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A new approach for Assessment of Pedagogical Competence of students at higher education institutions of technology and education in Vietnam

Abstract

Competence-Based Assessment (CBA) is a new approach for assessing pedagogical competence of students in higher education institutions of technology and education in Vietnam. CBA is the process of collecting evidences and making judgments on whether competence has been achieved. CBA does not provide students with evidences to recognize their own knowledge and skills from dealing with real-world problems, but regulate teaching and learning. This research mentioned on a brief literature review on CBA and revealed a status of assessing pedagogical competence in training students to become Technical and vocational education and training (TVET) teachers at higher education institutions of technology and education in Vietnam. Quantitative and qualitative methods were used to gather data associated with CBA in general and the application of this approach in assessing pedagogical competence of students. This research also gave minor suggestions to strengthen the quality of applying CBA in assessing pedagogical competence of students in higher education institutions of technology and education in Vietnam.

1 Introduction

To meet requirements about the quality of human resource in the fourth industrial revolution, changing from Knowledge Based Teaching (focus on knowledge) into Competence Based Teaching (focus on competences) has become the inevitable and general trend in the world (Khanh & Oanh 2015). In this trend, Competence Based Assessment (CBA) is a very important link to make the teaching process successful. Based on learning outcomes, curriculum or professional competence standards, CBA concentrates on finding evidences to prove the various levels of applying knowledge, skills, attitude, value, and motivation in dealing with real-world problems.

CBA can help students motivate and engage them during the learning process. It's a great way to provoke students to recognize the skills and knowledge they are possessing, and empower them to take control of their career development. The more competencies they acquire, the more valuable they will be to their development in the future. Furthermore, integration CBA into instruction is considered to strengthen a variety of applying active and experiential teaching methods. Not only students, but also teachers seem to have better opportunities to regulate their activities to achieve learning outcomes.

CBA is not new to the learning environment in the world but it can be the new approach to higher education institutions of technology and education in Vietnam. This paper refers to a literature review of CBA and a status of assessing pedagogical competence according to CBA in higher education institutions of technology and education in Vietnam.

2 Literature review of Competence-Based Assessment

Competence-Based Teaching does not focus on 'teach knowledge' or 'transfer knowledge'. It emphasizes the development of holistic competence of students. This teaching approach requires assessment to be shifted from 'assess knowledge and skills' to 'CBA'. CBA has attracted attention by researchers in the world. Studying on CBA has concentrated on main issues in the following:

Firstly: Identify the definition of CBA.

The similar points of view among researchers on the concept of 'CBA' are to collect evidences and make judgments on whether competence has achieved compared with learning outcomes or professional standards. Khanh & Oanh (2015) believed that CBA focuses on the purpose of assessment for learning of self-students instead of ranking/comparing among students.

According to Wolf (1995), CBA is a form of assessment that is derived from the specification of a set of outcomes; that so clearly states both the outcomes - general and specific - that assessors, students and interested third parties can all make reasonably objective judgments with respect to student achievement or non-achievement of these outcomes; and that certifies student progress on the basis of demonstrated achievement of these outcomes. Assessments are not tied to time served in formal educational settings. Wolf also suggested that assessors, students and third parties can understand what is being assessed, and what should be achieved based on the learning outcomes and professional standards.

In the guidelines for competence assessment in vocational education and training in Western Australia (Western Australia Department of Training and Workforce Development 2013), CBA is the process of collecting evidence and making judgments on whether competence has been achieved. This confirms that an individual can perform to the standard expected in the workplace as expressed in the relevant endorsed industry/enterprise competency standards (or outcomes of accredited courses if there are no competency standards for an industry).

This paper applies the following understanding of CBA (Oanh 2016):

"CBA is an assessment approach based on learning outcomes (subjects or curriculum) or professional standards to make judgments on whether competence has been achieved through evidences associated with flexible application of knowledge, skills, attitudes, values and personal attributes such as motives, interests, needs, beliefs and so on in dealing with real-world problems."

In contrary to 'assess knowledge or skills', CBA must be based on learning outcomes or professional standards and applied regularly via formative and summative assessment, especially via formative assessment. Assessors, students (self or peer assessment) and third parties co-participate in making judgments on whether competence has been achieved. Results from CBA do not identify individual's levels of competencies, but also give regulations of teaching and learning.

Secondly: Study on CBA techniques.

CBA techniques have been developed by Angelo & Cross (1993), Phye (1997), Fisher & Frey (2007), Irons (2008), Khanh & Oanh (2015) and so on.

The pioneer researchers in developing CBA techniques are Angelo & Cross (1993). Those presented 50 techniques as well as distinguish them into 3 categories:

- 27 techniques for assessing course-related knowledge and skills (Minute Paper, Muddiest Point, Word Journal and so on).
- 13 techniques for assessing learners, values, and self-awareness (Interest/Knowledge/Skills Checklists, Goal Ranking and Matching etc.).
- 10 techniques for assessing learner reactions to instruction (Group-Work Evaluations, Reading Rating Sheets, Assignment Assessment and so on).

