



# DETERMINANTS OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) INTEGRATION AND TECHNOLOGICAL ADVANCEMENT OF TEACHERS

Mary Ann M. Belardo

*A Faculty of Knights of Columbus Elementary School*

*Mary Ann M. Belardo is currently pursuing masters degree program in Educational Management in University of Rizal System, Antipolo City, Rizal, Philippines, PH +639 51 691 7882. E-mail: belardomaryann@gmail.com*

## KeyWords

advancement, content, ICT, leadership, pedagogies, practices, self- efficacy, technological skills.

## ABSTRACT

Technology integration is a necessary skill needed not just for the learners but the teachers in addition. Everyone has become dependent of the advantages of technology. This review could be a conceptual try and explore the factors influencing teachers' pedagogical decisions to include technology into their practice. This text also contributes knowledge about professional development initiatives and also the have to address not technology knowledge the maximum amount because the interdependence of technology, pedagogy, and subject content matter. Implicational suggestions for future research were presented.

## INTRODUCTION:

Technological advancement is the generation of data or the invention of data that advances the understanding of scientific relations or technology. The Malaysian teaching system has been revamped to complete the phenomenon of digital penetration in our daily lives. To realize this, first, the method of using technological advancements in teaching and learning must be changed (Halili, 2019). Teachers need a deep understanding of a developmental process for their conceptualization of the relationship between technology and pedagogy.

Information and communications technology (ICT) systems has been the foundation of today's knowledge-based society. Advances in this area are tailored at immense pace and global use of ICT has skyrocketed in recent years. (Fettweis, G., & Zimmermann, E. 2008). ICT has invaded and transformed many aspects of our lives to the extent that we sleep in an environment that's dominated by technology which itself is consumer driven. Information and communication technologies (ICT) is viewed to augment the quality of learning. (Livingstone, S, 2012). In a study (Cakir and Yildirim, 2009; Hew and Brush, 2007) presented the thoughts of the preservice and inservice computer teachers' about the factors that contribute to successful technology integration in basic education schools. Given the important place that technology has come to occupy in our lives, schools have a good responsibility to teach individuals who are capable of effectively using technology. Educators, teachers and researchers consider technology to be an indicator of quality in education (Ajjan, 2008). While students are increasing their use of emerging technologies like text messaging, wikis, social networks, and other Web 2.0 applications, this is often not the case with many university faculties. Studies revealed that few faculty members favor to use them within the classroom.

Each one beginning teachers used a good range of technological applications, mainly for structured learning approaches, while few created opportunities for student-centered technology use. (Prestridge, S. 2017). In a study conducted (Chen, P. S. D., Lambert, A. D., & Guidry, K. R. 2010), general positive relationship is perceived as the impact of Web-based learning technology on student engagement and self-reported learning outcomes in face-to-face and online learning environments. Accordingly, a study in Portuguese with millennials revealed that technology affects how they want to be taught in higher education and how they want to lead and expect to be led in organizations, after graduating. (Au-Yong-Oliveira, M., et. al 2018).

## TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE (TPACK) IN PRE-SERVICE EDUCATION

Teacher education institution has given ample time in order for the pre-service teachers to adopt technology. Adopting technology can't be done overnight. In a study wherein pre-service teachers' computer competence, attitude towards computer-assisted education, and intention of technology acceptance has been investigated, it was found out that these three factors have positive effect to pre-service teachers. (Baturay, 2017). In Norway, integration of digital competence in curriculum documents for teacher education highlights the three knowledge areas: technology proficiency, pedagogical compatibility and social awareness. (Instefjord, 2016). The interaction of theory and practice, generates flexible knowledge needed to successfully integrate technology use into teaching. (Koehler, M. J., Mishra, P., & Cain, W. 2013).

Researchers used Technological Pedagogical Content Knowledge (TPACK) framework to better understand how teachers support student learning through technology integration in their practice (Voogt, J., Fisser, P., Pareja Roblin, N., Tondeur, J., & van Braak, J. 2013). With these, it was found that pedagogical knowledge in ICT integration has bear the largest impact. Hence, TPACK demonstrated an effective means for examining teacher education programs and has led to significant recommendations regarding subject-specific pedagogical instruction, information and communications technology (ICT) education. Integrating technology into science education provides opportunities to foster students' meaningful learning thus yield positive results in enhancing teachers' capability to integrate ICT for instructional practice (Günes & Bahcivan, 2016; Nordin & Faekah, 2016; Özdemir, 2016; Chai, C. S., Koh, J. H. L., & Tsai, C. C. 2013). However, in their exploration of teacher use of computer-assisted education and its relationship to gender, found Technical Knowledge to be the biggest indicator of technology integration. (Baturay, et. al 2017).

In a systematic literature review by (Voogt, 2013) it has been found that teacher knowledge and beliefs on pedagogy and technology are related to each other. They are both determinants on the decision of the teacher to use with technology. Meanwhile, an interpretivist study of experienced secondary social studies teachers' planning, nature and development of these teachers' TPACK-in-action revealed three primary findings which are the decision on choosing the activities and technology to be presented to pupils must be strategic, varied, student-centered and must achieve the quality standards of integrating technology. (Harris & Hofer, 2009).

