been on parents’ acceptance of the use of face recognition systems on campus. To address this their study examined how different degrees of technological innovativeness and dangerous beliefs in the virtual world (DBVW) influence parents’ perceived value of using and intention to continue supporting schools’ use of face recognition systems.

The increasing prevalence and use of smartphones among college students has changed the teaching and learning arena, leading to a surge in research on integration of smartphones in education, especially language education say Cuiying Zou, Ping Li and Li Jin (Wuhan Business University, People’s Republic of China) in their article: Integrating smartphones in EFL classrooms: students’ satisfaction and perceived learning performance. While most studies focused on the use of smartphones after class for language learning, this study aimed at identifying factors affecting students’ satisfaction with and perceived learning performance in the practice of integrating smartphones in EFL classrooms. They found that student continuance intention towards the practice of integrating smartphones in EFL classrooms were positively and significantly influenced by social and facilitating conditions, perceived enjoyment, and learner control.

Detecting latent topics and trends in blended learning using LDA topic modelling is by Bin Yin and ChihHung Yuan (University of Electronic Science and Technology of China, Zhongshan, China). With the rapid application of blended learning around the world, a large amount of significant literature has been accumulated. This paper collected abstracts from 3772 eligible papers published from the Web of Science core collection. Through LDA topic modelling, abstract text content was analysed, and seven well-defined research topics were obtained. According to the topic development trends analysis results, the emphasis of topic research shifted from the initial courses about health, medicine, nursing, chemistry, and mathematics to learning key elements such as learning outcomes, teacher factors, and presences.

Ecenaz Alemdag (Middle East Technical University, Ankara, Turkey) then offers: Effects of instructor-present videos on learning, cognitive load, motivation, and social presence: A meta-analysis, pointing out that although instructional videos with on-screen instructors have become prevalent in various learning contexts, their effect has been questioned because of mixed findings in the literature. This meta-analysis study aimed to elucidate the overall effect of instructor-present videos on learning, cognitive load, motivation, and social presence and to indicate potential moderators. It analysed 20 experimental studies where participants watched an instructional video with or without an on-screen instructor.

Şebnem Koltan Yılmaz (Inonu University, Battalgazi/Malatya, Turkey) and Arzu Deveci Topal (Kocaeli University, Turkey) present: Analysis of awareness of academicians and graduate students about digital product copyrights with chi-squared automatic interaction detector. Academics are both owners and users of copyrighted material, they note, and complex, vague, and ever-changing copyright law creates problems for academicians and students who want to access works and digital prod-
ucts. It is important to increase the awareness of these individuals in order to prevent these problems, so their study aimed to classify academicians and graduate students according to their awareness of the copyright of digital products.

**The reality of E-counselling services in the light of Digital learning from the point of View of Teachers in Jordan** discusses research by Abdallah Mahmoud Abdallah Altarawneh (University of Islamic Sciences, Amman, Jordan) and Reem Abdelkareem Awwad Alomoush (Jordanian Universities, Amman, Jordan). Their study aimed to investigate the reality of e-counselling services in the light of digital learning from the perspective of teachers in Jordan. The scale of the counselling services for this study was created by the researchers, where the validity and reliability of the scale were approved, and the appropriate statistical procedures were used. The study reached some statistical results regarding e-counselling services in the light of digital learning from the perspective of teachers in Jordan. Their results revealed that there are no statistically significant differences at the overall level.

**MethodViz: designing and evaluating an interactive learning tool for scientific methods – visual learning support and visualization of research process structure** comes from Lena Boström and Mårten Sjöström (Mid Sweden University, Sweden). This study focussed on designing and evaluating a learning tool for the research process in higher education as mastering this seems to be a bottleneck within the academy. There is a great need to offer students other ways to learn this skill in addition to books and lectures, and the MethodViz tool supports ubiquitous aspects of the research process in the scientific works higher education students follow. The evaluation’s results are encouraging and show that MethodViz has the potential to improve students’ learning achievements.

**Using Rogers’ diffusion of innovation theory to conceptualize the mobilelearning adoption process in teacher education in the COVID-19 era** is from Rivi FreiLandau (Achva Academic College, Shikmim, Israel), Yulia MuchnikRozanov (Achva Academic College, Shikmim, Israel and Technion - Israel Institute of Technology, Haifa, Israel) and Orit AvidovUngar (Achva Academic College, Shikmim, Israel and The Open University, Ra’anna, Israel). Using mobile learning (ML) has become relevant in times of distant teaching. Although much is known about factors affecting mobilelearning (ML) usage, less is known about the ML adoption process under constraints such as the COVID-19 pandemic. The aim of this exploratory case study was to gain insight into the ML adoption process using the lens of Rogers’ Diffusion of Innovation Theory.

