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Building a Competency Assessment Framework for Grade 10 Physics: An Urgent Need from Teaching Practice

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Abstract

The context of implementing the 2018 General Education Curriculum requires a profound change in the assessment activities for Grade 10 Physics, shifting from a content-oriented approach to developing learners' competencies. This paper presents the main findings from a survey study aimed at clarifying the current state of teachers' perceptions, difficulties, and needs during this transition. Using a questionnaire survey method with 20 Physics teachers at high schools in Thai Nguyen province, data were collected and analyzed using descriptive statistics. The research results paint a challenging picture: the majority of teachers lack confidence and detailed guidance materials; they face significant pressure as developing matrices and assessment questions in the new orientation is considered too complex and time-consuming, leading to a common trend of reusing questions from old question banks. This situation also affects students, leaving them confused with new ways of learning and taking tests. Most notably, the study records a near-unanimous consensus (95%) on the urgent need for a standardized reference framework and question bank. These findings confirm the existence of a "difficulty loop" that is hindering the innovation process, while also emphasizing the urgency of building and implementing effective professional support tools to help teachers overcome barriers and bring the spirit of the new curriculum into practice.

Keywords:

Competency assessment, Physics 10, 2018 GEC, reference framework, assessment practices, teacher survey.

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1. Introduction

The fundamental and comprehensive reform of education and training, in line with the spirit of Resolution No. 29-NQ/TW (2013), is placing urgent demands on shifting the educational philosophy from focusing on knowledge transmission to the holistic development of learners' qualities and competencies. The introduction of the 2018 General Education Curriculum is a strong, concrete step in this direction, marking a systemic shift in all teaching and learning activities. In this context, assessment is identified as a key element, not only serving to measure final outcomes but also acting as a guiding tool and a driving force for innovating teaching methods.

The philosophy of assessment also needs to change accordingly, moving from "assessment of learning," which primarily serves the purpose of ranking, to "assessment for learning," where assessment becomes an integral part of the teaching process, providing timely feedback to help both teachers and students adjust their activities. However, the path from policy orientation to practical implementation in schools is always fraught with challenges. Recent studies in Vietnam have pointed out a significant gap between teachers' perceptions and their practice in implementing competency-based assessment.

Teachers, the core force of the innovation process, are facing great pressure to change their long-established mindsets and pedagogical skills. They are not only confused about identifying specific manifestations of competencies but also encounter difficulties in designing new assessment tools, which require more complexity and time investment. An inevitable consequence is that assessment activities risk changing only in form but not in substance. Due to time pressure and complexity, many teachers tend to revert to using familiar question formats from old question banks, which only focus on testing theoretical knowledge and pure calculation skills. This creates a major contradiction: the curriculum aims for the competency of application and creativity, yet the assessment tools measure the ability to memorize and reproduce knowledge, causing students to continue the habit of rote learning instead of developing problem-solving skills.

Stemming from this reality, a systematic study of the assessment practices in Grade 10 Physics is extremely necessary. This paper focuses on clarifying the core research questions: What is the current state of teachers' perceptions and actions in competency-based assessment? What are the main difficulties and barriers they are facing? And what are their specific needs for support solutions? The development and application of a standardized assessment framework, similar to international models like PISA (OECD, 2019) or TIMSS (Mullis & Martin, 2017), along with a quality question bank (Pham, 2024), is considered an urgent solution. Especially for Physics, having a clear competency framework is a crucial prerequisite for innovation (Nguyen, 2016), aligning with the general trend of standardizing teaching competencies in STEM fields (Le et al., 2024). Therefore, this study is conducted to provide convincing practical evidence, affirming the urgency of building and applying an assessment reference framework for Grade 10 Physics, thereby helping to bring the innovative spirit of the 2018 Curriculum into practice in a deep and meaningful way.

