

An Evaluation of the Consistency between Learning Objectives and Teachers' Tests Using the Index of Item–Objective Congruence (IOC) by Expert Assessment during the Academic Years 2022–2024

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Abstract

This study, titled “An Evaluation of the Consistency between Learning Objectives and Teachers' Tests Using the Index of Item–Objective Congruence (IOC) by Expert Assessment during the Academic Years 2022–2024” aims to: (1) evaluate the effectiveness of test item–objective alignment assessed through the IOC method; (2) analyze the congruence levels of items reviewed by experts during the academic years 2022–2024; and (3) provide recommendations for improving test item development to ensure alignment with curriculum objectives and assessment standards. The research was conducted within the context of the 2023 revised General Education curriculum at Suan Sunandha Rajabhat University, which emphasizes 21st-century learner competencies and employs a large-scale, online examination system requiring systematically validated test items.

A quantitative research methodology was used, drawing on IOC assessment data from experts who evaluated general education test items between 2022 and 2024. Statistical analyses were conducted to determine the degree of alignment between learning objectives and test items, supplemented by qualitative recommendations for test quality improvement. The findings highlight gaps in previous evaluation practices, particularly the absence of systematic studies on the effectiveness of IOC scores and overall item quality trends. The results of this study provide essential insights and constructive feedback for instructors and test developers, contributing to the ongoing enhancement of assessment quality and alignment within the General Education Program.

Keywords: Item–Objective Congruence (IOC), Learning Objectives, Test Item Alignment, Assessment Quality, Expert Evaluation

1. Introduction

The revised 2023 undergraduate curriculum requires the General Education component to emphasize the development of human qualities essential for contemporary and future society, including curiosity, 21st-century competencies, interdisciplinary problem-solving, and adaptability to social and global change (Ministry of Higher Education, Science, Research and Innovation (MHESRI), 2023). It further aims to cultivate responsible citizenship grounded in ethics and social contribution, in accordance with national curriculum standards stipulating that General Education must consist of at least 24 credits and incorporate clearly defined learning outcomes and assessment systems that accurately measure student achievement (MHESRI, 2023). Suan Sunandha Rajabhat University, the General Education Office has implemented an

online examination and item-bank system to manage large-scale assessments, with expert reviewers evaluating item quality; however, systematic research on the effectiveness of this evaluation process remains absent such investigation is essential, as the alignment between learning objectives and exam items determines the validity of assessment practices and the extent to which they represent intended learning outcomes.

Educational measurement and evaluation refer to a systematic process aimed at identifying learner characteristics and determining their value according to predetermined criteria. This process is used to verify whether learners achieve the intended educational objectives. It must be aligned with standardized principles and practices, ensuring that the outcomes are valid and reliable. Furthermore, the results of measurement and evaluation serve as essential data for improving and enhancing instructional quality and student learning effectiveness (Sukmaha,R, 2022).

The purpose of this study was to develop and evaluate the quality of an assessment tool measuring pre-service teachers' competency in creating innovations to promote moral and ethical values at the Faculty of Education, Suan Sunandha Rajabhat University. The study involved five experts and 30 pre-service teacher students as participants. The instruments included the Index of Item–Objective Congruence (IOC) and a 20-item, five-point Likert scale rubric assessing innovation competency for moral and ethical promotion. The results indicated that the content validity of the instrument was high, with IOC values ranging from 0.80 to 1.00, demonstrating that all items met the standard and were suitable for assessing students' innovation competency. Additionally, the reliability analysis using Cronbach' s alpha coefficient yielded a value of 0.850, confirming that the instrument was consistent and could be confidently used for evaluating pre-service teachers' competency in creating innovations to foster moral and ethical development. Phirumrat, K. (2024).

2. Research Objectives

This research aims to:

- 1) Evaluate the effectiveness of alignment between instructors' test items and learning objectives based on the Index of Item–Objective Congruence (IOC) assessed by experts.
- 2) Analyze IOC scores of test items reviewed during the academic years 2022–2024 to determine the overall quality and conformity with instructional goals; and
- 3) Provide recommendations for improving test design to ensure stronger alignment with curriculum objectives and educational assessment standards.

