MANAGING THE IMPLEMENTATION IN SCHOOLS OF ICT AND ITS INFLUENCE ON THE PERFORMANCE OF SCHOOL STUDENTS

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Abstract: *The integration of Information and Communication Technology (ICT) in teaching is a goal that education systems across the world strive for, in both developed and developing countries. However, ICT integration has not been found prevalent and consistent in empirical studies in the past three decades. Although many of these studies have examined the application of ICT and its effects on teaching and the achievement of learning objectives, empirical information is still lacking on the relationship between ICT integration and the ability to realize its potential benefits regarding students' achievement. The purpose of this paper, therefore, is to review the current empirical research examining the impact of ICT implementation in schools on students' academic achievements. The conclusion drawn from empirical research findings in the past two decades is that they tend to be consequential to the research approach from which they derive, and that a robust and distinct effect of ICT application on students' academic achievement cannot be determined. Additionally, findings reinforce the claim that the greatest impact on students' academic outcomes following the use of ICT is not significantly influenced by internal factors in students, but more by factors related to the teachers, the learning environment and opportunities and the school administration. Furthermore, a large proportion of these factors are, in turn, a subject of a certain cultural and social context. Consequentially, the association between ICT integration in a given educational system and the expected results of the process, is the product of a complex relationship between many factors, educational, cultural and social, and a successful ICT assimilation process has to be one that takes these factors into account. These findings highlight the need for further empirical research that will expand the current theoretical and practical knowledge on this issue. In addition, these findings need to be taken into account by policymakers as well as education professionals.*

Keywords: *ICT Integration; Education Management; Instructional Design; Twenty First Century skills.*

JEL Classification: *I21; I24; I28*

1. Introduction

The integration of Information and Communication Technology (ICT) in teaching is a goal that education systems across the world strive for, in both developed and developing countries. ICT has been such a desired objective in recent decades due to its many attributed benefits (Badarne, 2019a; Park & Weng, 2020). In particular, this process is attributed a significant potential impact on economic development and

growth in many countries, including Israel (Badarne, 2019b; Díaz & Cano, 2019). However, despite its appeal, ICT integration has not been found prevalent in international studies like PISA and PIRLS around the world. For this reason, in the past three decades, many studies have examined the application of ICT and its effects on teaching and the achievement of learning objectives. These studies can be divided into three main branches: The first consists of studies that examined the relationship between various factors and the progress of the ICT implementation process, including economic, social, cultural factors, teacher's skills and attitudes of stakeholders in the educational system in relation to technology and change (Ben Amram et al., 2021; Eickelmann, 2011; Eyles, 2018; Goldstein & Ropo, 2021; Hermawan et al., 2018; Muslem et al., 2018; Nikolić et al., 2019; Salam et al., 2018; Willis et al., 2019; Yeop et al., 2019). The second branch consists of articles that examined the relationship between systemic, country-wide and local factors and the impact of ICT on students' academic achievement (Basri et al., 2018; Díaz & Cano, 2019; Park & Weng, 2020). And the third branch of the research literature focused on the individual student level and were mainly interested in the study of the relationship between factors within the individual and the impact of the ICT application process on students' academic achievement (Hu et al., 2018; Meng et al., 2019).

Alongside these important studies, empirical information is still lacking in order to advance the theoretical and practical knowledge of the relationship ICT integration and the ability to realize its potential benefits regarding students' achievement. Thus, the purpose of this paper is to present a review of the current empirical research in the field. Accordingly, the article will be organized as follows. First, I will present and define the key concepts relevant to the paper. I will then review the field of research studying the factors that influence the integration of ICT in education systems. Next, I will focus on the question of the benefits and advantages of implementing ICT in schools according to empirical research. Correspondingly, I will present a recent review of the empirical research examining the impact of ICT implementation in schools on students' academic achievement, and the final section will conclude the paper.

