RÀ SOÁT MÔ HÌNH CÔNG NGHỆ THÔNG TIN VÀ TRUYỀN THÔNG (ICT): TƯ DUY LẠI VIỆC GIẢNG DẠY TRỰC TUYẾN Ở BẬC ĐẠI HỌC

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Việc chuyển các phương thức đào tạo truyền thống sang đào tạo trực tuyến khiến các cơ sở giáo dục đại học gặp phải thách thức không nhỏ trong việc tìm kiếm các mô hình ICT với mục tiêu vừa bảo đảm tiến độ dạy học vừa bảo đảm chất lượng giáo dục đại học tư duy bậc cao. Do đó, bài viết này nhằm mục đích giới thiệu 5 mô hình ICT đang được sử dụng rộng rãi trong giáo dục trên thế giới, có thể áp dụng trong giảng dạy trực tuyến ở bậc đại học tại Việt Nam, gồm có: UTAUT, SAMR, TPACK, R2D2, và RAT. Các mô hình được xem xét dưới góc nhìn phản biện trên 3 góc độ: điểm mạnh, điểm yếu, tính linh hoạt và hiệu quả trong việc ứng dụng trong giảng dạy ở bậc đại học ở Việt Nam. Bài viết cũng nhằm nêu bật các hướng mở để tạo ra thông lệ tốt nhất trong giảng dạy trực tuyến, đồng thời đề xuất việc khai thác có hiệu quả các mô hình nêu trên đối với các cơ sở giáo dục đại học ở Việt Nam.

Từ khóa: *giáo dục đại học, ICT, mô hình, giảng dạy trực tuyến, hiệu quả.*

A change from traditional modality of teaching delivery to online teaching and learning has put high pressure on higher education institutions who are struggling in seeking suitable models for ICT integration so as to achieve both curriculum agenda and the quality assurance of higher order thinking. To this end, this article aims to offer critical insights into five ICT models widely used in the world education, being applicable to online delivery in higher education in Vietnam, mainly: UTAUT, SAMR, TPACK, R2D2 and RAT. These models are reviewed from three fundamental perspectives: strengths, weaknesses, and effectiveness in their application in higher education in Vietnam. The paper also highlights open suggestions for best practices of online teaching/learning as well as recommendations for effective use of these models in Vietnamese educational institutions.

Keywords: *higher education, ICT, model, online teaching, effective.*

CRITICAL REVIEW ON ICT MODELS: RETHINKING ONLINE TEACHING IN HIGHER EDUCATION INSITUTIONS

1. Introduction

To date, the use of digital technologies in higher education (HE) has become an integral part of the university student's

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'experience' (Henderson, Selwyn, & Aston, 2017, p. 1) and their 'networked practices' (Eaton & Pasquini, 2020, p. 2). In other words, the emergence and acceptance of integration of technology in both learning and teaching remains 'protean' (Koehler & Mishra, 2009, p. 13)

implying the applicability in a diverse manner. To enrich student's learning experience, online mode of teaching delivery has been utilised and optimised (Kebritchi, Lipschuetz, & Santiague, 2017). In reality, online teaching and learning in higher education sector has been analysed in depth by Kim and Bonk (2006). Developing countries appear hesitant to adapting to online environment due to lack of resources, incentive-based policy, and affordances (Player-Koro, Tallvid, & Lindström, 2014). Yet, the Covid-19 pandemic has radically changed the higher education landscape, pushing HE institutions towards online teaching and learning without too much thinking and preparation. While Dabbagh and Bannan-Ritland (2005) examined the so-called limitations of traditional learning environments and argued that traditional learning environments are restrained by location, time and way of teaching. In reality, those constraints do not hamper the emergence and rapid integration of ICT in higher education, particularly the use of a variety of online platforms for teaching and learning as well as testing and assessment. Wide-range integration of online tools and platforms has demonstrated several easily-recognised benefits such as 'flexibility' in time and space, 'efficacy of knowledge and qualifications', better opportunities for relationship between teacher and student, 'cost effective', individualised learning, rewarding for academic staff, and 'self-pacing' for learners (Arkorful & Abaidoo,

2015, p. 34). However, online learning has several drawbacks including 'isolation, accelerated pace, competing responsibilities and technical issues' as reported by (White & Weight, 2000, p. 69).

