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### A CASE STUDY IN TEACHING: THE FACTORS DETERMINING OF ASSESSMENTING THE COMPETENCE OF TECHNOLOGY-BASED

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#### ABSTRACT

Assessment and measurement of learning outcomes are an important part of the teaching process. In addition to supporting content learning, technology-based assessments are more advantageous than traditional assessments, as it can help reduce time as well as provide more access to student needs and preferences, allowing educators to personalize learning. Nowadays, more and more different types and assessment tools are applied to assess according to competence, helping teachers to get the most accurate, objective and reliable results about the learners' competencies. Advances in technology will extend the use of student competence assessments aimed at improving the efficiency of the learning process in education. The goal of competence-based education is to focus on the output of the teaching and learning process, which emphasizes the competence and level of competence that learners need to achieve after the end of a training program, thus the development of technology, technology, socio-economy and politics from education has been identified as a key task in teaching towards developing competence for learners. This paper researches and identifies the factors in competence-based assessment with technology-assisted, contributing to identifying ways of assessing learners in the direction of competence development, aiming to diversify methods of student assessment in teaching and online teaching.

**Contribution/Originality:** This study contributes in the existing literature and additional about theory of the competence technology-based assessment, with a research method that combines educational practices to identify the determinants of learners' competence based on the technology driven environment aimed at diversifying student assessment methods in teaching.

#### 1. INTRODUCTION

The rapid development of information as well as science and technology has changed the form of education. Education is gradually shifting from knowledge-based teaching to competence-based teaching; Accordingly, learners need to be equipped with sufficient knowledge and skills to meet the requirements of the society as well as the labor market. In particular, with the 4th industrial revolution - the development trend based on the highly integrated platform of digital connectivity and information technology system will lead to inevitable changes of most fields, including education. Technology support tools can also support teacher assessment and coaching in teaching. These tools provide new ways to reflect, reflect, respond and evaluate teaching process.

At every level, the educational system will leverage the power of technology to measure problems and use the assessment data to improve learning to ensure all students have the best opportunity to express their opinions, knowledge and skills in technology-based exams and increasingly focus on practical skills and demonstrating complex knowledge.

Technology that improves the methods of assessment used over the long term, the information collected during the assessment process is used to most effectively impact students' learning. This means using assessments that ask students to express what they have learned in meaningful ways.

This paper researches and identifies the factors in competence-based assessment with technology-assisted, contributing to identifying ways of assessing learners in the direction of competence development, aiming to diversify methods of student assessment in teaching and online teaching the current digital age.

## **2. LITERATURE REVIEW AND RESEARCH CONTENT**

### *2.1. Concept of Competence and Technology*

#### *2.1.1. Competence*

In teaching theory in general, the concept of "competence" has many different definitions: According to the Philosophical point of view, competence is understood broadly as the psychological characteristics of an individual that govern an individual's behavior and an individual's living condition, in a special sense, competence is all The psychological character of the person makes it suitable for a certain form of professional activity that has been established in history. In modern teaching theory, competence is conceived as the convergence of many factors such as knowledge, skills, techniques, experience, willingness to act and moral responsibility.

The competence is a personal characteristic of proficiency - that is, being able to perform proficiently and surely certain types of activities [1].

Competence exists both as a potential form and as an competence that is revealed through the process of solving real-life situations. A realistic aspect of competence is what the school can organize to form and evaluate students [2].

We can realize the core common point of the above understandings about the concept of "competence" is the ability to apply knowledge, skills and attitudes to solve a real situation in life.

#### *2.1.2. Technology*

The origin in English is "Technology" which means systematic handling/tips or processing skills; is the creation, transformation, use, and knowledge of tools, machines, techniques, job skills, systems, and organizational methods, in order to solve a problem, improve a solution that already exists, meets a goal, or performs a specific function.

The concept of "technology" is also understood as a collection of methods, processes, skills, know-how, tools and means used to transform resources into products [2, 3]. Within the scope of this article, we refer to the concept of "technology" in the sense that technology is applied in teaching, the core of which is information and communication technology (ICT).

ICT competence in teaching is understood as the ability to use technology tools and resources to effectively communicate, create, disseminate, store and manage information in teaching activities. Technological tools and resources include technical equipment (computers, projectors, the Internet ...) software on computers and online applications [4, 5].

