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Editorial for EAIT issue 1, 2020

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Education and Information Technologies (EAIT) is the official journal of the Technical Committee on Education (TC3) of the International Federation for Information Processing (IFIP). It covers the complex relationships between information and communication technologies and education, from the micro of specific applications or instances of use in classrooms to macro concerns of national policies and major projects; from classes of five year olds to adults in tertiary institutions; from teachers and administrators, to researchers and designers; from institutions to open, distance and lifelong learning. The journal's breadth of coverage allows EAIT to examine fundamental issues at all levels, discuss specific instances and cases, draw inference and probe theory. This journal is embedded in the research and practice of professionals.

To begin we have an article from Russia: ***Convergent approach to synthesis of the information learning environment for higher education*** by Alexey Finogeev, Lejla Gamidullaeva, Alexandr Bershadsky, Ludmila Fionova, Michael Deev and Anton Finogeev (Penza State University, Russia). The article considers a convergent approach to the synthesis of the information learning environment for higher education, which includes tools for managing educational content and learning trajectories. The describe system includes the Alfresco educational content management subsystem, the Moodle learning management subsystem, the learning material presentation subsystem, the knowledge assessment subsystem, the learning activity management subsystem, the requirements of education standards and employers analysis subsystem.

Finding model through latent semantic approach to reveal the topic of discussion in discussion forum by Reina Setiawan, Widodo Budiharto, Iman Herwidiana Kartowisastro and Harjanto Prabowo (Bina Nusantara University, Indonesia) follows. The article notes that a lot of information and knowledge can be extracted from a discussion forum and presents a model to identify topics of discussion through a latent semantic approach, known as the Topics Finding Model (TFM). They describe how their model can be applied in various discussion forums and languages.

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Indonesia) and Riyan Hidayat (University of Malaya, Malaysia) describe a quasi-experiment conducted to determine the effects of using the software GeoGebra as a teaching aid for the achievement of Form Two students – ***Effect of use of GeoGebra on achievement of high school mathematics students***. Significant differences were found in student achievements in relation to the topics of functions and limit functions according to their group type and showed that teachers and students approved the use of GeoGebra in the teaching and learning of mathematics. Their study suggests that learning mathematics with the help of GeoGebra allows for an active interaction between teachers and students.

ASD children experience different development to other children and so require special services to optimise their development. ***Implementation of family awareness intervention program by parents with ASD children*** by Endang Rochyadi, Rona Wulandari, Mayasari Manar, Endun Sunanda and Yopi Yuliana (Indonesia University of Education) notes that one of the factors that greatly contributes to determining child development is the family environment in which children live and develop, but that not all parents have realised and understood the conditions of child development which are more likely to relate to ASD conditions. Their study aimed to form a family awareness intervention program based on the needs of children and parents and to describe the implementation of intervention programs carried out by the family to find out whether parents are able to properly implement the programs that have been prepared.

Blended learning in computing education: It's here but does it work? Ellen F. Monk, Kevin R. Guidry, Kathleen Langan Pusecker and Thomas W. Ilvento (University of Delaware, USA) begin by noting that blended learning, a combination of face-to-face and computer-assisted pedagogy, is gaining acceptance at universities as an alternative learning experience and that modern technology has facilitated incorporation of active learning and student engagement. Although use of technology enhanced coursework is usually regarded as comparable to what occurs in traditional coursework, recent studies focusing specifically on blended learning in totally redesigned classes report positive results. The authors use a critical realism lens to create a mechanism for learning. Their study showed that self-regulatory skills were evident, so confirming that blended learning can aid in the construction of learning.

The next paper comes from Israel and was contributed by: Hana Stein, Irina Gurevich and Dvora Gorev (Achva Academic College, Israel). Their reported research focuses on attitudes of novice mathematics teachers towards the use of technological tools in their teaching and is titled: ***Integration of technology by novice mathematics teachers – what facilitates such integration and what makes it difficult?*** Their results indicated that the novice teachers believed that integrating technology into their teaching facilitates their pupils' learning and understanding. Their participants were open to technological innovations and adopted ICT and other digital tools in a conscious and intelligent manner. They found, however, that there were difficulties the participants faced related to effective lesson management and lack of technical support from school authorities. This raises the issue of school management support as a key factor for successful integration of up-to-date technology.