2. Research Methods

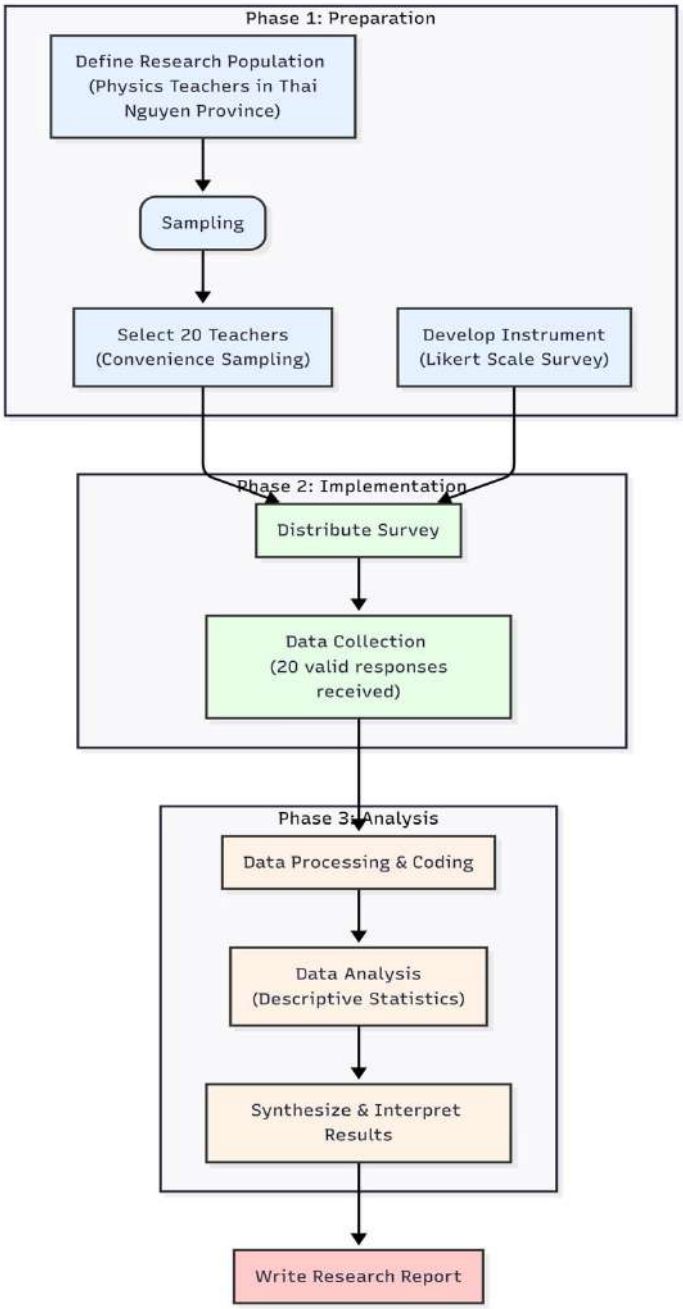
To address the research questions posed, this study was designed using a descriptive method, with a questionnaire survey as the primary tool. This approach was chosen because it allows for the systematic collection of quantitative data on teachers' perceptions, attitudes, and actions within a specific scope, thereby painting a comprehensive and objective picture of the current state of assessment practices.

The object of the study comprises all activities related to the assessment of learning outcomes in Grade 10 Physics according to the orientation of the 2018 General Education Curriculum. The selected survey subjects were 20 teachers directly teaching Physics at high schools in Thai Nguyen province (Figure 1). The selection of this group ensures that the collected information is authentic and insightful, as they are the ones directly implementing the curriculum and facing the advantages as well as the difficulties in daily practice.

The main data collection tool was a carefully designed questionnaire, consisting of three distinct parts. The first part introduced the purpose of the survey and committed to information confidentiality to build trust and encourage honest responses. The second part collected basic information about the teachers' years of teaching experience, a factor that could be used for deeper analysis of perceptual differences among teacher groups. The third part, the core content section, was structured into 12 statements, divided into three main groups of issues. The first group focused on teachers' perceptions and accessibility to the competency-based teaching orientation. The second group delved into the current practices of constructing and using periodical assessment tools. The third group explored teachers' perspectives on students' expressions and the need for support tools.