### *2.2. Situation of Research on Competence Based Assessment*

Regarding practical experience, developed countries such as the United Kingdom, New Zealand, USA, etc, that have successfully implemented Competency Based Training (CBT) and Competency Based Assessment (CBA) in

the vocational training and skill development system. In recent years, a number of Southeast Asian countries such as Malaysia, Philippines, Thailand and other regions such as India, South Africa, etc, which have also approached and applied training and assessment according to ability.

The concept of assessment according to competence: many research works have solved problems of measurement methodology and assessment in education: multiple choice methods, assessment process, and especially science measure in assessment of academic achievement, assessment processes, multiple choice design techniques and the theory of multiple choice questions of RASCH have been introduced for the application of practice assessment, and assessment in education in Vietnam over the past years, which are mainly towards higher education and general education [6].

Some commonly used terms in measurement and assessment of learning results include: test, measurement, assessment and multiple choice questions; requirements of testing and assessment in terms of reliability and validity; assessment questions and quizzes on difficulty and discrimination; multiple choice process has been clarified by some authors [2, 4, 7].

Assessment is "value judgment". In education, for the purpose of assessment, we can divide assessment into three groups: diagnostic assessment, formative assessment, and summative assessment [8].

- *Diagnostic assessment* is made at the beginning of the teaching process in order to understand the learning deficiencies of some learners (what specific learning goals did the learners not achieve in the past and the causes for them not reaching that goal) and explore the strengths or special abilities of some learners in relation to specific learning goals. Through the results of the diagnostic assessment, it is possible to classify learners, and in case of necessity, additional training may be provided to groups of learners with disabilities and attention should be given to support the promotion of the learners' capacity ahead of general level.
- *Formative assessment* will clarify the level of achievement and achievement of vocational training objectives, the status of knowledge, skills, and attitudes of students against the requirements of the training program; detect the causes of errors, help students adjust their learning activities; help teachers have a practical basis to identify their strengths/weaknesses, self-adjust and perfect teaching activities.
- *Summative assessment* what the student has achieved, classify the student, select appropriate students to continue training or use in the future, demonstrating the effectiveness of the course and the teaching of the teachers, set future goals for students.

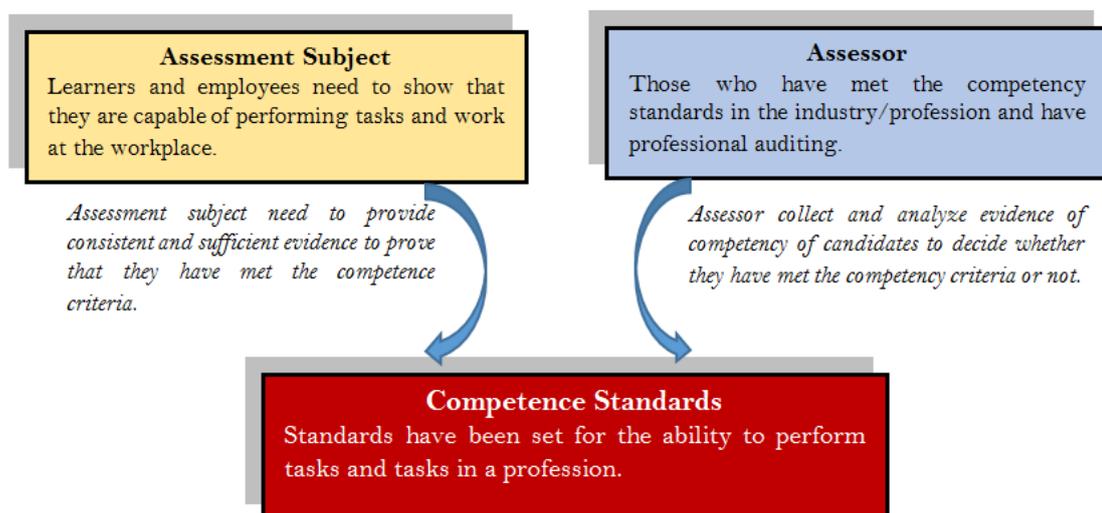


Figure-1. Model of competence-based assessment in education.