From Greece, Fotis Lazarinis (Hellenic Open University, Greece), Kyriaki Alexandri (Ministry of Education, Greece), Chris Panagiotakopoulos (University of Patras, Greece) and Vasileios S. Verykios (Hellenic Open University, Greece) next offer: ***Sensitizing young children on internet addiction and online safety risks through***

storytelling in a mobile application. Their study looks at an application which through storytelling attempts to improve the understanding of students with respect to online risks. Each short story presents a situation that children face while surfing the Internet and uses the emotions of the virtual characters and specific visual clues to make students consider the online activities and alter their attitudes.

Cloud computing can be seen as a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources including networks, servers, applications, and services. ***Cloud computing services adoption among higher education faculties: development of a standardized questionnaire*** by Zoleixa Asadi, Mohammadhiwa Abdekhoda and Haidar Nadrian (Tabriz University of Medical Sciences, Iran) describe a study to develop and validate an instrument to investigate the determinants of cloud computing services (CCSs) based on the Theory of Planned Behaviour (TPB). The factors identified by the study included Attitude toward CCSs use, Perceived Privacy/Security, Perceived Behavioural Control, Intention to use CCSs and Subjective Norms. They argue that their findings demonstrate validity, reliability, simplicity and functionality of the TPB-CCSQ.

The use of Twitter and Youglish for the learning and retention of commonly mispronounced English words comes from Galip Kartal and Saadet Korucu-Kis (Necmettin Erbakan University, Turkey). Their paper reports on the findings of a study into the effects of the social networking sites Twitter and Youglish on the learning and retention of commonly mispronounced words. This is important as relevant research, especially on the use of microblogging for the learning of pronunciation, is rather limited. This issue becomes even more apparent in countries like Turkey where English is taught as a foreign language and a considerable number of words are commonly mispronounced by Turkish language learners, including pre-service language teachers. Twitter was used for explicit instruction and input enhancement for the words by capitalizing of stressed syllables, providing links to talks, stressing the problematic features of the target words and showing other pronunciation-related familiar words. Youglish was used to utilize the tenets of extensive listening and input enhancement. Tweets are aimed at drawing direct attention to the pronunciation of each word. Findings from this study have strengthened the evidence supporting the impact of Twitter (supported by Youglish) for pronunciation instruction.

Jakia Sultana (University of Dhaka, Bangladesh) next presents: ***Determining the factors that affect the uses of Mobile Cloud Learning (MCL) platform Blackboard - a modification of the UTAUT model***. The study aimed to unveil factors that affect use of Mobile Cloud Learning (MCL) platform Blackboard. The Unified Theory of Acceptance and Use of Technology (UTAUT) model was applied and modified with two additional variables: mobility and self-management learning, to understand the usage behaviour of the users. Performance expectancy, effort expectancy and self-management learning were found in the research to be significant factors.

Constraints and strategies for effective use of social networking sites (SNSs) for collaborative learning in tertiary institutions in Nigeria: perception of TVET lecturers describes research by Chijioke Jonathan Olelewe (University of Nigeria), Chibueze Tobias Orji (University of Nigeria), Emmanuel C. Osinem (University of Nigeria) and Ikemelu Chinelo Rose-Keziah (NwaforOrizu College of Education, Nigeria) on the popularity of using social networking sites as an educational tool as many educators are trying to integrate online teaching platforms from Google, LinkedIn

and Facebook into the learning environment. However, despite the importance of SNSs, constraints seem to hinder its effective use for collaborative learning in Nigeria by TVET lecturers. The purpose of their research was to ascertain perception of TVET lecturers on the constraints and possible strategies to effective use of SNSs for collaborative learning in tertiary institutions in Nigeria. Their findings on the use by TVET lecturers and the constraints hindering this use are discussed.