3. Conceptual Framework

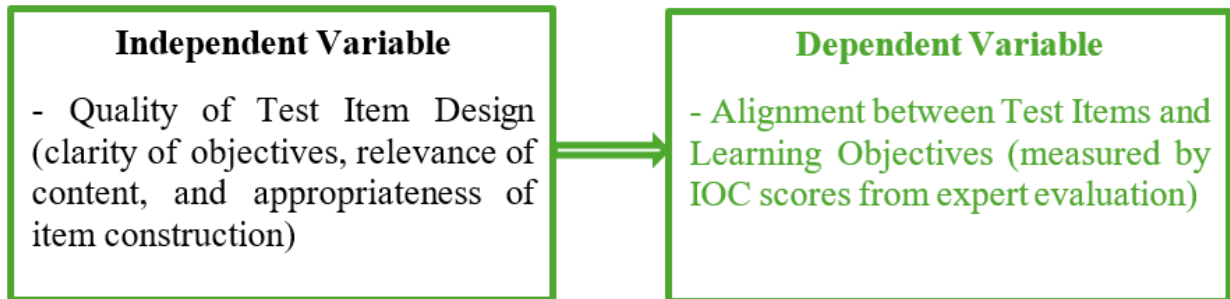


Figure 1. Conceptual Framework

This study is grounded in the principle that the validity and effectiveness of test items depend on their alignment with intended learning objectives. The conceptual framework positions the expert evaluation of test items—measured through the Index of Item–Objective Congruence (IOC)—as the primary factor influencing the overall effectiveness of assessment design. Expert reviewers assess each item to determine how accurately it reflects the instructional objectives defined in the General Education curriculum. The resulting IOC scores serve as indicators of the consistency and quality of the test items, allowing the study to analyze patterns of alignment across academic years and identify strengths or areas requiring improvement.

The research employed a quantitative approach, collecting IOC assessment data from General Education examinations reviewed by experts during the academic years 2022–2024. The data were analyzed using statistical methods to determine the degree of congruence between test items and learning objectives. Following the analysis, qualitative interpretations were used to develop recommendations for enhancing test item design and ensuring stronger alignment with curriculum standards. This descriptive research process provides a comprehensive overview of the effectiveness of assessment practices and offers evidence-based guidance for improving future test development within the General Education Program.

4. Methodology

This study employed an evaluation research design to examine the alignment between course learning objectives and instructors' test items in General Education courses at Suan Sunandha Rajabhat University. The population included undergraduate students enrolled in General Education courses, while the sample consisted of 17 sets of end-of-course examinations from core General Education subjects in science, social sciences, and languages across the academic years 2022–2024. Only exams submitted for expert evaluation using the Index of Item–Objective Congruence (IOC) were included. Three experts evaluated each exam using the IOC form, assigning +1 if an item aligned with the learning objective, 0 if uncertain, and –1 if the item did not align. Independent variables included the course learning outcomes (CLOs), characteristics of the test items, and instructional context factors such as academic year and instructor experience. The dependent variable was the effectiveness of alignment between objectives and test items, measured through IOC scores. (Anderson, L.,(2001).

Data analysis involved calculating the IOC for each item using the formula $IOC = \frac{\sum R}{N}$, where $\sum R$ represents the sum of expert ratings and N the number of experts. Items with $IOC \geq$

0.50 were considered aligned and usable, $0.30 \leq IOC < 0.50$ indicated items needing revision, and $IOC < 0.30$ indicated misalignment and unsuitability. Descriptive statistics, including mean, percentage, and frequency distribution, were used to summarize the overall alignment levels and examine trends across the three academic years. The findings provide evidence-based feedback to instructors for improving test design and ensuring stronger alignment with intended learning outcomes. (Polit, D,(2006).

5. Result

The study examining the alignment between instructors’ test items and course learning objectives, assessed through the Index of Item–Objective Congruence (IOC) by experts during the academic years 2022–2024, found that the overall IOC scores of General Education exams ranged from 0.67 to 0.89, exceeding the acceptable threshold of 0.50. This indicates that the majority of test items were well-aligned with learning objectives and suitable for assessing students’ achievement. When analyzed by academic year, average IOC scores found that the consistency between the questions and the objectives compared over a 3-year period, was as follows: improved progressively: 95% in 2022 with a small proportion of items requiring revision, 98.54% in 2023 with fewer items needing adjustment, and 100% in 2024, showing full alignment with learning objectives. These findings reflect continuous improvement in test design quality and instructors’ growing competency in aligning assessment items with intended outcomes.

The research also demonstrated significant practical impacts. For instructors, IOC evaluation provided actionable feedback, enhanced test validity, and promoted professional development in assessment design. Students benefited from fairer and more transparent evaluations that accurately reflected their learning. Administrative staff gained a systematic tool for quality assurance, supporting internal and external accreditation reporting. At the organizational level, the use of IOC contributed to stronger assessment standards, evidence-based policy-making, and the cultivation of a quality-focused culture. Overall, the results highlight the effectiveness of IOC as a mechanism for monitoring, improving, and sustaining the alignment of assessments with learning objectives.