**Understanding the career interests of Information Technology (IT) students: a focus on choice of major and career aspirations** is from Sophie McKenzie (Deakin University, Geelong, Victoria, Australia) and Dawn Bennett (Bond University, Gold Coast, Queensland, Australia). They remark that despite continuous growth in the number of positions in Australia’s IT industry since 2015, only half of Australia’s IT graduates go on to work in IT positions. A much-debated challenge for graduates is that the transition to work is complex and often demands several attempts, but less discussed is why school students choose to study IT at university and whether these motivational factors inform their career choice. To understand the antecedents to career interest, this study investigated the choice of major and career aspirations of undergraduate IT students at an Australian university. The results show that the
motivation to study IT is based largely on intrinsic interest and enjoyment of IT rather than on external factors such as salary or job security.

Practical early prediction of students’ performance using machine learning and eXplainable AI comes from Yeonju Jang and Seongyune Choi (Korea University, Seoul, Republic of Korea), Heeseok Jung (Korea University, Seoul, Republic of Korea and Classting AI Research, Seoul, Republic of Korea) and Hyeoncheol Kim (Korea University, Seoul, Republic of Korea). Predicting students’ performance in advance could help assist the learning process and if “at-risk” students can be identified early on, educators can provide them with the necessary educational support. Despite this potential advantage, the technology for predicting students’ performance has not been widely used in education due to practical limitations. The authors propose a practical method to predict students’ performance using machine learning and explainable artificial intelligence (XAI) techniques. To verify whether at-risk students could be distinguished using the selected features, the researchers experimented with various machine learning algorithms: Logistic Regression, Decision Tree, Random Forest, Multi-Layer Perceptron, Support Vector Machine, XGBoost, LightGBM, VTC, and STC.

Shubham Gargrish, Archana Mantri and Deepti Prit Kaur (Chitkara University, Rajpura, Punjab, India) next write on: Evaluation of memory retention among students using augmented reality-based geometry learning assistant. They point out that the teaching of Mathematics and in particular, Geometry, through conventional methods has been a challenging task for tutors. Augmented Reality (AR) based applications available in commercial space, have not followed any structured pedagogical approach in the designing process, and do not ensure that the learning time of students is spent prolifically. In this paper, they explore the use of AR in mathematics for geometry education, to aid visualisation of multidimensional objects and long-term retention of concepts by the learners.

Carlos Javier Pérez Sánchez, Fernando CalleAlonso and Miguel A. VegaRodríguez (Universidad de Extremadura, Cáceres, Spain) then offer: Learning analytics to predict students’ performance: A case study of a neurodidactics-based collaborative learning platform. In this work, 29 features were defined and implemented to be automatically extracted and analysed in the context of NeuroK, a learning platform within the neurodidactics paradigm. Neurodidactics is an educational paradigm that addresses optimisation of the learning and teaching process from the perspective of how the brain functions. In this context, the features extracted can be input into various machine learning algorithms to predict the students’ performance. The proposed approach was tested with data from an international course with 698 students.

We are experiencing a transitional period in education: from traditional, face to face teaching to new teaching and learning models that apply modern pedagogical approaches, utilise technological achievements, and respond to current social needs, point out Charalampos Zagouras (Computer Technology Institute & Press – “Diophantus”, Patras, Greece and University of Patras, Greece), Demetra Egarchou, Panayiotis Skiniotis and Maria Fountana (Computer Technology Institute & Press – “Diophantus”, Patras, Greece) in their article: Face to face or blended learning? A case study: Teacher training in the pedagogical use of ICT. In this paper they compare face to face (“traditional”) teacher training with teacher training through a
blended learning approach. The reported case study was based on a large-scale in-service teacher training initiative which has been taking place in Greece for over a decade to train teachers in utilisation and application of digital technologies in teaching practice (i.e. B-Level ICT Teacher Training).

Jihyun Sung (Sungkyunkwan University, Seoul, South Korea) then writes on: Assessing young Korean children's computational thinking: A validation study of two measurements. Computational thinking (CT) in young children has recently gained attention. This study verified the applicability of the Korean version of the Bebras cards and TACTIC-KIBO in measuring CT among young children in South Korea. A total of 450 children responded to the Bebras cards, TACTIC-KIBO, and Early Numeracy tasks that were used for the following analyses. The results showed that these two measurements are acceptable for assessing CT among young children, demonstrating good validity and reliability, despite limitations such as the weak factor loadings of some items and low internal consistency of subfactors.

MOOCs as a massive learning resource for a Higher Education Community. The Universitat Politècnica de València experience using the EdX remote access program by Ignacio Despujol (Universitat Politècnica de València, Spain), Linda Castañeda (Universidad de Murcia, Spain) and Carlos Turró (Universitat Politècnica de València, Spain) discusses a Remote Access Program, to give access to free certificates for its Massive Open Online Courses (MOOCs) to the communities of its partners. EdX launched this initiative during the 2020 COVID-19 lockdown. This paper describes experience of a Higher Education (HE) institution in Europe participating in this initiative as a strategic action to spread MOOCs, not just as a resource to but also to improve the professional development possibilities of its community.