As digital multimedia devices increasingly pervade people's lives, including those of older adults, the need to provide relevant training for these age groups grows say Borka Jerman Blažič and Andrej Jerman Blažič, (International Post-graduate School Jožef Stefan and Institut Jožef Stefan, Ljubljana, Slovenia) in their article: ***Overcoming the digital divide with a modern approach to learning digital skills for the elderly adults***. Older adults often find it difficult to use digital devices like smartphones, and lack the basic digital literacy required to use multimedia interactive devices with touchscreen technology leading to their experiencing of a sharp digital divide in the twenty-first century. Their study involved older adults from four European countries participated in a two-phase process: playing interactive games on a large touchscreen tablet and learning how to use a smartphone to access digital services. Findings and recommendations for an effective approach to this problem are discussed.

Jaël Muls, Valérie Thomas, Free De Backer, Chang Zhu and Koen Lombaerts (Vrije Universiteit Brussel, Belgium) then introduce a study aimed to explore the existence and extent of social media visions, policies and guidelines in high schools in Flanders and how these policies are embedded in the schools. Their paper is titled: ***Identifying the nature of social media policies in high schools*** and points out that there is a wide variety of guidelines amongst schools, and that schools often experience struggles in determining their position within the social media debate. This study offers input for the design of more coherent school policy decisions to facilitate use of social media, contributing to the wellbeing of both students and teachers in high schools.

Understanding the nuances of E-learning in orthodontic education is by Gururajaprasad Kaggal Lakshmana Rao, Yulita Hanum P. Iskandar and Norehan Mokhtar (Universiti Sains Malaysia). The aim of their study was to understand the phenomenon of e-learning in orthodontic graduate education. E-learning was assessed based on two objectives, summarising its outcomes and implications over other forms of learning, and understanding the impediments in the integration of technological advances in orthodontic educational instruction. Their study conducted a comprehensive electronic search in the English language on PubMed, Medline, EMBASE and Google Scholar using the Problem/Patient/Population, Intervention, Comparison or Control and Outcome (PICO) criteria in the selection of reviewed articles. Their review showed an overall knowledge gain and that student's attitudes were found to be positive following e-learning and a smart learning environment.

The next article describes a study investigated moderating effect of factors of innovation consciousness and quality consciousness. ***Moderating effect of innovation consciousness and quality consciousness on intention-behaviour relationship in E-learning integration*** is from C. T. Olugbara (University of Zululand, South Africa), S. N. Imenda (University of Zululand, South Africa), O. O. Olugbara (Durban University of Technology, South Africa) and H. B. Khuzwayo (University of the Western Cape, South Africa). Previous authors have suggested a deeper theoretical examination of conditions under which intention may or may not directly influence behaviour and in

this paper the authors introduce three hypotheses to investigate moderating effect of innovation consciousness and quality consciousness on the relationship between intention to integrate e-learning and actual e-learning integration behaviour.

Artificial intelligence moving serious gaming: Presenting reusable game AI components comes from a large group of authors from The Netherlands, Portugal and Romania: Wim Westera (Open University of The Netherlands), Rui Prada (INESC-ID, Rua Alves Redol, Portugal and Universidade de Lisboa, Portugal), Samuel Mascarenhas (INESC-ID, Rua Alves Redol, Portugal and Universidade de Lisboa, Portugal), Pedro A. Santos (INESC-ID, Rua Alves Redol, Portugal and Universidade de Lisboa, Portugal), João Dias (INESC-ID, Rua Alves Redol, Portugal and Universidade de Lisboa, Portugal), Manuel Guimarães (INESC-ID, Rua Alves Redol, Portugal and Universidade de Lisboa, Portugal), Konstantinos Georgiadis (Open University of The Netherlands), Enkhbold Nyamsuren (Open University of The Netherlands), Kiavash Bahreini (Open University of The Netherlands), Zerrin Yumak (Utrecht University, The Netherlands), Chris Christyowidiasmoro (Utrecht University, The Netherlands), Mihai Dascalu (University Politehnica of Bucharest, Romania), Gabriel Gutu-Robu (University Politehnica of Bucharest, Romania) and Stefan Ruseti (University Politehnica of Bucharest, Romania). Their article provides a comprehensive overview of the use of artificial intelligence (AI) for serious games. They report on the work of a European flagship project on serious game technologies that presents a set of advanced game AI components enabling pedagogical affordances that can be easily reused across a wide diversity of game engines and game platforms. Serious game AI functionalities include player modelling (real-time facial emotion recognition, automated difficulty adaptation, stealth assessment), natural language processing (sentiment analysis and essay scoring on free texts), and believable non-playing characters (emotional and socio-cultural, non-verbal bodily motion, and lip-synchronised speech), respectively.