Not only categorized, but the characteristics, purposes and ways of applying these techniques were also introduced in detail by Angelo & Cross.

Phye (1997) encouraged teachers to apply various techniques such as multiple choices, portfolios (writing samples, audiotapes of speeches, artwork, lab reports, even mathematics worksheets), rubrics, concept mapping and so on in the classroom.

Irons (2008) introduced some techniques to enhance learning through formative assessment and feedback. Assessment techniques were proposed including diagnostic interviews and tests; project supervisions; multiple choice questions; portfolios and so on.

Fisher & Frey (2007) convinced teachers to use oral language, questions, writing, projects and performances, tests, and common assessments and consensus scoring to check for understanding.

CBA was also classified assessment techniques in 3 groups by Khanh & Oanh (2015):

- Techniques for cognitive competence (Minute Paper, Muddiest Point, One-Sentence Summary, Word Journal and so on).
- Techniques for application competence (paper or project prospectus, directed paraphrasing, applications card and so on).
- Techniques for self-assessment and feedback on the teaching process (group-work evaluations, checklist and so on).

According to Khanh & Oanh (2015), the application of these techniques should be engaged with learning outcomes and specific conditions of learning environment.

In short, CBA techniques have been drawn attraction of researchers for long time. CBA techniques are very various and link closely with learning outcomes and instruction, so they should be considered carefully before being applied in the classroom.

Thirdly: Study on integrating CBA into instruction

Instruction and assessment are core components of the teaching process. However, instruction seems to be separated from assessment. Oosterhof (2003) believed that educational reform efforts tend to emphasize the importance of integrating assessment into instruction. Knowledge should be instructed and assessed simultaneously.

In Competence-Based Teaching, the shift from assessment of learning to assessment for learning has been taken place by integrating CBA into instruction (William 2004; Elui 2008; Heffernan & Koedinger 2012; Oanh 2016). This integration does not provide teachers and students with valuable feedbacks to regulate the way of teaching and learning but give suggestions how the lesson could be improved.

Study on comparing the perception of academic coordinators and teachers, regarding the implementation of the competencies-based assessment and the difficulties and challenges they experimented in this process in the Spanish university context, Ion et al. (2015) also did indicate that CBA should be fully integrated in the learning process, provide information about learner progress and support learners in selecting appropriate learning tasks.

To sum up, CBA has been studied and applied in the classroom since the final decade of the 20th century. Literature of CBA revealed that the variety of CBA techniques and the benefits of integrating CBA into instruction could support teachers to make judgments on whether competence has achieved compared with learning outcomes or professional standards. In the Vietnamese universities of technology and education, assessment and other components of the teaching process (learning outcomes; content; instruction) are often separated. Assessment seems to be only of learning, not for learning. So, integrating CBA into instruction becomes more relevant to the trend of moving from 'focus on knowledge' to 'focus on competence' at Vietnamese universities of technology and education.

3 Status of assessing pedagogical competence of students at higher education institutions of technology and education in Vietnam

3.1 Outline of higher education institutions of technology and education in Vietnam

Technical and Vocational Education and Training (TVET) plays a significant role in developing high quality human resources for each country. In TVET institutions, TVET teachers are responsible for training apprentices to become labourers. Parallel with technical competencies, TVET teachers must have pedagogical competence. Pedagogical competence

consists of pedagogical professional knowledge (content knowledge; pedagogical knowledge; knowledge about learners; knowledge about curriculum) and skills (planning; communication classroom management; teaching; assessment; technology) (Moreno 2010). The pedagogical competence should be trained and assessed carefully.

There are five universities and nine faculties in specialized universities which are responsible for training TVET students to become TVET teachers. TVET students are trained in pedagogical competence by TVET teacher-trainers.

Table 1: Universities and faculties are assigned to train TVET teachers in Vietnam

Faculties of Technical Education	Universities of Technology and Education
1. School of Engineering Pedagogy (Ha Noi University of Science and Technology)	1. Ho Chi Minh City University of Technology and Education (HCMUTE)
2. Faculty of Technical Education (Ha Noi University of Education)	2. Vinh Long University of Technology and Education (VLUTE)
3. Faculty of Education and Foreign Language (Viet Nam National University of Agriculture)	3. Hung Yen University of Technology and Education (HYUTE)
4. Faculty of Technology Teacher Education (Hue University of Education)	4. Vinh University of Technology and Education (VUTE)
5. Faculty of Chemistry – Biology – Agricultural Technology Teachers Education (Dong Thap University)	5. Nam Dinh University of Technology and Education (NUTE)
6. Faculty of Physic –Industrial Technology Teacher Education (Dong Thap University)	
7. Faculty of Foreign Language and Technical Education (Ho Chi Minh City University of Agriculture and Forestry)	
8. Faculty of Technical Education (The University of Da Nang)	
9. Faculty of Technical Education (Thai Nguyen University of Technology)	

So, how do universities and faculties identify levels of achieving pedagogical competence of students? Answers for the question will help institutions propose solutions to improve the quality of assessment of pedagogical competence of students.