In 2019, the Horizon Report presents several key trends affecting the integration of ICT in higher education (Alexander et al., 2019). Among these trends, most striking are 'Blended learning' and 'Rethinking how institutions work' (Alexander et al., 2019, p. 6). Rethinking of the role of HE institutions in face of the industry revolution 4.0 is of prime importance. The reason implied refers to the change agents of this process: teacher, students and technology partners. Prevalence of ICT tools as well as the emergence of Artificial Intelligence (AI) that can be applicable to HE requires rethinking of how HE institutions work and what ICT models can be screened for an effective integration. To that end, this paper renders the following ICT models from critical perspectives, thus identifying the strengths, weaknesses and effectiveness of the models.

1.1. Context and rationale

This paper looks at the world context, developing countries context and HE institutions within developing countries context. The world education system keeps searching and exploring the so-called 'authentic learning environment' (Herrington & Herrington, 2005, p. 1) with a focus laid on students (Hoidn, 2016). The world higher education system

particularly is now evolving to keep pace with the rapid change ICI-based higher education (Bhanot & Fallows, 2004). Updating not only teachers but students with ICT skills constitutes rising demand on different modes of teaching. The revolution of the industry 4.0 pushes HE system towards fundamental change in teaching delivery. This evolution has unveiled 'tectonic' shift (Daniel, Kanwar, & Uvalić-Trumbić, 2006) from traditional way giving instruction to mobile learning mode of delivery (Rajasingham, 2011) and online teaching (He, Xu, & Kruck, 2019). In the context of developing countries, the shift aims to redefine the roles of the teachers and students being evolved from 'transmissive to transformative' (Madar, Subari, & Baqutayan, 2019, p. 1). HE insitutions in developing countries are no exception as they also struggle against the competition from different education partners and education institutions from abroad. All the challenges mentioned above are echoed in the questions imposed by Fallow (2005, p. 2) seeking answers to whether ICT-based higher education can 'enhance the quality of learning and teaching' and to what extent. Therefore, this paper aims to provide an overview of the ICT models that can be partly or fully explored by HE institutions in developing countries.

1.2. Overview of key ICT related terms

Within the scope of this paper, only key terms associated with ICT in higher education are discussed, namely ICT, distance learning, online learning, e-learning, and Learning Management System (LMS).

ICT stands for Information and Communication Technology as mentioned in the Abstract. In academic circle, the term can appear in both forms: singular as 'Technology' or ICT to refer to 'human interaction' and plural as 'Technologies'or ICTs to imply 'the whole field of data communications infrastructure' (Lloyd, 2005, p. 3). In this paper, the former distinction is preferred to shed better lights on the pedagogical part of integration of technology rather than using technology tools as add-on devices for learning and teaching.

Distance learning is perceived as a way of offering opportunities to learners to get access to learning with varying types and degrees of instructional materials at different times and places (Benson, 2002; Moore, Dickson-Deane, & Galyen, 2011).

Online learning can be briefly understood as a better form of distance learning with focus laid on enriching learning experience through the use of ICT tools (Benson, 2002; Moore et al., 2011). E-learning covers a wide range of technological tools such as 'includes audio- and videotape, satellite broadcast and interactive TV' and other web-based applications, websites and programmes (Moore et al., 2011, p. 2). Learning Management System (LMS) can be used under different umbrellas like Course Management System, Virtual Learning Environment or Knowledge Management

System (Moore et al., 2011, p. 2) or Collaborative Learning Environment (Gagne, Wager, Golas, Keller, & Russell, 2005, p. 219).