The statements in the main content section were designed as closed-ended questions using a 5-point Likert scale, ranging from “1 - Strongly Disagree” to “5 - Strongly Agree”. The use of this scale helps to effectively quantify teachers' opinions and attitudes, facilitating statistical analysis. This structure not only allows for determining the general level of agreement on each issue but also helps compare the intensity of different difficulties and needs that teachers are facing. In addition to the closed-ended questions, the survey included an open-ended question at the end, providing an opportunity for teachers to share additional opinions, suggestions, or specific concerns not covered in the existing statements, thereby enriching the qualitative data for the study.

Figure 1. The Research Process



The data collection and analysis process was conducted scientifically and rigorously. After the questionnaires were sent to the teachers, a total of 20 valid responses were collected. All data were then coded and entered into software for processing. The primary data analysis method used was descriptive statistics. Specifically, the study calculated basic indicators such as frequency, percentage, and mean score for the answers to each statement. These statistical results were then synthesized and organized according to the predefined issue groups. The analysis did not stop at presenting numbers but focused on interpreting their meaning in a practical context, linking the results to highlight trends, contradictions, and core challenges, thereby providing convincing answers to the research questions.

3. Research Results

The analysis of the survey data has painted a detailed and multidimensional picture of the current state of assessment in Grade 10 Physics, clearly reflecting the barriers from teachers' perceptions and professional actions to students' expressions and the need for practical support.

3.1. On Teachers' Perception and Accessibility to the New Assessment Orientation

The survey results show an overall picture of the teaching staff's awareness: there has been initial access, but it still lacks depth and confidence in implementation (Table 1). Specifically, the level of confidence in mastering the requirements of the new curriculum is not high. For the statement about mastering the required learning outcomes and the manifestations of the three components of Physics competency, the average score was only 3.4 out of 5. Although 70% of teachers chose “Agree” or “Strongly Agree,” 25% still felt “Undecided,” indicating that the understanding of a significant portion of teachers is not yet truly deep and certain.

One of the biggest barriers identified is the lack of highly applicable guidance materials. The statement that current materials are detailed enough to implement assessment effectively received a very low average score of only 2.2/5.0, with 70% of teachers expressing “Disagree” or “Strongly Disagree”. This reflects the reality that general orientation documents are necessary but not sufficient; teachers need guidance on assessment technology to apply it in practice.

Table 1. Teachers' Perception and Accessibility to the New Assessment Orientation

Statement Content	Mean Score	Strongly Agree/Agree (%)	Undecided (%)	Disagree/Strongly Disagree (%)
Mastering the required outcomes and manifestations of the 3 Physics competency components	3.4	70%	25%	5%
Current guidance materials are sufficiently detailed	2.2	10%	20%	70%
Difficulty in changing teaching methods	4.1	80%	10%	10%
Lack of in-depth training programs	4.6	90%	5%	5%

Alongside resource barriers, teachers also admit to facing many difficulties in changing their pedagogical methods and express a great need for in-depth training programs. There is a close connection between innovating teaching methods and innovating assessment, as the statement about the difficulty of shifting from knowledge transmission to organizing competency development activities received high agreement with a mean score of 4.1/5.0. Corresponding to that difficulty, the need for professional support is very urgent. The mean score reached 4.6/5.0 for the statement about the lack of systematic training programs on the

techniques for designing questions and assessment tools, with 90% of teachers agreeing or strongly agreeing. These numbers show that to successfully innovate assessment, it is necessary to start by fostering and enhancing the capacity of the teaching staff in a substantial and effective way.

3.2. On the Current Situation of Developing and Using Periodical Assessment Tools

If the first group of issues revealed perceptual barriers, the second group delves into specific manifestations in teachers' professional activities. The results clearly indicate the challenges and ruts in practice, which are the direct consequences of the aforementioned difficulties.

Developing a test matrix that fully covers the competency components and cognitive levels is considered an overly complex and time-consuming task, with a mean score of 4.7/5.0 and 95% of teachers agreeing (Table 2). This is the biggest technical barrier right from the first step of the test-making process. Faced with that pressure, a common coping mechanism has formed: up to 75% of teachers admit that they tend to reuse questions from the old question bank of the 2006 curriculum when preparing tests.