3.2 Methodology

A parallel curriculum (engineering and pedagogic) in training TVET students becoming TVET teachers is applied at higher education universities of technology and education in Vietnam. Quantitative (questionnaires) and qualitative (interview, observation, document

analysis) methods were used to gather data on status of assessing pedagogical competence of TVET students (from the first to the fourth year).

27 participants, which are TVET teacher-trainers, were selected to participate in this research. They are teaching pedagogical subjects, designing tests and assessing students' pedagogical competence at universities/faculties. Furthermore, they must have a minimum of 3 years of relevant work experience.

Statistical analysis was also conducted to find out types of learning tasks and assessment techniques in 64 tests of 9 semesters within four the school years 2012-2013, 2013-2014, 2014-2015, and 2015-2016 at HCMUTE. These are written and multiple choice tests used in the summative assessment.

3.3 Conducting the research

This research was conducted from March to June 2017 at HCMUT, VLUTE, HYUTE, and School of Engineering Pedagogy (Hanoi University of Science and Technology). Since there were dilemmas in access to formative and summative tests at universities and faculties, a case study was conducted at HCMUTE to explore further types of learning tasks and assessment techniques applied to identify TVET students' pedagogical competence.

3.4 Research findings

Later for identifying the status of assessing pedagogical competence of students, items were developed to gather data from TVET teacher-trainers about aims, criterions of assessing pedagogical competence of students; types of learning tasks and CBA techniques applied to assess pedagogical competence of students. The definition/aim/characteristics and CBA assessment techniques were manipulated to set up these items.

Every item was chosen and linked with one of five levels by participants:

1. Very rarely or never (0-10 per cent of the time)

2. Rarely (11-25 per cent of the time)

3. Occasionally (26-50 per cent of the time)

4. Very frequently (51-75 per cent of the time)

5. Always (more than 75 per cent of the time)

3.4.1 Aims of assessing pedagogical competence of students

In CBA approach, assessment is not directed to rank among student and identify achieved levels of knowledge and skills of students. It concentrates on assessment for learning and identifying the application of previously learned information in dealing with real-world problems (Khanh & Oanh 2015).