Eleni Demitriadou (Cyprus University of Technology), Kalliopi-Evangelia Stavroulia (Cyprus University of Technology) and Andreas Lanitis (Cyprus University of Technology and Research Centre on Interactive Media Smart Systems and Emerging Technologies, Cyprus) next present: ***Comparative evaluation of virtual and augmented reality for teaching mathematics in primary education***. They point out that Primary School students often find it difficult to understand the differences between two dimensional and three-dimensional geometric shapes. Taking advantage of the ability of virtual and augmented reality to visualize 3D objects, their research investigated the potential of using virtual and augmented reality technologies for teaching the lesson of geometric solids to primary school children. Their results indicated that implementation of new technologies in education of virtual and augmented reality improve interactivity and student interest in mathematics education, contributing to more efficient learning and understanding of mathematical concepts when compared to traditional teaching methods.

The impacts of multi-modal PowerPoint presentation on the EFL students' content knowledge attainment and retention over time is an article by Yahya Gordani and Yaser Khajavi (Salman Farsi University of Kazerun, Iran). They begin by pointing out that although a wide range of studies on the use of PowerPoint Presentations in different fields have been conducted, few have looked at the effects of different aspects of multimodal PowerPoint presentation on the language comprehension of foreign

language students. This study was conducted to investigate the effect of PowerPoint-supported (PPS) lectures on immediate comprehension and longer term retention of the content by foreign language University students. They found that learners' comprehension improves significantly both immediately and in the long run when they are provided with PPS lectures with slides at propositional level, but that the slides must be selected and designed with care so that key terms, issues and ideas are covered.

Many cultural and psychological factors affect the behaviour of users towards use and acceptance of mobile-based educational applications. Arefeh Ameri, Reza Khajouei, Alieh Ameri and Yunes Jahani (Kerman University of Medical Sciences, Iran) discuss this in: ***Acceptance of a mobile-based educational application (LabSafety) by pharmacy students: An application of the UTAUT2 model***. The aim of their study was to evaluate behavioural intention of pharmacy students of acceptance and long-term use of the mobile-based application for educating safety measures in pharmaceutical laboratories (LabSafety). They made use of the Unified Theory of Acceptance and Use of Technology (UTAUT2) and found that 'Performance Expectancy', 'Social Influence' and 'Habit' had positive effects on 'Behavioral Intention' and that 'Behavioral Intention' had significant positive effects on 'Use Behavior'. The effect of 'Habit' on 'Use Behavior' in men was higher than women.

From Morocco, Ibtissam Azzi (University of Sidi Mohamed Ben Abdellah, Morocco), Adil Jeghal (Groupe Sup'Management, Morocco), Abdelhay Radouane (Centre Régional des métiers de l'éducation et de Formation, Morocco), Ali Yahyaouy (University of Sidi Mohamed Ben Abdellah, Morocco) and Hamid Tairi (University of Sidi Mohamed Ben Abdellah, Morocco) discuss: ***A robust classification to predict learning styles in adaptive E-learning systems***. They note that in E-Learning Systems, automatic detection of learners' learning styles provides a concrete way for instructors to personalise the learning. Classification techniques are the most used techniques to automatically detect the learning styles by processing data coming from learner interactions with the system. To construct a robust classifier a representative set of data is crucial, so a robust approach for automatically detecting learning styles must take into account the wealth of information to be processed. The authors propose a robust classifier which can be able to identify the learning style of the learner in E Learning Systems.