Table 2. The Current Situation of Developing and Using Periodical Assessment Tools

Statement Content	Mean Score	Strongly Agree/Agree (%)	Undecided (%)	Disagree/Strongly Disagree (%)
Developing a test matrix is too complex and time-consuming	4.7	95%	5%	0%
Tendency to reuse questions from old question banks	4.3	75%	15%	10%
Tests are still heavy on theoretical knowledge	4.4	85%	10%	5%
Difficulty in developing higher-order thinking questions	4.5	90%	5%	5%
Limited coordination of other assessment forms	3.8	65%	20%	15%

The inevitable consequence of this action is that current tests do not accurately reflect the spirit of the new curriculum. This is affirmed by 85% of teachers who agree that tests are still heavy on testing theoretical knowledge and calculation skills, and do not truly assess the competency to apply knowledge to real-life situations. The challenge is not only in covering the competency components but also in creating questions at high cognitive levels. As many as 90% of teachers report that they have difficulty developing questions and exercises at the higher-order application level, which requires students' analysis and creativity. This difficulty indicates a shortage not only of time but also of skills in designing problem-based situations

linked to reality, which require students to mobilize integrated knowledge to solve them—a high-level pedagogical skill.

3.3. On the Expressions from Students and the Urgent Need for Support Tools

The difficulties faced by teachers have a direct impact on the learners. The survey results show that 85% of teachers notice that students are still confused and have not developed the habit of applying integrated knowledge to solve real-world problems. This confusion among students is a mirror reflecting the difficulties in the implementation of teaching and assessment methods by teachers (Table 3). Furthermore, the shift to a culture of "assessment for learning" also faces obstacles, as 80% of teachers report that students are not really interested in and do not perform well in self-assessment or peer assessment. This shows that changing the assessment culture in the classroom is still a long journey.

Table 3. Expressions from Students and the Need for Support Tools

Statement Content	Mean Score	Strongly Agree/Agree (%)	Undecided (%)	Disagree/Strongly Disagree (%)
"Students are confused, not used to applying integrated knowledge"	4.3	85%	10%	5%
Students are not interested in self-assessment or peer assessment	4.0	80%	10%	10%
The need for a standardized reference framework and question bank	4.8	95%	3%	2%

After pointing out a series of difficulties, the teachers strongly affirmed the solution they need. The statement that having a standardized reference framework and question bank would make teaching and assessment much more convenient received almost unanimous agreement. With the highest average score in the entire survey at 4.8/5.0 and 95% of teachers choosing "Agree" or "Strongly Agree," this is the clearest evidence, a direct voice from practice. This result confirms that building a reference framework is not just a scientific research task but also an urgent requirement, meeting the exact needs and expectations of the teachers who are directly implementing the curriculum.

4. Discussion

By connecting the survey results, a comprehensive picture of a systemic "difficulty loop" becomes evident. This loop originates from initial barriers in terms of perception and resources, where teachers feel a lack of confidence, detailed guidance, and in-depth training programs. This foundational deficit directly leads to the second consequence in professional practice: facing the complexity of building matrices and questions according to the new orientation, teachers tend to seek the safest and most time-saving solution, which is to revert to using old assessment tools that are heavy on testing theoretical knowledge. This loop then

directly impacts the final subject, the learners, making them confused, unable to form the habit of applying knowledge to practice, and unenthusiastic about new forms of assessment. The students' passivity, in turn, reinforces the teachers' reluctance to innovate, creating a closed cycle that hinders the spread of the educational reform spirit. Thus, the identified difficulties are not isolated issues but are tightly linked links, creating a cumulative resistance that widens the gap between the curriculum's goals and its practical implementation.

The numbers obtained from the survey not only quantify the difficulties but also carry profound implications. The near-unanimous agreement among teachers on the complexity of building a matrix (mean score 4.7/5.0) and the urgent need for a standardized reference framework (mean score 4.8/5.0, with 95% agreement) has turned individual concerns into a strong collective voice. This shows that the problem does not lie in the attitude or capacity of individual teachers, but is a common challenge for the entire system, requiring a macro-level solution. The implication of the study is that supporting teachers cannot be limited to general orientation training sessions but must address specific technical problems. The need for a "reference framework" is not merely to reduce the workload for teachers, but more importantly, it serves as a set of "technical standards" to ensure consistency, objectivity, and fairness in assessment on a large scale. Building and issuing such tools will be a strategic step to break the analyzed "difficulty loop," synchronize the implementation capacity of the teaching staff, and create a reliable assessment environment that truly promotes the development of learners' competencies.