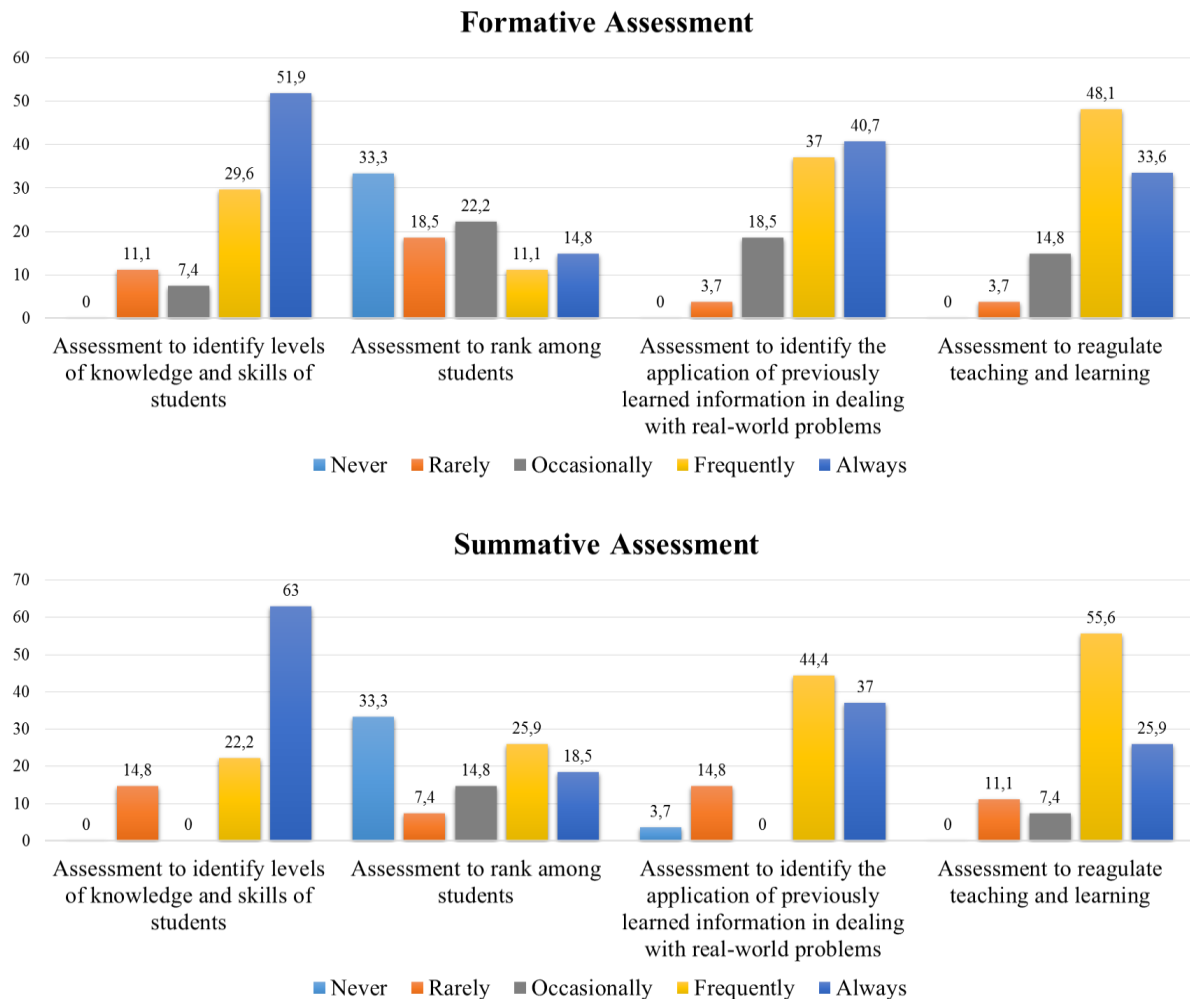## Formative Assessment

Summative Assessment

Figure 1:   Aims of assessing pedagogical competence of students

Results of the figure 1 showed that, there were 14.8 per cent participants assessing to rank among students in formative assessment with more than 75 per cent of the time. In summative assessment, the statistics of this aim is higher than 4.3 per cent. Especially, up to 63 per cent (in summative assessment) and 51.9 per cent (in formative assessment) participants assessed to identify achieved levels of knowledge and skills of students. Obviously, although CBA has been used in higher education institutions of technology and education in Vietnam, but there is a high rate of participants who misunderstand the aim of this approach.

TVET teacher trainers at HCMUTE shared that, there is not any content associated with CBA in the pedagogical training curriculum. This means TVET students are not trained in CBA to understand adequately. It is not difficult to find the similar status in the pedagogical training curriculums at other universities of technology and education in Vietnam. In addition, most TVET teacher trainers have a difficulty in accessing in-depth CBA studies in the world because of their limited English proficiency. Further studies on CBA in the Vietnamese university of technology and education context have not been still drawn researchers'

attention. These reasons seem to be main obstacles to adequately understand CBA in general and particularly the aims of CBA.

3.4.2   Criterions of assessing pedagogical competence of students

Levels of achieving knowledge were the most chosen criterion in more than 75 per cent of the time. It is the most significant criterion of 'assess knowledge and skills', not 'CBA'. The other criterion of 'assess knowledge and skills' is the application of previously learned information in dealing with typical examples or situations. This criterion requires students to remember/recall practiced patterns/learned information and apply them to meet requirements of learning tasks. 29.6 per cent participants used this criterion in summative assessment compared with 25.6 per cent in formative assessment. These results proved the close relationship between aims and criterions of assessment.
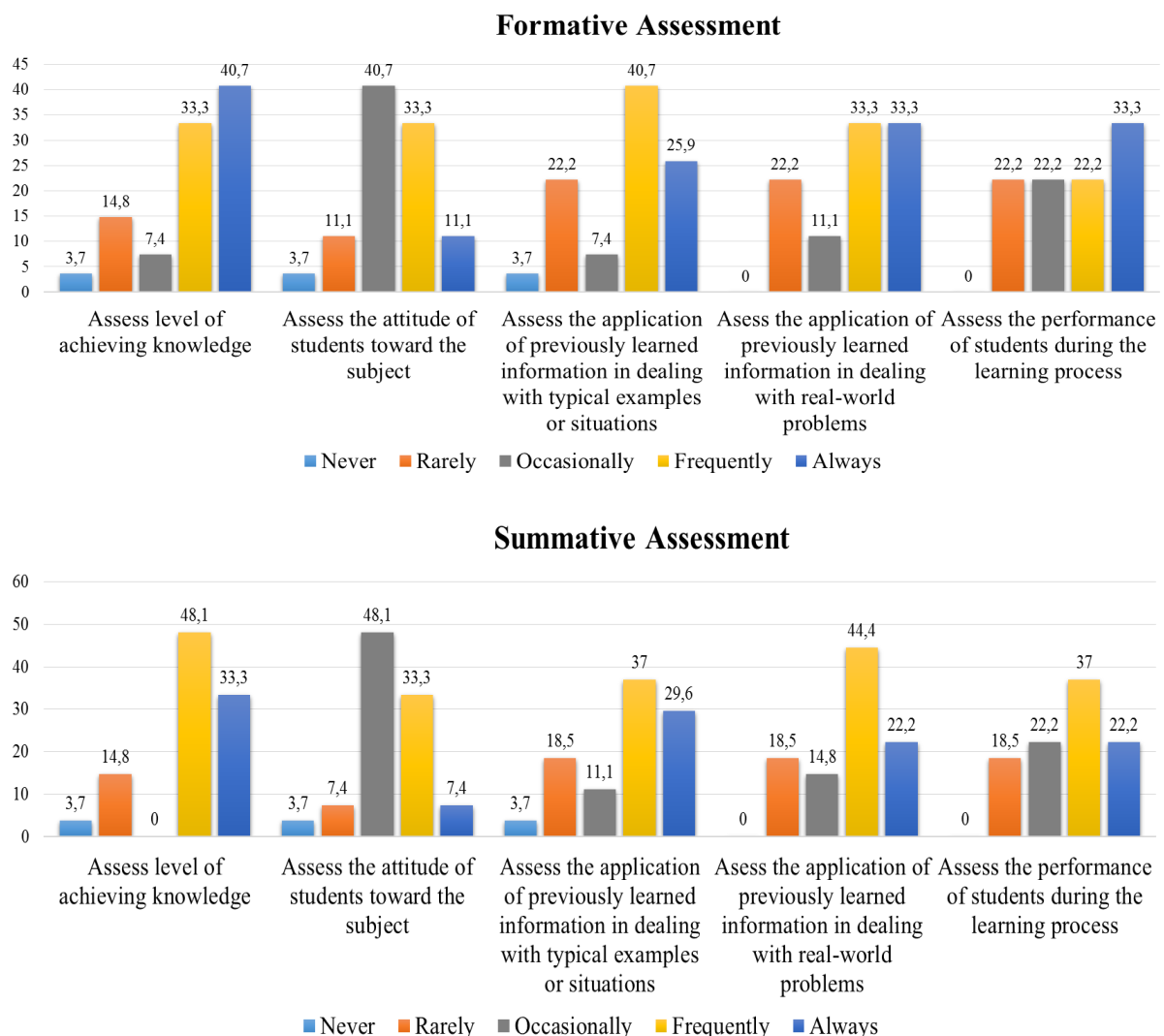
Formative Assessment