2. Integration of Information and Communication Technology in Education

Over the past century, many attempts have been made to integrate technological developments into teaching and learning practices, beginning with radio, film and television, and on to computer assisted and online learning. However, despite immense expectations of each attempt to significantly improve learning efficiency and outcomes, most of them did not have long term usage and significant integration in actual teaching and learning. Nonetheless, thanks to great advances in mobile communication technology, social networks and Cloud technology in the recent decades, ICT integration in education is expected to become a major contributor to the achievement of teaching objectives and goals (Badarne, 2019a). Accelerated by

the effects of Covid-19 quarantines and disruptions, E-learning and remote learning have become wide-spread and routine practices all over the world (McQuirter, 2020). Moreover, ICT integration is considered a key factor in 21th century skills education and development. 21st century skills refer to a global set of skills and capabilities including information management, communication, media literacy, collaboration, creativity, planning, entrepreneurship, critical thinking, risk taking, conflict management, problem solving, alongside social and cultural skills, flexibilities and lifelong learning. A major aspect of these skills involves operating and manipulating data and technology; thus, it is clear why education systems around the world play a central role in instilling these skills and preparing learners for adult life in a future world of information-rich environments (Amzaleg & Masry-Herzallah, 2021; Badarne, 2019b). Additionally, ICT implementation holds great potential for improving many populations' accesses to quality education without incurring excessive costs, thus becoming an agent of social change (Abdelrahman & Salhi, 2020; Badarne, 2019b).

2.1. What is ICT in Education

ICT integration in education is the implementation of information and communication technologies in learning and teaching practices as well as in administration and evaluation, viewed as an organizational change (Basri et al., 2018). ICT includes computers, use of the Internet in mobile and stationary instruments and electronic systems such as sound equipment, televisions and projectors and others (Díaz & Cano, 2019). Using communications technology platforms, education organizations and educators can manage courses, curriculums and distance learning processes. In addition, information technology can be used to develop innovative learning materials and methods. Moreover, the combination of information and communication technologies allows greater interaction, between the students, the learning materials and the teacher (Badarne, 2019a). Furthermore, ICT provides the teachers with a variety of tools with which they can diversify their lessons, using different methods, interactions, games and stimulating environments, thus improving not only learning efficiency, but also students' attitudes toward various subjects. The students themselves benefit from ICT as it allows progress at a personal pace, active learning with immediate feedback, enhance interest and enjoyment in the learned subject and cultivation of personal skills. Last but not least, ICT also allows to bridge physical obstacles such as geographic distance, handicap accessibility and budget restrictions, thus contributing to the basic principle of equality in education (Badarne, 2019a; Díaz & Cano, 2019).

Although there is a broad consensus about the importance of ICT in education, even today, after years of investing in computer equipment and internet infrastructure in many countries around the world, some researchers claim that the expected benefits of ICT integration are still marginal (Ben Amram et al., 2021). This claim leads to the on-going discussion over the various factors that influence ICT integration. The

study of these factors and their supposed relationship with ICT integration success stands at the center of the next few paragraphs.

2.2. Factors Affecting ICT Integration

Most of the research literature on ICT integration leads to a conclusion of a multi-factor model, that includes teacher-specific variables, environmental and school-specific variables and student variables (Salam et al., 2018). However, the highest amount of research attention has been granted to teachers and teaching variables, under the assumption that teachers have a key role in implementing ICT (Eickelmann, 2011). Literature shows that teachers' implementation of ICT tools and skills in their teachings is highly varied, for many different reasons, such as seniority, personal abilities, digital literacy, motivation and cultural characteristics (Amzaleg & Masry-Herzallah, 2021) as well as past experience, seniority, work-load and digital literacy (Al Shobaki & Abu-Naser, 2017; Yeop et al., 2019).

Another major factor impacting ICT integration is teachers' and school administrative staff's attitudes toward ICT in particular and organizational change in general. These feeling, pre-conceptions and beliefs among faculty and administration have been found to have a significant impact, either positive or negative, in implementing, accepting and advancing ICT use in schools (Badarne, 2019b; Willis, 2018). School principles' attitude toward ICT, their enthusiasm for implementing ICT in their schools, their willingness to learn alongside their subordinate teachers and set a personal example, all influence actual ICT integration through teachers' practices and behavior (Cohen, 2019; Eickelmann, 2011; Habiballah et al., 2021).

However, the success of ICT integration depends not only on teacher-specific variables, but also on student-related factors. As an example, cultural variables and personal attitudes of the students have been found to cause anger and frustration among some students. These negative beliefs and feelings toward ICT integration may hinder its implementation (Badarne, 2019a). Avidav-Ungar and Porcush Baruch (2016) pointed to a combination of factors, both internal within the teachers and external, circumstantial and environmental factors. Their finding show that lack of time allocation is a major cause for ICT integration impediment, alongside external factors such as lacking equipment, faulty infrastructure and low organizational support. These findings coincide with and support a multi-factor theoretical approach toward the analysis of ICT integration processes in education, such as the RIPPLES model (Surry et al., 2005) and others (Salam et al., 2018). However, in most research models and approaches, the greatest weight is given to the human factor, attitudes, perceptions and beliefs of people towards the technology, their acceptance of it and its application.