1.3. Some critique on the employment of ICT terms

The ICT terms mentioned above, in some cases, can be used interchangeably despite conflicting views stay unsolved. ICT is the broadest term as it covers both online and offline mode of technology use and integration in varying forms and scales. Among these terms, online learning remains challenging (Moore et al., 2011) to define because students may go online without learning at all. The online learning is understood as an integral part of a transformation from traditional way of teaching delivery to digital platforms. The commonalities are internet access, content management, LMS and learning

opportunities offered to students. To make an effective use of online learning, it is necessary to acquire an LMS suitable to a particular HE institution.

2. Literature Review

2.1. Tech use vs tech integration

To offer critical insights into various ICT models, this paper first introduces the clear distinction between ICT use and ICT integration. ICT use refers to low level of application of technology into teaching and learning. This way of utilisation of technology does not serve deep learning. Technology tools can be regarded as add-on devices during learning process. ICT integration stresses the need to enhance pedagogy when it comes to technological application in education. The following table extracted from Rao (2013) summarises the difference between tech use and tech integration:

Using Technology	Technology Integration
Technology usage is random, arbitrary & often an afterthought	Technology usage is planned & purposeful
Technology is rare or sporadically used in the classroom	Technology is a routine part of the classroom environment
Technology is used purely for the sake of using technology	Technology is used to support curricular goals & learning objectives
Technology is used to instruct students on content	Technology is used to engage students with content
Technology is mostly being used by the instructor(s)	Technology is mostly being used by the student(s)
Focus on simply using technologies	Focus on using technologies to create and develop new thinking processes
More instructional time is spent learning how to use the technology	More instructional time is spent using the technology to learn
Technology is used to complete lower-order thinking tasks	Technology is used to encourage higher-order thinking skills
Technology is used solely by individuals working alone	Technology is used to facilitate collaboration in & out of the classroom
Technology is used to facilitate activities that are feasible or easier without technology	Technology is used to facilitate activities that would otherwise be difficult or impossible
Technology is used to deliver information	Technology is used to construct & build knowledge
Technology is peripheral to the learning activity	Technology is essential to the learning activity

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In this study, the models aim to unpack whether ICT is used or integrated into teaching and learning. Yet, in some cases, the models may imply both ICT use and ICT integration due to learning and teaching spectrum and the level of ICT knowledge.

To identify main factors influencing the use of the 5 ICT models mentioned above, this section aims to review in-depth studies related to these ICT models. The review also aims to identify key determinants of the strengths, weaknesses, flexibility and effectiveness of the models.

2.2. Review of five ICT models

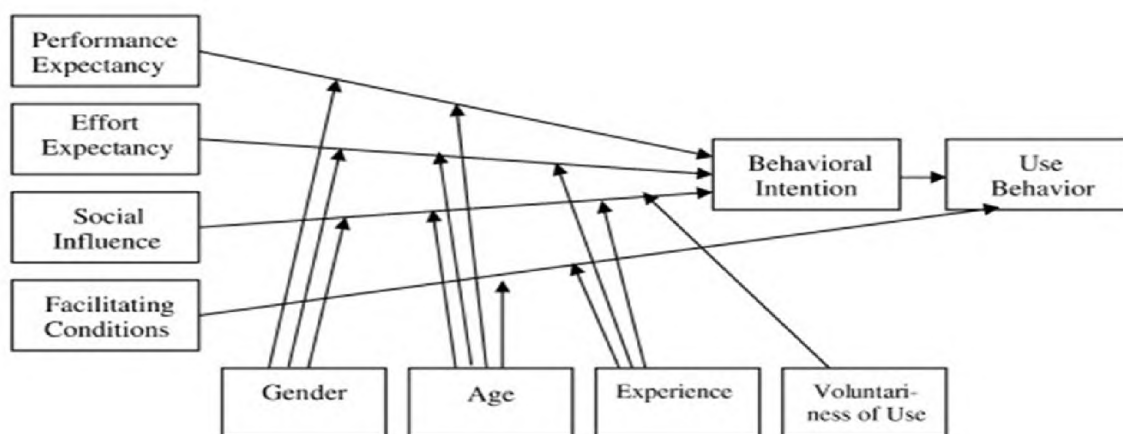### The UTAUT model by Venkatesh, Morris, Davis, and Davis (2003)