Summative Assessment

Figure 2:   Criterions of assessing pedagogical competence of students

3.4.3 Types of learning tasks in assessing pedagogical competence of students

Learning tasks can be seen as cognitive questions. Those are developed based on the Taxonomy of Education Objectives (Bloom et al. 1956) and the revision of Bloom's Taxonomy (Anderson et al. 2001). The Taxonomy of Educational Objectives is a scheme for classifying educational goals, objectives, and, most recently, standards. It provides an organizational structure that gives a commonly understood meaning to objectives classified in one of its categories, thereby enhancing communication (Krathwohl 2002). In this research, learning tasks are linked closely with the six major categories in the cognitive domain: remember, understand, apply, analyse, evaluate, and create.

Types of learning tasks in assessing pedagogical competencies of students were identified by items engaged with the nature of the six major categories in the cognitive domain. These items were labelled in the following:

- Type 1: Learning tasks require students to recognize knowledge from memory.
- Type 2: Learning tasks require students to understand knowledge.
- Type 3: Learning tasks require students to apply previously learned information in dealing with typical examples and situations.
- Type 4: Learning tasks require students to apply previously learned information in dealing with new examples or non-typical situations.
- Type 5: Learning tasks require students to apply previously learned information in dealing with real-world problems.
- Type 6: Learning tasks require students to break down materials or concepts into parts and determine how the parts relate to one another or how they interrelate, or how the parts relate to an overall structure or purpose.
- Type 7: Learning tasks require students to relate to parts of materials or concepts into new overall structures/models.
- Type 8: Learning tasks require students to make judgments based on criteria and standards through checking and critiquing.
- Type 9: Learning tasks require students to put elements together to form a coherent or functional whole as well as to reorganize elements into a new pattern or structure through generating, planning, or producing.

As you can see in the figure 3, learning tasks which require students to apply previously learned information in dealing with typical examples and situations were always used with the highest rate in both formative and summative assessment. In contrary, the higher applying levels, those are the application of learned information in dealing with new examples or non-typical situations or real-world problems were used less remarkably than the above level.

There was not much difference about the rate of participants using learning tasks at understanding versus applying, approximately 3.7 per cent. Although the rate of using learning tasks at remembering was rather lower than mentioned two categories, but it was

higher than other categorizes of the higher cognitive domain such as analysing, evaluating and creating.