3. ICT's Relationship with Student's Academic Achievements

The integration of ICT in educational organizations has proved to be a useful process that led schools and universities to significant improvements in management, learning methods, teaching practices, research, innovation and overall development

(Nikolić et al., 2019). However, this process's impact on students' academic achievement, a crucial question that occupies many researchers in the field of education, learning and organizational change, has yet been determined and fully resolved (Basri et al., 2018). An improvement in students' academic performance relates to the enhancement of students' knowledge and skills as they are reflected in their Grade Point Average (GPA) and in other aspects that signify their personal and academic growth (Basri et al., 2018). This definition is considered to correspond with a wide approach to academic achievements, as opposed to a narrow approach, examining only grade improvement. The problem with the narrow approach, even though it is considerably easier to apply and measure, is that the improvement in students' performance is usually attributed to the syllabus, making it difficult to differentiate ICT integration's specific contribution. Another obstacle in attempting to measure the impact of ICT integration on learning outcomes is the difficulty in distinguishing the effect of a rapidly changing technology and performing valid comparisons in order to isolate their effect (Basri et al., 2018; Díaz & Cano, 2019). In order to distinguish between the effects of learning on academic achievements to the effect attributable to ICT integration, a different approach measures not the change in students' grades, but the change in their learning behavior. Following this approach, Díaz & Cano (2019) examined the relationship between ICT integration and mathematics school performance. The findings, collected during the International Student Assessment Program test (PISA), indicated that ICT integration explains 28% of the variance in the students' mathematics performance, whereas 72% was explained by the students' work at scholl and at home and background variable. Similarly, Sarsur (2019) examined the effectiveness of ICT integration among Israeli fifth-graders in terms of motivation, cooperation, self-efficacy and achievement. An alternative method to evaluate the impact of ICT on learning outcomes is to perform the comparison between schools which adopt ICT programs and those which do not, as was carried out by Ben Amram et al., (2021) who used a qualitative research method in a "case study" model to contrast between two Israeli primary schools, in terms of teachers' perceptions and attitudes as well as actual teaching performance.

3.1. How can ICT affect Academic Achievements?

Young people nowadays are very familiar and proficient in using digital sources and information technology, nevertheless, that does not automatically mean they know how to use these technologies for learning. In fact, studies show that there still is a critical need for instruction, especially due to the almost infinite amount of information online, and that students' ability to incorporate online information into their learning process is influenced by the teaching methods employed by their teachers. Furthermore, the introduction of ICT into school itself isn't sufficient to evoke an improvement in academic performance; the implementation of ICT tools and practices must follow a constructed teaching plan in order to effectively achieve its goals (Ben Amram et al., 2021; Díaz & Cano, 2019). Indeed, ICT when put to effective use, can assist in repetitive learning, memorizing vast amounts of material,

enhancing students' motivation, creativity and fun, stimulate cognitive and emotional processing and advance alternative methods of problem solving. All of these benefits are believed to be translated into improved academic achievements. But better yet, not only can ICT support schoolwork, but it can also offer help to student who encounter difficulty during their homework (Nikolić et al., 2019).

Moreover, ICT can improve teaching in several different ways, in medium, in materials, in accessibility and timing and in communication and interaction (Díaz & Cano, 2019). In the medium of teaching, ICT enables learners and teachers to conduct lessons unbounded to the physical classroom, as the digital medium is practically boundless, allowing an endless variety of learning environments, elaborate demonstrations and interactions as well as a vast amounts of teaching and practice material (Ghalib, 2021; Nikolić et al., 2019). Finally, the matter of accessibility has been demonstrated to be one of the most important traits of ICT in education during the Covid-19 school closures. But even before the massive switch to distance learning that occurred all over the world as a result of the attempt to stop the pandemic outbreak, ICT has offered people with mobility disabilities and other disabilities, the chance to participate in learning despite their inherent limitations. Furthermore, through ICT, learning can occur at any time and any place; thus, teachers can dispense personalized practice for students to complete wherever and whenever they are available, and even receive personalized feedback in real time (Díaz & Cano, 2019).