The effect of modelling, collaborative and game-based learning on the geometry success of third-grade students is a study by Halil Coşkun Çelik (Siirt University, Turkey). These approaches were applied to geometry instruction in nature on the success of students in geometry in which students' views about geometry activities were also examined. The quantitative findings obtained at the end of the study revealed that the students' success in geometry was greatest in the modelling group. Qualitative findings showed that geometry activities in nature were more effective than in-class activities.

Skills in the area of digital safety as a key component of digital literacy among teachers was contributed by Łukasz Tomczyk (University of Cracow, Poland). The goal of the reported research was to assess the level of Digital Literacy (DL) among teachers, and was diagnostic in order to show DL in six selected key areas: the ergonomics of using ICT, assessing the credibility of information, secure online communication, maintaining anonymity in the digital world, safe logging-in, and intellectual property. Based on the data collected, it was noticed that: DL is a

heterogeneous concept; the respondents possess the lowest level of knowledge in the area of intellectual property law and know the most about ergonomics; gender does not determine the level of knowledge and competencies in the group. Also, the Dunning-Kruger effect is noticeable among the teachers in the context of evaluation of DL related to digital safety.

Osman Birgin (Usak University, Turkey), Kübra Uzun (Şehit Er Ali Oktaytekin Secondary School, Kütahya, Turkey) and Sacide Güzin Mazman Akar (Usak University, Turkey) next offer a study to investigate the perceived ICT proficiency of Turkish mathematics teachers, titled: ***Investigation of Turkish mathematics teachers' proficiency perceptions in using information and communication technologies in teaching***. The research found that while Turkish mathematics teachers use ICT for social media and communication purposes, they have insufficient knowledge and experience of ICT usage for teaching purposes. It was found that perceived proficiency of mathematics teachers in ICT usage did not significantly differ in terms of gender, while significant differences were found in terms of their years of professional experiences, teaching level and having training on computer-assisted instruction.

Ramón Tirado-Morueta (University of Huelva, Spain), Inmaculada Berlanga-Fernández (Universidad Internacional de la Rioja, Spain), Helena Vales-Villamarín (Attendis, Spain), Mª Dolores Guzmán Franco (University of Huelva, Spain), Ana Duarte-Hueros (University of Huelva, Spain) and José Ignacio Aguaded-Gómez (University of Huelva, Spain) point out that one-to-one mobile programs in elementary schools as a substite for textbooks have become popular worldwide. In ***Study of a sequence to stimulate the engagement in one-to-one iPad programs at elementary schools*** the authors utilized and adapted a self-system model of motivational development in order to better understand the mechanisms behind the promotion of academic engagement in one-to-one iPad programs. They found that in some courses, certain activities with iPads influenced students' engagement, while promoting authentic learning and satisfying their needs.

The following study investigated acceptance, over time, of two specific technologies in a university setting, namely interactive quizzes and screen sharing. It made use of the Technology Acceptance Model (TAM) that includes its perceived usefulness, perceived ease of use and behavioural intention as its main concepts. ***A longitudinal study to understand students' acceptance of technological reform – When experiences exceed expectations*** describes research by: Annelies Raes (Centre for Instructional Psychology and Technology, Belgium and ITEC, IMEC research group at KU Leuven, Belgium) and Fien Depaepe (Centre for Instructional Psychology and Technology, Belgium and ITEC, IMEC research group at KU Leuven, Belgium). The study aimed to investigate students' expectations towards educational technology at the start of the project and students' experiences with educational technology throughout the academic year, and results showed that students started out with a positive predisposition to the usefulness, ease of use, and behavioural intention of using educational technology in university settings.