Overall, learning tasks belonging to higher thinking levels were used with the low rate in more than 75 per cent of the time. Only 14.8 per cent to 18.5 per cent participants did apply them in formative assessment. The rate of using learning tasks at analysing, evaluating in summative assessment was similar. Furthermore, the rate of using learning tasks at creating was the lowest with 7.4 per cent participants chosen.
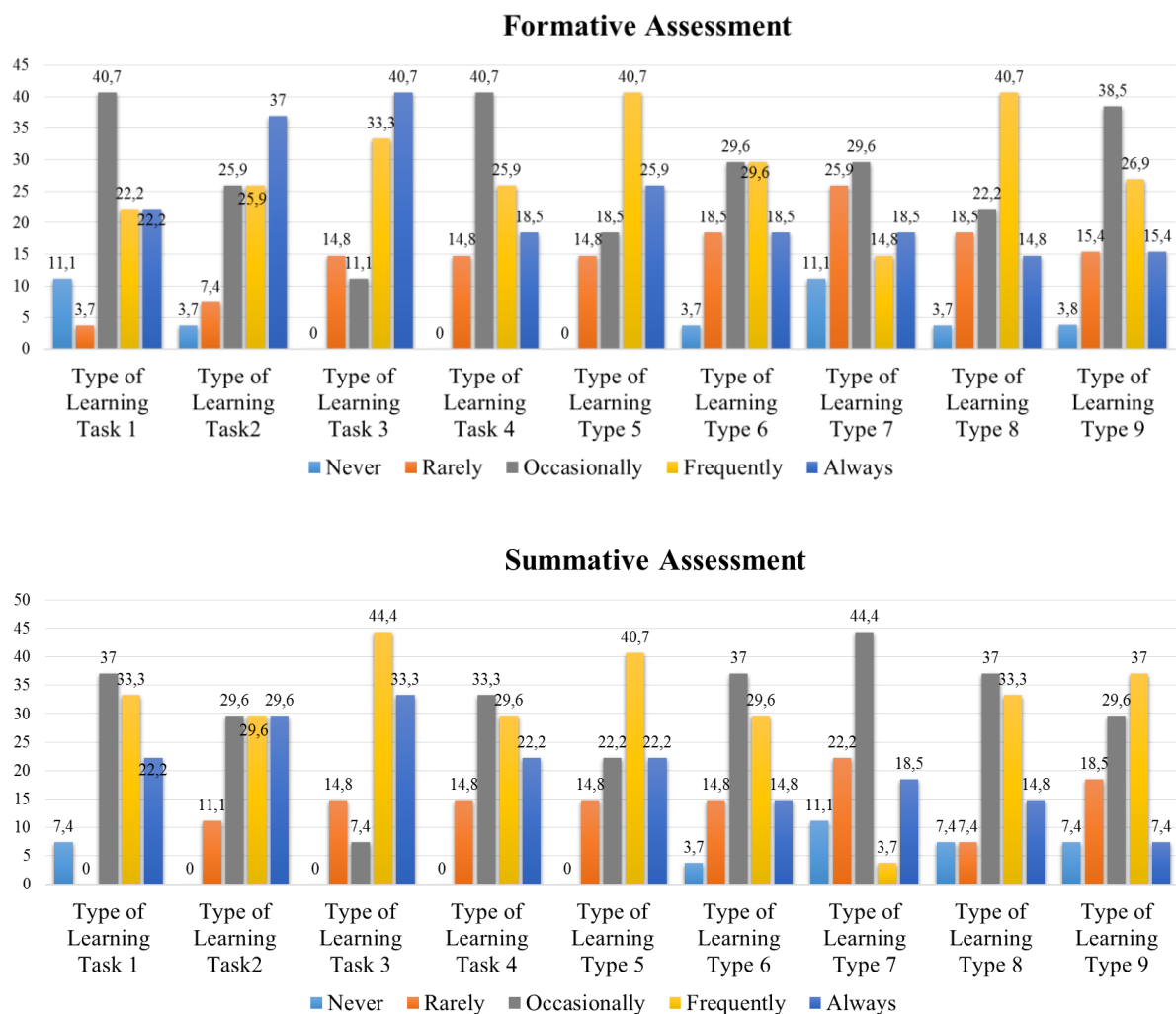

Figure 3:   Types of learning tasks in assessing pedagogical competence of students

In summary, learning tasks were engaged with the six major categorizes of cognitive domain. Learning tasks at the lower cognitive levels were always used more than learning tasks at the higher cognitive.

Further studies on 64 summative tests with 172 questions in 9 semesters from the school year of 2012-2013 to the first semester of the school year of 2016-2017 at HCMUTE showed a meaningful relationship among above analysed results of learning tasks with teaching and