3.2.   Evidence from Empiric Studies

In the early twentieth century, great advances in the field of mass media had seemed like they are on the brink of revolutionizing the concept of distance learning and traditional teaching practices. Yet, many studies have shown that the medium itself was not enough to cause a major transformation in learning, but it was more so dependent on the instruction of the teacher (Díaz & Cano, 2019). Nevertheless, as instruments of ICT teaching and instruction have evolved, so did the understanding of the possible strategic use of these capabilities. Accordingly, educational plans and curriculums were designed to better harness the potential of ICT in improving teaching and learning.

Basri et al., (2018) studied the adoption process of ICT in Saudi Arabia universities and its effect on students' academic achievements. Their research included 1,000 university students in four different institutions and explored the possible effects of gender, GPA and students' majors as moderators. In their research they defined three distinct research objectives in order to determine ICT integration's impact on academics. The first objective was to evaluate the extant the organization has adopted ICT; The second is determining the type of relationship that exist between ICT integration and academic performance among the students, and third, to explore the impact ICT integration has on the organization in general and students' performance in particular. The research findings indicate a positive relationship between the integration of ICT and students' academic achievements. They also found that ICT

integration positively affected the improvement of female students more than that of male students, however, they found no effect for GPA nor study majors.

Another empirical evidence of ICT's contribution to students' academic achievements can be concluded from a recent study conducted in an Arabic school in northern Israel (Ghalib, 2021). The first stage of the study focused on recognizing the main obstacles in ICT implementation in biology teaching in middle school. After identifying the main issue to be addressed as a lack of clear instructions for teachers on how to effectively implement ICT in their teaching, a specific teaching plan was designed and carried out by the teachers of the experiment group, while the teachers of the control group didn't follow a special plan but the regular curriculum. The results show that the experiment group improved their biology grades in more than 10 points (15%) whereas the control group went down 1.5 points at the end of the program. These findings not only point to the immense potential inherent in the application of ICT in education, but more importantly, it points to the significance of an appropriate guidance and instruction for teachers, without which the desired improvement in outcomes cannot be achieved.

Finally, the most comprehensive studies of ICT integration effect on academic achievements in the last decade were based on the 2015 PISA international test results including the data of hundreds of students in many countries (Hu et al., 2018; Meng et al., 2019; Park & Weng, 2020). The findings indicated a complex picture of factors and effects that are to some extent, counter-intuitive. For example, it was found that ICT skills had a more positive effect on student academic performance than did ICT access and use at the national level; also, students ICT availability at school was positively associated with academic success, whereas student ICT availability at home was negatively associated with it; in addition, student ICT academic use was negatively correlated with student performance, while ICT entertainment use was positively correlated with academic success. Moreover, student attitudes toward ICT demonstrated mixed effects on student academic success – specifically, student interest, competence, and autonomy in using ICT had positive correlations, while student enjoyment of ICT social interaction had a negative correlation with academic performance. Findings also indicate an interaction effect between country GDP and cultural variables and some student-specific factors like perceived autonomy and the influence on academic achievements.

4. Discussion

In the information age, teaching and learning are going through a gradual change, as they shift from traditional practices and patterns on to a model of continues learning through search and review of information (Nikolić et al., 2019). ICT integration in education plays a vital role in imparting the necessary skills to young members of future society, as well as keeping school and the institutionalized education system relevant (Díaz & Cano, 2019). Indeed, learning is becoming more fluent and flexible thanks to ICT and it offers substantial benefits to learners as well as educators, but

as the research literature reflect, these benefits are dependent on a variety of contributing and inhibiting factors (Eickelmann, 2011).

In the review presented in this paper we sought to answer the question of whether the application of ICT has a positive effect on the academic achievements of students. The conclusion drawn from empirical research findings in the past two decades is that they tend to be consequential to the research approach from which they derive, and that a robust and distinct effect of ICT application on students' academic achievement cannot be determined. Additionally, findings reinforce the claim that the greatest impact on students' academic outcomes following the use of ICT is not significantly influenced by internal factors in students, but more by factors related to the teachers, the learning environment and opportunities and the school administration. Furthermore, a large proportion of these factors are, in turn, a subject of a certain cultural and social context (Hu et al., 2018; Meng et al., 2019; Park & Weng, 2020).