Assessment results will indicate the competence or level of skill development of the learner assessment according to competence has the following functions:

- *Diagnostic assessment* helps identify educational or learning needs.
- *Formative assessment* of providing feedback on how students will progress towards gaining competencies.
- *Summative assessment* assess the academic results to confirm the competence.

Recognize current competency or previous academic results to determine whether someone has accumulated competency through formal or non-formal learning and life experience, work experience.

If competency is seen as the ability to use knowledge, skills and attitudes in a coordinated way to solve problems in specific contexts, the curriculum and the methods of assessment must also be combined which of these three factors [9, 10].

Self-assessment in the learning process, especially in teaching in the direction of capacity development, is a method for students to form skills and techniques to identify their own strengths and weaknesses, especially the learning method to find a fix. In terms of awareness, self-assessment creates a backward link, helping students have a practical basis with high reliability to self-assess their learning results as well as overcome mistakes and shortcomings. In particular, each time self-assessment associated with technology factors will provide students with multi-dimensional interactive environment and conditions, develop the potential capacity to promote their own learning activities to meet their requirements. There is a need to set a standard of competency in each subject for students. In this way, students talk and assess themselves, understand what can be done, and what does not satisfy the need for research and study, from which to overcome or promote, contribute practice each student's deep, independent and creative actions.

Competence-based curricula require appropriate assessment methods to measure instructional goals. therefore, when the curriculum and teaching methods change, the assessment method must change as well. because assessment is primarily about output assessing, the assessment process focuses on collecting and analyzing information so that assessment of students 'competencies can be compared to their goals. however, in order for the assessment methods to achieve the required quality, the teacher must assess in many ways and through many tools.

According to the point of view of positive teaching, the assessment must take place in a multidimensional way: combining the assessment of the teacher and the self-assessment of students, which may refer to the mutual assessment between students and students with at a higher level, the teacher needs to create conditions for the study to self-assess not only by the score but also to the candidate's efforts, progress and results. This theory of positive assessment is consistent with the trend of the assessment method associated with technology and multidimensional factors that are the basis for evaluating the results of the training process.

In the studies on the above-mentioned competency assessment models, the authors have specified the requirements and criteria needed in assessing the competencies of the learners, but the research results are stopped at the tissue. The picture of the traditional pure assessment method has not mentioned the role of technology application in the model of learners' competency assessment, determining that this is the content we need to discuss and propose defining factors. in the technology-based competence assessment described below.

### *2.3. The Factors Determining Assessment According to the Competence of Technology-Based*

Technology-based teaching methods have changed the way of teaching and learning in a positive way and developed a more comprehensive capacity. If in traditional teaching, the teacher will convey the content of direct learning, according to the new teaching method associated with the element of using technology, the teaching medium will contain both learning content and medium which can contribute to the replacement of the content of the teacher content to learners in a multi-dimensional direction.

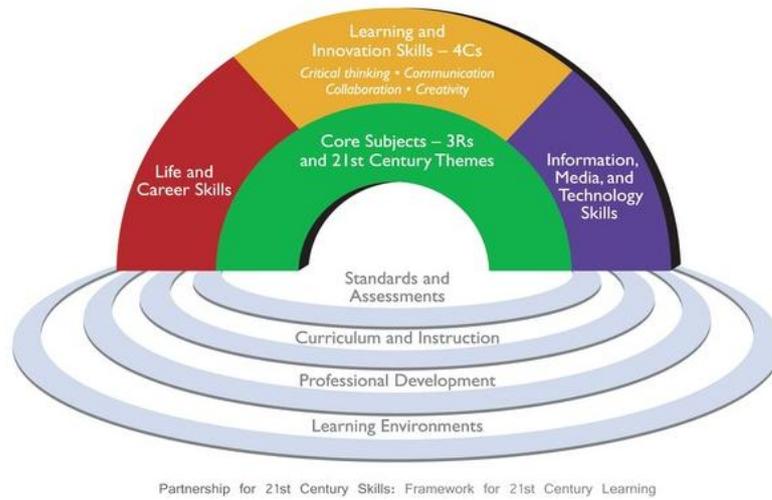


Figure-2. 21<sup>st</sup> Century student outcomes and support systems (<http://www.p21.org>).