Figure extracted from (Venkatesh, Morris, Gordon, & Davis, 2003, p. 447)

UTAUT stands for Unified Theory of Acceptance and Use of Technology. The UTAUT model is quite comprehensive as it examines the benefits brought by the use of technology as related to *Performance Expectancy*, the degree of difficulty in *Effort Expectancy*, social aspects in *Social Influence* and conditions for implementation in *Facilitating Conditions*. Other governing factors are involved such as *Gender, Age, Experience* and *Voluntariness of Use*. The minus point of this model is that it is quite complex for testing and assessment of online learners.

The SAMR Model (Puentedura, 2006)

(Image retrieved from http://jennyluca.wikispaces.com/ TPACK+and+SAMR)
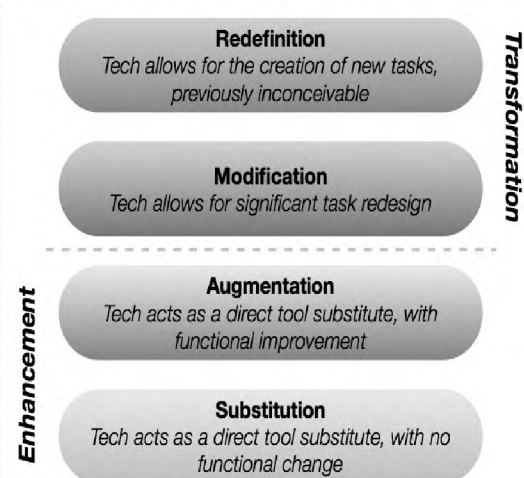
SAMR stands for Substitution, Augmentation, Modification and Redefinition. The SAMR model focuses on aspects of enhancement and transformation Technology is used (or not) in a way that triggers new pedagogies. How the knowledge is integrated to move from 'enhancement' of skills/knowledge to transformation stage is emphasized. This helps redefine the role of university teacher and teacher's role in digital age: moving from 'transmitters of knowledge to guiders of learning resources' (Naismith, Lonsdale, Vavoula, & Sharples, 2004, p. p. 25). Here, technology has the functions of both improving and transforming teachers' tech skills towards better learning outcomes. The SAMR model has strong point in terms of tracking down the progress of ICT integration from 'enhancement' to transformation'. The downside of this model refers to blur line between the two spectrums. The SAMR model is quite effective and flexible in its application to almost any subject or fields in higher education. For future studies, the SAMR models can be used to review the nature and consequences of the technological utilization that can be observe either in classroom or online.

The TPACK model by Mishra and Koehler (2006)

(image retrieved from http://willcarr.edublogs.org/2012/03/06/tpack-model-of-teaching/)
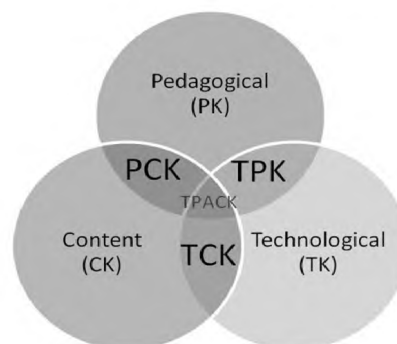
Originally, this model comes from the idea of TPK model initiated by (Shulman, 1986). The TPACK model is based on three pillars: content, pedagogy and technology. This model refers to aspects of knowledge focusing on knowledge of the content of the subject matter, knowledge of technology tools and knowledge of teaching methods; the overlapping zone refers to TPACK where the knowledge of technology, content and pedagogy converges. It is a way of modeling the various sorts of knowledge/skill sets required of educators in the digital age, and the ways in which these knowledge sets need to interact. The most striking point of this model is that it can be applied to identify the knowledge and skills required of university teachers. Another bonus point lies in the stressed role of pedagogy in relation to the integration of technology. This is of prime importance to ensure an effective use or integration of technology tools in HE learning environment. The weakpoint might be a lack of structured social factors embedded in the model.