The main conclusion to which the review presented above leads, is that the association between ICT integration in a given educational system and the expected results of the process, is the product of a complex relationship between many factors, educational, cultural and social, and that successful ICT assimilation in education has to be one that takes these factors into account.

5. In conclusion

As presented in this paper, the research literature has yet to fully address some of most important questions regarding ICT implementation in educational practice, such as, which kinds of technological uses and applications have a positive impact on learning and which do not? What is the optimal frequency of using ICT in teaching? When does the use of technology in teaching become counterproductive? Moreover, with so much information being made available to them, students nowadays need to be instructed of the best efficient ways to process and contain that information, how to treat it critically and make judgements and how to put it to the best use in accordance with the lesson plan. This aspect shines a light on the importance of teachers' training, to become good ICT integrators and to become better teachers in an ICT rich environment.

Unfortunately, the research literature consistently leads to the conclusion that teacher training in regard to the application of ICT tools is lacking; that the reference to ICT within the teacher training colleges is insufficient and does not constitute a good example of practice; and that the training carried out on the job is not frequent and in-depth enough in order for the ICT application to be sustainable. Thus, the required extension of the current body of research in the field is one that will focus on the relationship between optimal teacher training and the optimal impact on student achievement. This research could help focus the definition of ICT implementation in education, which is currently lacking, and improve the cost-effectiveness of the many resources invested in implementing ICT in education systems in Israel and around the world.

References

1. Abdelrahman, I., & Salhi, A. Y. (2020). Understanding the Factors Affecting the Adoption of E-Learning by Teachers from East Jerusalem Schools. *Ortadoğu ve Göç, 10*(20), 305-348.

2. Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211. https://doi.org/10.1016/0749-5978(91)90020-T

3. Al Shobaki, M. J., & Abu-Naser, S. S. (2017). The Requirements of Computerized Management Information Systems and Their Role in Improving the Quality of Administrative Decisions in the Palestinian Ministry of Education and Higher Education. *ITEE Journal, 6*(6), 7-35.

4. Amzaleg, M. & Masry-Herzallah, A. (2021): Cultural dimensions and skills in the 21st century: the Israeli education system as a case study, *Pedagogy, Culture & Society*, 1-21. https://doi.org/10.1080/14681366.2021.1873170.

5. Avidav-Ungar, A., & Porcush-Baruch, A. (2016). Motivating and Inhibiting Forces and the Perception of Success in ICT Assimilation in Collages of Education-The perspective of the lecturers throughout time. In Y. Eshel-Alkalai, E. Blau, A. Caspi, N. Geri, Y. Kalman, V. Zilber-Varod (eds.): *The Book of the 11th Conference on Innovation and Learning Technologies: The Person Who Studies in the Technological Era*, The Open University.

6. Badarne, G. (2019). Expectations of ICT integration in the education system in Israel and the implementation of the ICT programs in Moldova. In *Dialog intercultural polono-moldovenesc*, *3*, 136-142.

7. Badarne, G. (2019b). The Israeli national program for adapting the education system to the 21st century: the factors involved and the expectations from ICT. *Acta et commentationes (Ştiinţe ale Educaţiei)*, *15*(1), 119-130.

8. Basri, W. S., Alandejani, J. A., & Almadani, F. M. (2018). ICT adoption impact on students' academic performance: Evidence from Saudi universities. *Education Research International*, *2018*. https://doi.org/10.1155/2018/1240197.

9. Ben Amram, S., Aharony, N., & Bar Ilan, J. (2021). Information literacy education in primary schools: A case study. *Journal of Librarianship and Information Science*, *53*(2), 349-364. https://doi.org/10.1177/0961000620938132.

10. Cohen, G. (2019) Principals' leadership behaviors that shaped teachers' motivation to implement an educational ICT reform imposed by state authorities in Israel, *Israel Affairs, 25:3*, 554-570, https://doi.org/10.1080/13537121.2019.1593658

11. Davis, F. D. (1986). *A technology acceptance model for empirically testing new end-user information systems*. Cambridge, MA.

12. Díaz, L. M. B., & Cano, E. V. (2019). Effects on academic performance in secondary students according to the use of ICT. *IJERI: International Journal of Educational Research and Innovation*, (12), 90-108. https://doi.org/10.46661/ijeri.4045.