The learning model with learners is the center, showing that knowledge comes to learners not only directly from the teachers but can be provided from: computer networks, via e-learning, e-books, art activities, natural environment, society, family, audiovisual facilities ..., the lecturers' lectures can be provided to learners through products packed by videos, digital video tape.

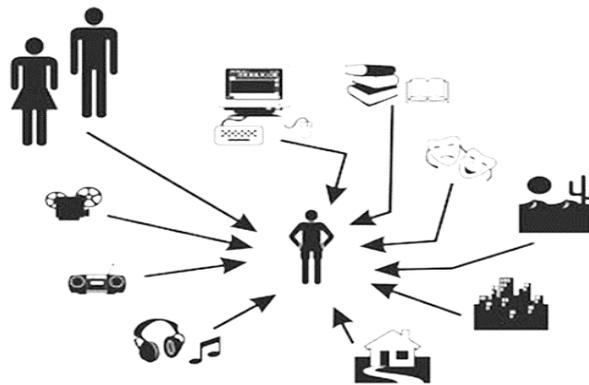


Figure-3. The learner learning model is central.

Thus, whenever the teaching method is used with technology that is based on ICT, learners can acquire knowledge and learn from many dimensions through different technical and technological means to acquire knowledge.

Technology can help us visualize and redefine assessment in different ways. These tools can provide measurements for learners who are designing and building products, conducting experiments with technological equipment and executing them in simulation models [7, 10, 11]. Issues posed in the real world with students asking to perform tasks, or include scenarios that simulate a defined realistic interaction associated with the topic of study; teachers can access information about their students' progress throughout the learning process, adapting the guide in personalizing learning to address issues that are still stuck in each specific lesson.

Factors that determine assessment based on technology-based competence include:

*i. Set of Advanced Question Types*

Technology-based assessments allow many different types of questions to go beyond common choices (there are many options like true or false, fill in the blanks ... which are close to traditional assessments).

Examples of advanced question types include:

- Feedback via graphics, including any content that students respond by drawing, moving, arranging or selecting the graphic area illustrated.
- Interactive text in which students select or rearrange sentences or phrases in a paragraph.
- Editing the equation in which students answer by entering an equation.
- Assessment is based on performance, in which students perform a variety of complex tasks.

Advanced questions apply technology that allows students to express more complex thinking and share their understanding of content in a way that previously had been difficult to assess with traditional methods in particular, performance-based assessments designed for students to complete a range of complex skills, such as requiring students to aggregate information from multiple sources, analyze information and provide justification. for the conclusion that students choose.

*ii. Measure Complex Competence*

Importance of expanding the focus of the assessment includes the incomplete cognitive capacity and the importance of technology in measuring knowledge, skills and abilities [12].

Assessment program, the management system that assesses based on new technology of students' academic results in creative problem solving designed to measure the competence of students to respond to situations, problems infrequent topics to harness the inherent potential of students, emphasizing the simulation-based curriculum and assessment designed to use technology that measures the student's understanding of the required knowledge scientific consciousness in the curriculum.

*iii. Technology that Allows Growth Assessment*

With the development of science and technology, especially ICT, applied products are designed and put into use to enhance the form of students' assessment of student results. Through the support of technology such as image, sound, multimedia technology, computer network interaction environment, software products, technology devices, etc., enable assessment to operate for study's learning according to the growth mindset towards capacity development, increasing the learning effectiveness of students.

Assessment of growth through technology will result in a significant increase in students' thinking, related to their positive academic goals, beliefs, efforts, habits, and behaviors.

*iv. Provide Real Time Feedback*

Technology-based assessments can provide real-time feedback reports, allowing the teachers to understand the strengths and weaknesses of the students during the course of the course guide. practice through rational explanations, which can be done in teaching assessment reviews can allow educators to see, evaluate and respond to students' work faster, more realistically than traditional assessments thanks to the technology environment. Technology-based aggregated assessments also facilitate faster feedback of feedback from schools and learners.

Some assessments based on today's technology allow for a choice of approaches that are more preeminent than traditional assessments. Some assessment platforms are formed that allow educators to provide feedback to students through online comments (via video, audio, images or digital text), participating in face-to-face conversations of online, provide direct e-mail feedback for parents and learners, connect learners with additional resources to practice specific skills or develop the core content of the curriculum.