assessing pedagogical competencies of students. As you can see the figure 4, questions at the level of evaluating and creating have not been completely applied for many years. This trend seems to be contrary to requirements of the quality of teachers in the fourth industrial revolution and education 4.0 in which critical and creative thinking are the core competencies of workers. In addition, education is not only a science, but also an art. So, we believe that, lack of evaluating and creating in education will become big obstacles to diversify forms and teaching methods as well as assessment in the classroom.
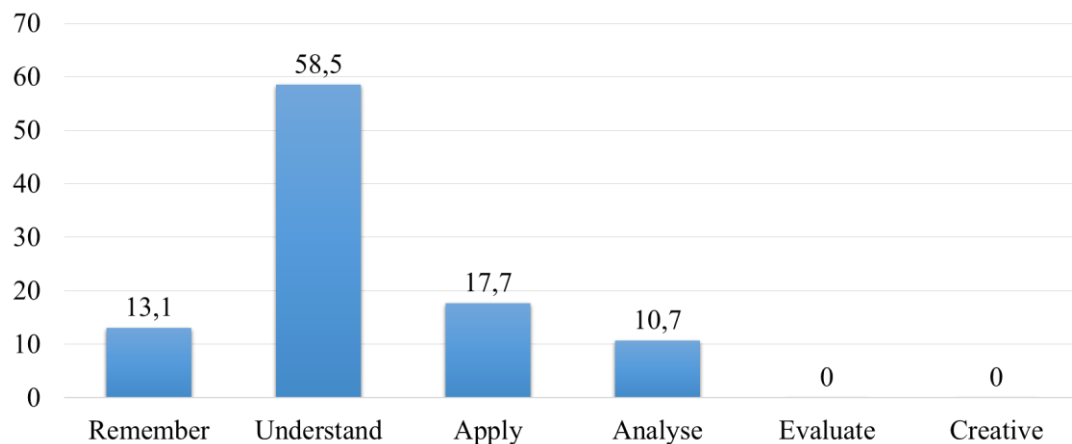

Figure 4: Types of questions to assess pedagogical competence of students in summative tests at HCMUTE

The figure 4 also revealed that students' pedagogical competence was assessed at all four levels of cognition. However, the rate of questions at understanding is the highest. On the other hand, there were 13.1 per cent questions requiring students to recognize knowledge from memory. Question at the level of application and analysis were also used but with a much lower rate than the question at the level of understand.

3.4.4 CBA techniques in assessing pedagogical competence of students

As we can see in the figure 5, many CBA techniques were applied to assess pedagogical competence of students in almost all levels. While multiple choices were always used the most widely in formative assessment, written test was the most popular in summative assessment. These technique meets requirements of learning tasks designed based on categorizes of remembering and understanding.

Although essay seems to be suitable to assess learning tasks at analysing, evaluating and creating, but the rate of using it was lower than multiple choices and written test. There were not any differences about the rate of using oral test and practice in both formative and summative assessment. Only 18.5 per cent participants used them very frequently and always.

On the other hand, checklist was used at least in comparison with others assessment techniques those have been mentioned in this study.

In brief, students seem to be required to remember/understand more than apply/analyse/evaluate and create based on previously learned information.
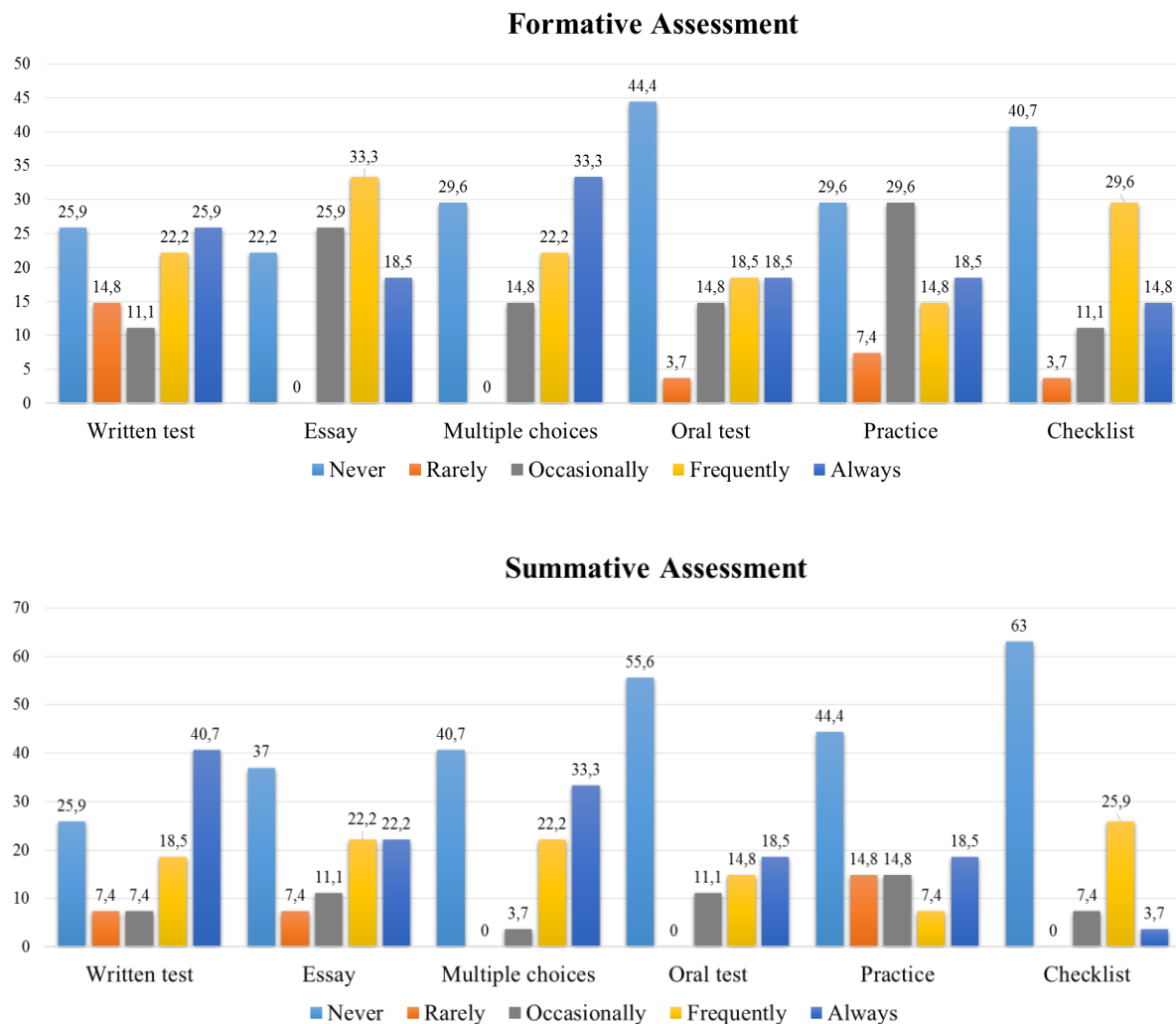
Formative Assessment