5. Conclusion and Recommendations

The study has provided clear practical evidence, confirming that the assessment of Grade 10 Physics according to the competency development orientation is facing systemic barriers, creating a "difficulty loop" from teachers' perceptions to professional actions and students' adaptation. Challenges regarding a lack of confidence, a shortage of detailed guidance materials, and the pressure from the complexity of new assessment tools have led to a tendency to stick to old ways, reducing the effectiveness of the innovation process. Through this, the study strongly affirms that the need for a standardized assessment reference framework is no longer a theoretical proposal but has become an urgent demand, the common voice of the teachers directly implementing the curriculum. This is a prerequisite for resolving obstacles, creating synchronization, and improving the quality of assessment activities.

From these conclusions, the study proposes several strategic recommendations. For education managers, it is necessary to prioritize the development and issuance of common reference tools such as reference frameworks, specification matrices, and illustrative question banks for each subject, while organizing in-depth training and professional development programs focused on the practical skills of designing assessment tools. For educational institutions, it is necessary to strengthen the role of professional group activities, creating a space for teachers to collaborate, share experiences, and resolve difficulties in practice. Finally, researchers should continue to build, pilot, and refine specific competency

assessment models and tools, providing a solid scientific and practical basis for large-scale application, thereby contributing to bringing the innovative spirit of the 2018 General Education Curriculum into depth and substance.

References

Anh, H. S. (2019). Understanding student assessment and innovating student assessment towards a competency-based approach. *Ho Chi Minh City University of Education Journal of Science*, (50), 131-131.

Black, P., & Wiliam, D. (1998). Inside the Black Box: Raising Standards Through Classroom Assessment. *Phi Delta Kappan*, *80*(2), 139-148.

Ministry of Education and Training. (2018).
Circular No. 32/2018/TT-BGDĐT dated December 26, 2018, promulgating the General Education Program.

Khanh, N. C. (2016). *Innovating high school student assessment according to the competency-based approach*. National conference on building the general education curriculum.

Lê, T. T. H., Phạm, K. C., Lê, C. N., Vũ, T. T., & Nguyễn, T. L. N. (2024). Developing criteria for assessing STEM teaching competency of general education teachers in Vietnam. *Journal of Education*, *24*(11), 110–115. Retrieved from https://tcgd.tapchigiaoduc.edu.vn/index.php/tapchi/article/view/2759.

Mullis, I. V. S., & Martin, M. O. (Eds.). (2017). *TIMSS 2019 Assessment Frameworks*. Boston College, TIMSS & PIRLS International Study Center.

Resolution No. 29-NQ/TW, issued on November 4, 2013, by the 11th Central Committee of the Communist Party of Vietnam.

Nguyễn Văn Biên. (2016). Proposing a competency framework and teaching orientation for Physics in high schools. *Hanoi National University of Education Journal of Science*, *61*(9), 112-119. https://doi.org/10.18173/2354-1075.2016-015.

OECD. (2019). *PISA 2018 Assessment and Analytical Framework*. PISA, OECD Publishing. https://doi.org/10.1787/b25efab8-en

Phạm, T. T. H. (2024). A study on building a question bank for periodical assessment in high school Literature. *Journal of Education*, *24*(special issue 4), 38–42. Retrieved from https://tcgd.tapchigiaoduc.edu.vn/index.php/tapchi/article/view/1971.

Trần, T. H., & Nguyễn, V. H. (2020). Difficulties of high school teachers in implementing the innovation of assessing students' learning outcomes. *Journal of Education*, *478*, 10-15.

Vũ, P. L., Vũ, D. N., & Lê, T. H. (2024). The current state of primary school teachers' perception and practice of student assessment according to the competency-based approach. *Journal of Education*, *24*(2), 44–50. Retrieved from https://tcgd.tapchigiaoduc.edu.vn/index.php/tapchi/article/view/1369.