*v. Adapt to Learners' Abilities and Knowledge*

The computer-compatible test model has enabled the assessment to estimate exactly what the student knows and can do through the assessment program in a test or an exam, the computer adaptive test simulation model uses algorithms that can adjust the difficulty of questions during the assessment process based on student feedback.

The way to build tests with technology adaptation to the goal is to design the test content in accordance with the level, knowledge and capabilities of each student, so adaptive assessment will result in assessment results are more accurate, more diverse, more flexible and more detailed for all students throughout the learning process than required to be achieved at the same time, the same level of accuracy in assessment price by the traditional method (on paper).

vi. *Be Attached to the Learning Process*

Assessments are associated with a potential learning process and are useful for predictive and supportive purposes, they provide detailed information on why students have difficulty mastering concepts with conceptualize and provide detailed information on how to personalize student responses to address these challenges.

Incorporating assessment through technology products such as an intellectual game that helps students in the learning process to identify and identify situations, improve the thinking and learning capacity of students [13].

vii. *Access to Learning thinking Development*

Technology provides students with many ways to demonstrate their competence to develop learning elements. To demonstrate their understanding, students can create multimedia products, build websites to organize and analyze information, design interactive presentations; through these products, the teacher can assess the knowledge and skills students gain in the learning process. Technology that allows for flexible presentation and assessment, personalized by using alternative representations of the same concept or skill on a problem in a training program.

In addition to the benefits brought about by the use of ict in teaching, the limitations in assessing the learning process using ict are still exist and need to be overcome, including: capacity and information technology level of the teacher; the traditional way of teaching is still deeply rooted in each teacher; exploit and use computers with excessive levels of abuse; access and interactivity on students 'computers; mechanical properties in evaluating teaching period with the curriculum framework; equipment and facilities.

In the future, assessments based on increasingly modern technology will enable personalized learning to be stronger, able to accelerate the change from content-based learning to real-time learning. based on capacity. Although this process often has certain difficulties, technology-based assessment is also being conducted in education in some countries. Technology-based assessment will continue to improve in more relevant ways of:

*Continuous improvement assessment:* Traditional paper-based tests and even some simple technology-based assessments are often reviewed and updated only within a designated schedule. The continuous improvement of assessment in the technology environment, the online distribution of assessments allows continuous improvement in addressing the assessment goals according to the output standards of the training programs.

*Technology integrated assessment system:* Technology can translate assessment from separate measures, separate from the progress of students to an integrated assessment system and personalized guidance to meet Self-Assessment needs of learners. Technology can integrate more fully the formative assessments and summaries of classroom experiences, student homework, all assessment results are closely tied to the learning outcomes of each subject learn.

*Effective and appropriate use of data:* In order to use and share data on student information systems, we need to address some challenges of shared data management platforms and systems. Technically, barriers to the development of multi-level assessment systems are created by having multiple student data systems running in parallel, along with different data formats and inadequate capacity interoperability between systems. Regarding student data, interactive programs on student data should be provided and accessible at different levels and in different quantities to address different needs in the education system. for the school.

*Sharing skill standards:* When moving to personalized learning, the growing need for a common set of skill standards needs to be provided and shared. The development of this information is an approach to addressing needs

by creating a shared, complete system for successful communication in developing learner competencies through the results of the assessment by technological factors.

Along with the results through analysis and assessment of the competency of using technology in teaching, the research of the authors in Raiyn [14]; Krause, et al. [15] also confirmed and pointed out the barriers in teaching applied public technology, but the new role of the teacher in an online learning environment to improve the quality of the course is linked to the technology application framework. This issue needs to be discussed and clarified for the next research direction.

### 3. DISCUSSION AND CONCLUSION

Currently, more and more different types and assessment tools are applied to assess according to competence, helping teachers to get the most accurate, objective and reliable results about the learners' competencies. The goal of competence-based education is to focus on the output of the teaching and learning process, which emphasizes the competence and level of competence that learners need to achieve after the end of a training program, thus the development of technology, technology, socio-economy and politics from education has been identified as a key task in teaching towards developing competence for learners.

The research results of this article initially identify the elements of assessment based on the technology-assisted competence that are mainly ICT and contribute to identify ways of assessing learners towards competence development and will be the trend of scientific and technological development suitable to the educational era in the digitalization today.

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