Approaches such as mentoring methods course faculty, teachers, and creating technology-rich instructional materials, online reflections with self-report measures to assess teachers' self-regulated learning (SRL) in the context of technological pedagogical content knowledge (TPCK): hypermedia with metacognitive instruction (HYP + META) and without (HYP) were associated with increases in preservice teachers' technological knowledge and their frequency of technology-rich instruction during field experiences. (Kramarski, B., & Michalsky, T. 2010).

## ATTITUDES, BELIEFS OF TEACHERS IN TECHNOLOGY INTEGRATION

Attitudes and beliefs of teachers in technology integration plays a vital role in determining the speed and quality of computer literacy a teacher opt to display to his/ her teachings. In a study conducted (Li, 2019). teachers' belief on his/ her capabilities to use technology is a factor in integrating tools conducive to achieve learning outcomes set. Reckoning on the perceptions about e-Learning, technologies are either wont to achieve immediate objectives for immediate contributions or long-term and broader objectives. Despite increases in computer access and technology training, technology isn't being employed to support the styles of instruction believed to be most powerful. Teachers' characteristics or qualities influence technological resourcing as instructional tools wherein teachers must adapt the thinking that teaching is not effective without the integration or use of ICT in fostering student learning. (Ertmer, P. A., & Ottenbreit-Leftwich, A. T. 2010). Teachers must possess competence in integrating ICT into education to assist the teaching- learning process. A study aimed to determine the extent of ICT integration revealed that uneasiness in computer operation, ICT competence needed and pedagogical knowledge are all contributing factor to the ICT integration of a teacher. (Aslan, A., & Zhu, C. 2016). However in a study conducted, (Bhuasiri, W., Xaymoungkhoun, O., Zo, H., Rho, J. J., & Ciganek, A. P. 2012). it has been viewed that learners' behavior should be modified and the teachers have to arouse the interest of their learners in order for them to achieve successful e-learning activities.

Results also suggests that student-centered beliefs sprovide support or a firm basis for implementing student-centered activities. Administrative decisions had no impact in technology integration of student-centered teachers. (Ertmer, et. al 2012). Moreover, teachers beliefs on the importance of technology becomes the driving force in associating technology in their daily teaching. (Ottenbreit-Leftwich, A. T., Glazewski, K. D., Newby, T. J., & Ertmer, P. A. 2010).

Reasearchers have explored mixed methods study to investigate how teacher beliefs were related to technology integration practices. (Kim, C., Kim, M. K., Lee, C., Spector, J. M., & DeMeester, K. 2013). In a study conducted with Tennessee public school teachers the direct and indirect effects of teachers' individual characteristics and perceptions of environmental factors that influence their technology integration in the classroom is examined. (Inan, F. A., & Lowther, D. L. 2010). Self-efficacy of teaching with technology had the strongest influence on technology use, which was resolved by their perceived value of teaching and learning with technology. (Chen, R. J. 2010). Different ways to interpret and understand teachers' conceptions of teaching and learning (CoTL) have been formed and provided richer and more nuanced understanding of technology acceptance. (Teo, T., & Zhou, M. 2017).

## ADMINISTRATIVE ROLES IN FACULTY DEVELOPMENT IN TECHNOLOGY INTEGRATION

School leaders viewed the use of technology positively. (Cakir, 2012). School leaders who showed support in the implementation of classroom management and data gathering through software foster student learning gains effectively. (Means, B. 2010). There should be a thorough planning with regards to technology integration because the complexity of software to be used will determine the time needed for the teachers and pupils to have a good grasp of its features. (Chance, B., et. al 2007).

Machado, L. J., & Chung, C. J. (2015). investigated the perception of school leaders on using technology and how do these affect on teachers' success on integration technology and what could help improve the performance of teachers and by conducting survey and interviews it was found to be substantial. As Yehya, F., et. al (2018) emphasized, curriculum planners should be explicit about the level of ICT integration in the content and provision for technical support through infrastructure improvement should be addressed.

School leaders initiating to implement technology integration in a school through professional development could be of great help. (Schrum, L., Galizio, L. M., & Ledesma, P. 2011). And since technology is directed by the school administrators, it is also their task to monitor the development of teachers' competence in technology integration. (Berrett, B., Murphy, J., & Sullivan, J. 2012).

## Conclusion

An increased focus has been placed on research and policies that surround the factors that influence ICT integration and technological advances of teachers because of the current situation of educational system. While it is clear from the research reviewed that technological pedagogical content knowledge (TPACK) in pre-service education and attitudes, beliefs of teachers in technology integration are very influential for teachers in the field of teaching. Günes, E., & Bahçivan, E. (2016) suggests the repetition of the research but would be supported by different types of data with similar cases to make a more comprehensive data interpretation.

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