The R2D2 model
by Bonk and Zhang (2006)

http://kgrieger.blogspot.com/2017/10/a-review-of-two-instructional-models.html
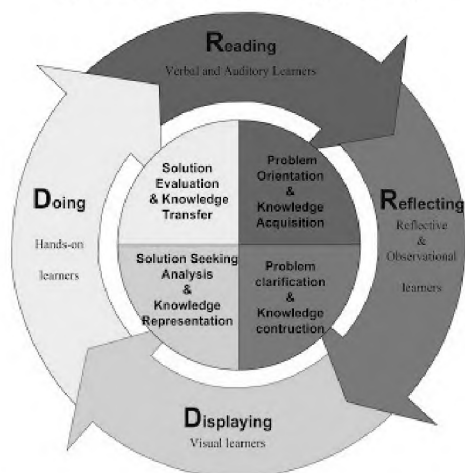
Flex = mode of delivery depending on the type of learners

R2D2 stands for *Reading – Reflecting – Displaying & Doing*: The first component, *Reading*, is to help learners acquire knowledge through different methods based on their types of learning. The second 'quadrant', *Reflecting*, refers to 'reflexive activities' needed to get greater engagement of the learners. The third ingredient, *Displaying*, supports the learning process through different 'visualisation techniques'. The fourth part, *Doing*, implies the actual practices of the learners through 'hands-on activities. This model shows the biggest advantage of how to engage online learners. Therefore, R2D2 model can be a good option for examining the online interactions among teachers and students. However, this model does not clearly indicate how

teacher and student's capability of tech integration is evaluated.

The RAT model (Ngo, 2016)

RAT stands for Responsive, Adaptive and Timely. This model focuses on the key components required of an intended-for-use ICT model. The model derives from empirical research of university teachers of English in a higher education institution in Vietnam. Specifically, the model emphasises that the first key segment is *Response*, which means teachers regardless of being online or offline, should be responsive to students' learning needs rather than teachers' need of acquiring state-of-the-art technology. The second component *Adaptive* encourages teachers and students to get themselves prepared to technological changes in HE scenery. *Timely* factor indicates the need to learning needs and unexpected changes that might occur during online learning and teaching process. Below is the model proposed by Ngo (2016, p. 232).
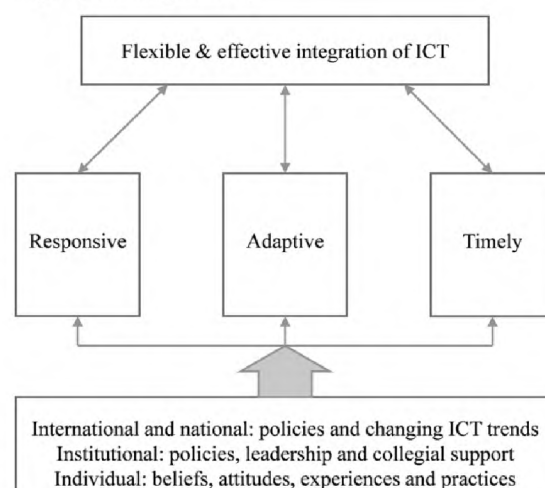
The RAT model's genuine aspect refers to its emphasis on ICT integration effectiveness in EFL setting in higher education in Vietnam. This implies that the model can be utilised to evaluate the effectiveness of online learning and teaching looking at world and national, institutional, and individual aspects involved in the implementation process.