The use of semantic similarity tools in automated content scoring of fact-based essays written by EFL learners comes from Qiao Wang (Waseda University, Tokyo, Japan). This study searched for open-source semantic similarity tools and evaluated their effectiveness in automated content scoring of fact-based essays written by English-as-a-Foreign-Language (EFL) learners. Fifty writing samples under a fact-based writing task from an academic English course in a Japanese university were collected and a gold standard was produced by a native expert. A shortlist of carefully selected tools, including InferSent, spaCy, DKPro, ADW, SEMILAR and Latent Semantic Analysis, generated semantic similarity scores between student writing samples and the expert sample.

Educational data mining (DEM) provides valuable educational information by applying data mining tools and techniques to analyse data at educational institutions and Wei Zhang, Yu Wang and Suyu Wang (South China Agricultural University, Guangdong, China) discuss this in: Predicting academic performance using tree-based machine learning models: A case study of bachelor students in an engineering department in China. In this study, tree-based machine learning algorithms are used to predict students’ overall academic performance in their bachelor’s program. The transcript data of the students in the same department in a Chinese university were collected. Three tree-based machine learning models were established: Decision Tree (DT), Gradient Boosting Decision Tree (GBDT) and Random Forest (RF). Results show that we can successfully identify more than 80% of the students at low-performance risk using the RF model at the end of the second semester. This is
meaningful because global quality of teaching and learning of the department can be improved by taking targeted measures in time according to the machine learning model.

Also from China, Min Chen (Central China Normal University, Wuhan, China and Strategic Research Base of the Ministry of Education, Wuhan, China), Yanqiu Liu, Zhaoang Li and Yating Li (Central China Normal University, Wuhan, China) offer us: Promoting teacher information literacy from a principal’s perspective based on intermediate chain analysis. Teacher information literacy is an important aspect of teachers’ professional development and is affected by the school environment. From the perspective of principals, this study discusses the impact of principals’ information leadership (PIL), organisational climate (OC), and ICT implementation strategies (IMS) on teachers’ information literacy (TIL) and further analyses the complex system of TIL and the relationship between these factors.

Memory transfer language as a tool for visualization-based pedagogy comes from: Leonard Mselle and Fredrick Ishengoma (The University of Dodoma, Tanzania). In this paper, Memory Transfer Language (MTL), an approach for visualisation-based pedagogy, is analysed and contextualised in both Cognitive Load Theory (CLT) and Dual Coding Theory (DCT). Through MTL, lectures, tutorials, laboratory sessions and individual study in learning and teaching programming are all carried out using two cognitive channels, verbal and non-verbal. Diagrams together with animations are used to visualise codes, while text and voice are used for verbal presentations. A class experiment was carried out to evaluate the impact of using MTL together with animations in teaching programming.

Next, Carles Bruguera, Montse Guitert and Teresa Romeu (Universitat Oberta de Catalunya (UOC), Barcelona, Spain) give us: Social media in the learning ecologies of communications students: Identifying profiles from students’ perspective. Social media can be a support during the initial training of communication professionals, although most studies on social media and learning have focused on other professional groups. The purpose of this article was to explore how communication students learn, and their use of social media platforms to identify the role of social media in supporting this. Data was collected using a questionnaire sent to communication students and analysed using a clustering technique, to identify student profiles based on how they organise their learning and their use of social media platforms.

Finally in this issue comes: A dynamic review allocation approach for peer assessment in technology enhanced learning by Gabriel Badea and Elvira Popescu (University of Craiova, Romania). They note that peer assessment plays an important role in education, fostering involvement and critical thinking skills for students, while reducing the grading workload for the teacher. Research on review allocation mechanisms in the context of peer assessment is relatively scarce in the literature. This paper proposes an innovative dynamic review allocation mechanism with extra bidding that attempts to solve some of the issues exhibited by the static and random approaches. The new method splits the review period in two stages: a first review phase, where students have to submit required assessments, and an extra review phase, where students can offer bidding points to perform additional optional reviews. The mechanism was integrated as part of their LearnEval peer assessment platform.
EAIT again displays its truly international character with articles in this issue coming from researchers in: Algeria, Australia, Brazil, China, Czech Republic, Egypt, Ghana, Greece, Hong Kong, India, Indonesia, Israel, Japan, Jordan, South Korea, Macau, Mexico, Morocco, New Zealand, Romania, Russia, Rwanda, Saudi Arabia, Spain, Spain, Sweden, Taiwan, Tanzania, Turkey, and USA.

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