13. Eickelmann, B. (2011). Supportive and hindering factors to a sustainable implementation of ICT in schools. *Journal for educational research online*, *3*(1), 75-103. https://doi.org/10.25656/01:4683

14. Eyles, A. M. (2018). Teachers' perspectives about implementing ICT in music education. *Australian Journal of Teacher Education*, *43*(5), 110-131. http://dx.doi.org/10.14221/ajte.2018v43n5.8.

15. Ghalib, B. (2021). *Integration of Information and Communication Technologies in the teaching-learning process of biology within middle school education from Israel*. A Doctoral Thesis, Tiraspol State University.

16. Goldstein, O., & Ropo, E. (2021). Preparing Student Teachers to Teach with Technology: Case Studies in Finland and Israel. *International Journal on Integrating Technology in Education (IJITE)*, *10*(3), 19-35. https://doi.org/10.5121/ijite.2021.10302

17. Habiballah, S., Bibu, N., & Danaiata, D. (2021). Educational Leadership and ICT Implementation in Israeli Arab Sector-towards a Model of Hybrid Leadership. *Revista de Management Comparat International*, *22*(1), 74-86. http://dx.doi.org/10.24818/RMCI.2021.1.74.

18. Hermawan, H. D., Deswila, N., & Yunita, D. N. (2018). Implementation of ICT in Education in Indonesia during 2004-2017. In *2018 International Symposium on Educational Technology (ISET)*, 108-112. https://doi.org/10.1109/ISET.2018.00032.

19. Hu, X., Gong, Y., Lai, C., & Leung, F. K. (2018). The relationship between ICT and student literacy in mathematics, reading, and science across 44 countries: A multilevel analysis. *Computers & Education*, *125*, 1-13. https://doi.org/10.1016/j.compedu.2018.05.021.

20. McQuirter, R. (2020). Lessons on Change: Shifting to online learning during COVID-19. *Brock Education: A Journal of Educational Research and Practice, 29*(2), 47-51. https://doi.org/10.26522/brocked.v29i2.840

21. Meng, L., Qiu, C., & Boyd-Wilson, B. (2019). Measurement invariance of the ICT engagement construct and its association with students' performance in China and Germany: Evidence from PISA 2015 data. *British Journal of Educational Technology*, *50*(6), 3233-3251. https://doi.org/doi:10.1111/bjet.12729.

22. Muslem, A., Yusuf, Y. Q., & Juliana, R. (2018). Perceptions and barriers to ICT use among English teachers in Indonesia. *Teaching English with Technology*, *18*(1), 3-23.

23. Nikolić, V., Petković, D., Denić, N., Milovančević, M., & Gavrilović, S. (2019). Appraisal and review of e-learning and ICT systems in teaching process. *Physica A: Statistical Mechanics and its Applications*, *513*, 456-464. https://doi.org/10.1016/j.physa.2018.09.003

24. Park, S., & Weng, W. (2020). The relationship between ICT-related factors and student academic achievement and the moderating effect of country economic index across 39 countries. *Educational Technology & Society*, *23*(3), 1-15.

25. Salam, S., Zeng, J., Pathan, Z. H., Latif, Z., & Shaheen, A. (2018). Impediments to the integration of ICT in public schools of contemporary societies: A review of literature. *Journal of Information Processing Systems*, *14*(1), 252-269. https://doi.org/10.3745/JIPS.04.0062

26. Sarsur, F. (2019). *The Effectiveness and Cost Effectiveness of Integrating ICT in Science Classes at the Fifth Grade in Arabic-Speaking Schools in Israel*, Doctoral dissertation, School of Education, Bar-Ilan University Ramat Gan, Israel.

27. Surry D. W., Ensminger D. C., Jones M. (2005). A model for integrating instructional technology into higher education, *British Journal of Educational Technology 36*(2), 327-329. http://dx.doi.org/10.1111/j.1467-8535.2005.00461.x

28. Venkatesh, V., Morris, M., Davis, G., & Davis, F. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*, 425-478.

29. Willis, R. L., Lynch, D., Fradale, P., & Yeigh, T. (2018). Influences on purposeful implementation of ICT into the classroom: An exploratory study of K-12 teachers. Education and Information Technologies, 1-15. https://doi.org/10.1007/s10639-018-9760-0

30. Yeop, M. A., Yaakob, M. F. M., Wong, K. T., Don, Y., & Zain, F. M. (2019). Implementation of ICT policy (Blended Learning Approach): Investigating factors of behavioural intention and use behaviour. *International Journal of Instruction*, *12*(1), 767-782.