ICT models viewed from strengths and limitations

The following table summarises the reviewed models of ICT in higher education setting.

ICT models	Authors	Descriptions	Strengths	Limitations	Main areas of use
UTAUT	(Venkatesh, Morris, Gordon, et al., 2003)	Unified Theory of the Acceptance and Use of Technology	Comprehensive description of technology integration	Quite complex for assessment	Higher education
SAMR	Puentedura (2006)	Substitution Augmentation Modification Redefinition	Tracking down of technology integration of teachers and students	Blur distinctions of components and difficult to make it applicable to different settings	Higher education
TPACK	Mishra and Koehler (2006)	Technology Content Pedagogy	Effective for online assessment	Lack of social strata and institution factors	Higher education
R2D2	(Bonk & Zhang, 2006)	Read Reflect Display Do	Online engagement of students	Emphasis laid on pedagogical component, difficult to assess teacher and student capability of tech integration	Higher education
RAT	Ngo (2016)	Response Adaptive Timely	Pedagogical factors emphasized	Limited scope of application	Higher education with focus on EFL setting

Regardless of the positive side of the models, Guri-Rosenblit (2011, pp. 22-27) pointed out that practitioners (i.e., teachers, educators and policy makers) confront the following challenges: Time Consumption and Lack of Incentives, Lack of Technological Literacy and Support Systems, and Burnout. In plain language, technology integration can make teachers exhausted and bored if they lack motivation and good knowledge of ICT.

3. Recommendations & Conclusion

This paper has presented five ICT models applicable to HE institutions with a focus on both teachers and students as well as their interaction. Individualised learning is one of the top priorities when it comes to online learning and teaching so as to achieve student needs (Bernat & Mueller, 2013). Equipping students with technology tools indicates determination, support and vision of higher education institutions. Yet, more important indicator refers to how educators, teachers and even policy makers inspire students with technology (Nettelbeck, 2005) in an attempt to enhance their autonomy. As mentioned in the Introduction, student's learning experience is of utmost importance as they can unleash their creativity and fully have their development needs met (Chickering, 1987). The ICT models presented and reviewed in this paper aims to offer comprehensive insights into online teaching and the transformed role of students as 'creators' (Alexander et al., 2019, p.6) rather knowledge receipients. ICT tools regardless of the models should be utilised in way that can empower both teachers and students, otherwise the use of technology just sparks uncertainty, resistance and fear.

Student-centred approach can be seen as central to online teaching pedagogy because it may create a personalised, customised and on-demand learning environment for students to enjoy. To this end, HE institution is advised to re-examine the seven main principles of teaching in higher education by Chickering, Gamson, and Poulsen (1987), they are:

- Good practice encourages student-faculty contact.
- Good practice encourages cooperation among students.
- Good practice encourages active learning.
- Good practice gives prompt feedback.
- Good practice emphasizes time on task.
- Good practice communicates high expectations.
- Good practice respects diverse talents and ways of learning.

These principles remain of good value to HE institutions to date. Student-teacher relationship and interaction constitutes one of the key components to ensure the success of teaching and learning.

This paper concludes with an idea for ICT integration that should be open with 'a well of thought and strategies' (Herrington & Herrington, 2005, p. 2) for teachers, educators and HE policy makers. For university teachers, acquiring an understanding of these ICT models could enrich and enlarge their professional development opportunities for now and in the near future. ICT integration, regardless of its necessity and urgency, should be taken into serious consideration as the role of teachers remains crucial while technology for some areas remains

'solvable', some 'difficult', and some mischievous (Alexander et al., 2019, p. 5). This heralds existing challenges in engaging students in an online learning environment. Testing and assessment and is not always secure and precise when it comes to online learning and teaching. Finally, teachers who are not tech-savvy staff should be encouraged to integrate ICT into teaching thanks to policy and incentives to be undertaken by HE institution leaders.

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