A design-based research approach for developing data-focussed business curricula by Shah J. Miah (Victoria University, Australia), Ian Solomonides (Victoria University, Australia) and John G. Gammack (Zayed University, Dubai, United Arab Emirates) notes that although existing data science educational programmes develop talent and produce graduates, business-focused data science curricula comprising

essential skills oriented to business and managerial data with associated analysis, remain underserved. Current pedagogy has focused either on data science or on purely analytic technical aspects meaning that there is an opportunity to rethink how institutions can develop innovative data-focussed education programmes, addressing both modern industry and community demands. As both academia and industry strive to integrate applied learning, transferable and enterprise skills into business and sciences, this paper proposes a design based research approach for such a new interdisciplinary data science teaching curriculum as a foundation to deliver undergraduate degrees in Business Data Science.

The next article describes an experimental research study in vocational schools intended to develop a system of educational process informatization taking into account the ICT competence of skilled workers and the trends of the information society. ***Informatization of technical vocational schools: Theoretical foundations and practical approaches*** describes this research undertaken by: Andrii Lytvyn (Lviv State University of Life Safety of the State Emergency Service of Ukraine), Vitalii Lytvyn (National University "Lviv Polytechnic", Ukraine), Larysa Rudenko (Lviv State University of Life Safety of the State Emergency Service of Ukraine), Yuriy Pelekh (Jan Dlugosz University in Czestochowa, Poland), Oleksandr Didenko (National Academy of the State Border Guard Service of Ukraine named after Bogdan Khmelnitsky, Ukraine), Radosław Muszkieta (Nicolaus Copernicus University, Poland) and Walerij Żukow (Nicolaus Copernicus University, Poland). A set of interrelated activities that comprise learning management systems, information and analytical databases, computer simulation of professional actions, programs of control of knowledge, application of ICT for writing diploma papers, computer methods of competence diagnostics, simulation training complexes, expert and decision support systems was implemented at a technical vocational school. The experiment showed that use of developed methods of information training of applying pedagogical software tools at technical vocational school and of training vocational school teachers how to use ICT contributes to the improvement of graduates' professional competence.

Present-day management of universities in Russia: Prospects and challenges of e-learning by Elena R. Vershitskaya (V.I. Vernadsky Crimean Federal University, Russia), Anna V. Mikhaylova (North-Eastern Federal University, Russia), Suriya I. Gilmanshina (Kazan (Volga Region) Federal University, Russia), Evgeniy M. Dorozhkin (Russian State Vocational Pedagogical University, Russia) and Vladimir V. Epaneshnikov (Kazan (Volga Region) Federal University, Russia) notes that as evidenced by the increased budget allocations for e-learning programs, the e-learning market is becoming more and more popular around the world. The reported study aimed to evaluate the readiness of university management and students for active e-learning and to identify the prospects and problems of ICT in educational management when introducing e-learning. The research showed that despite the potential of a learning management system to support both blended learning and e-learning, most e-learning initiatives are not fully realised or fail. Poor marketing strategies, poor service strategies and insufficient technical support are some of the most likely causes of failure.

In the final paper for this issue, ***Patterns of multitasking behaviours of adolescents in digital environments***, Karen Ettinger and Anat Cohen (The Jaime and Joan Constantiner School of Education, Tel Aviv University, Israel) consider the centrality

of multitasking in teenagers' lives that has triggered vast interest in popular and academic discussion. They researched multitasking patterns, prevalence, types, combinations and gender differences of adolescents using observations, in-depth interviews and questionnaires and found a large variety of multitasking prevalence and types that they categorised as simultaneous multitasking and task switching. Most of this observed multitasking was actually task switching with a higher frequency of multitasking during leisure than during study time and an interesting finding was a connection between the natures of tasks: passive, active or incidental and the multitasking type. Gender differences in multitasking were observed, especially with regard to the nature of the task combinations.

As usual, this issue is a truly international one with article coming from authors in Australia, Bangladesh, Belgium, Cyprus, Greece, Indonesia, Iran, Israel, Malaysia, Morocco, Nigeria, Poland, Portugal, Romania, Russia, Slovenia, South Africa, Spain, The Netherlands, Turkey, UAE, Ukraine and USA.

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Editor-in-Chief.