Summative Assessment

Figure 5:   CBA techniques in assessing pedagogical competence of students

Is there any relationship between results of applying CBA techniques in general and the case study? A quantitative research concerning with 64 summative tests at HCMUTE revealed that written test, multiple choices and practice were main assessment techniques. Written tests occurred in almost every one of the 64 tests, multiple choices and particularly practice were used with the very remarkably lower rate. These statistics can be clear evidences about using assessment techniques not directed to higher cognitive levels in assessing pedagogical competence of students at HCMUTE (see the figure 6).
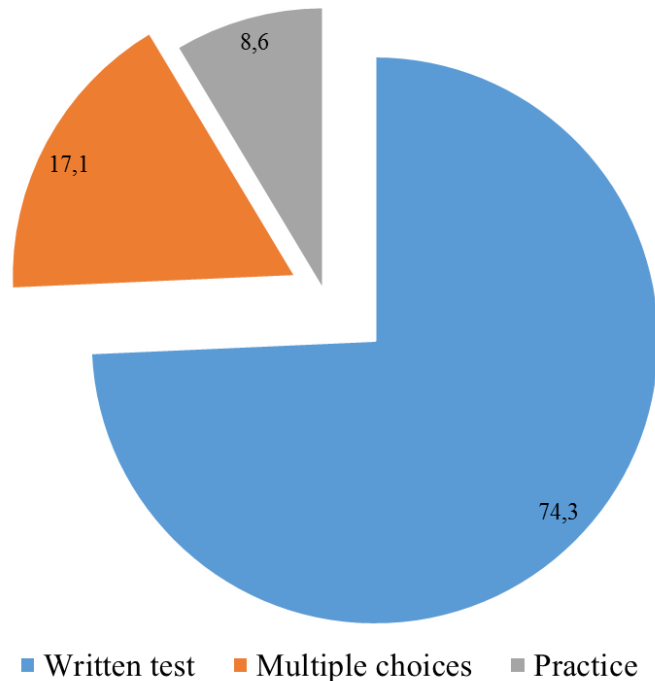
Figure 6:   CBA techniques in assessing pedagogical competence of
students in summative tests at HCMUTE

4   Conclusion

CBA is the new approach for assessing students' pedagogical competence in higher education institutions of technology and education in Vietnam. CBA concentrates on assessing the application of previously learned information in dealing with real-world problems. CBA does not only provide students with evidences to self- recognize their own skills and knowledge but also regulate teaching and learning.

Quantitative and qualitative results on the status of assessing students' pedagogical competence at higher education institutions of technology and education in Vietnam revealed that aims of CBA were misunderstood. Criterions and learning tasks were mainly directed to assess understanding and remembering knowledge more than applying, analysing, evaluating and creating. Although CBA assessment techniques were applied quite numerously, but multiple choices and written test were still the most popular technique in formative and summative assessment. These techniques are more relevant to assessing pedagogical competence at understanding and remembering level.

Lack of further studies on CBA, not to be trained in CBA formally and limited English proficiency of TVET teacher-trainers seem to be main barriers to understand CBA adequately and apply CBA in the Vietnamese university of technology and education context. Hence, theoretical knowledge and skills on CBA should be developed in pedagogical curriculum at universities of technology and education. Further studies on CBA need to be conducted in the

Vietnamese universities of technology and education context. National or international seminars or workshops on CBA should be regularly organized to support TVET teacher trainers and TVET students to understand and effectively apply it in teaching and assessing students' pedagogical competence.

It is also believed that changing the awareness of TVET teacher trainers on CBA and developing assessment tools according to the higher cognitive levels will strengthen the quality of applying CBA in assessing students' pedagogical competence at higher education institutions of technology and education in Vietnam.

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