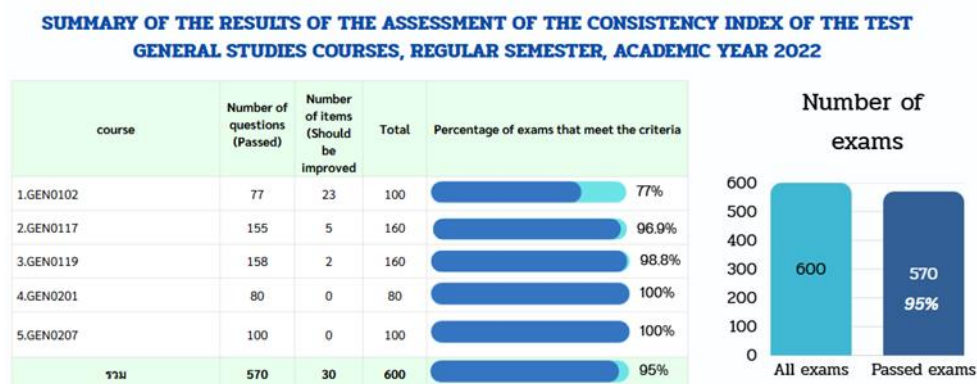


Figure 1 Summary of the results of the evaluation of the consistency index of the general education subject examinations for the academic year 2022

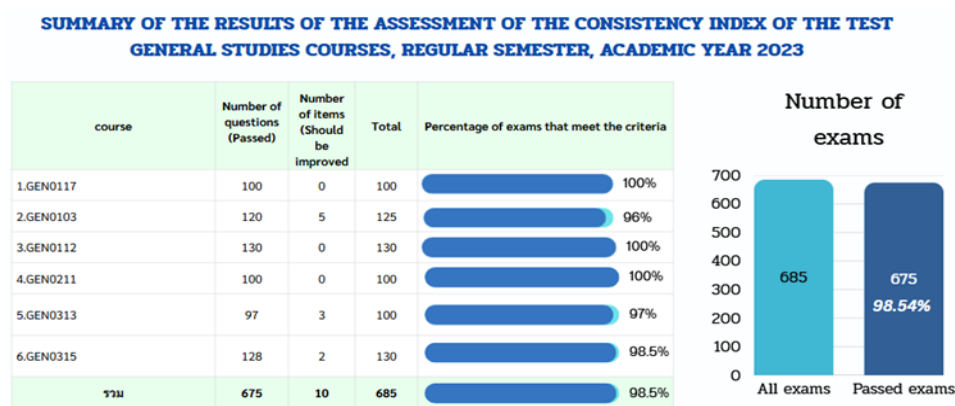


Figure 2 Summary of the evaluation results of the General Education Examination Conformity Index for the academic year 2023

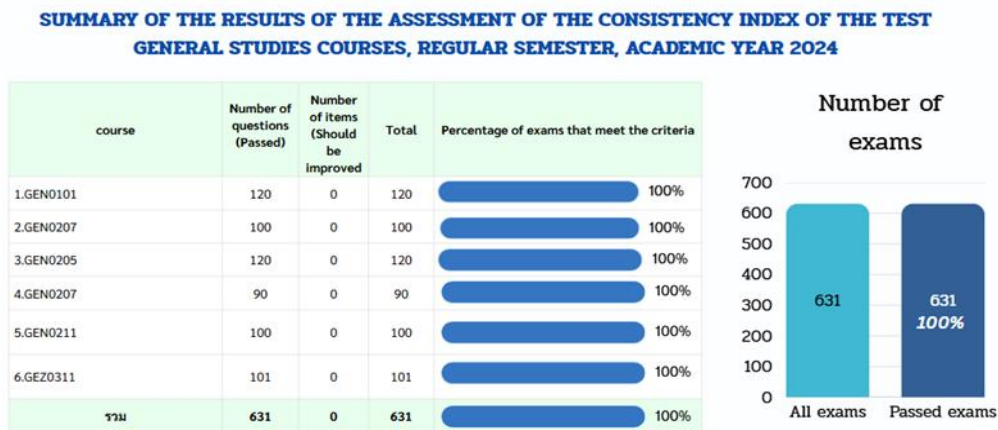


Figure 3 Summary of the evaluation results of the General Education Examination Conformity Index for the academic year 2024

6. Findings

This study focused on evaluating the effectiveness of General Education exams by examining the alignment between course learning objectives and the test items created by instructors, using the Index of Item–Objective Congruence (IOC) assessed by three experts over the academic years 2022–2024. The results indicated that the overall IOC scores ranged from 0.67 to 0.89, exceeding the standard threshold of 0.50, demonstrating that most exams were well-aligned with learning objectives and suitable for assessing student learning. Analysis by year showed a progressive improvement: 95% alignment in 2022, 98.54% in 2023, and 100% in 2024, reflecting continuous enhancement in the quality of test items and instructors’ growing competency in assessment design. The use of IOC assessments helped instructors recognize the importance of constructing exams that accurately reflect learning objectives, supporting systematic improvement in test quality.

The findings also highlighted the broader impacts of implementing IOC evaluation. Instructors received feedback that guided the development of more precise and comprehensive exams, while students benefited from fairer, more transparent assessments that accurately measured learning outcomes. Administrative staff and academic units gained a reliable system for quality assurance, providing evidence for accreditation and institutional reporting.

Continuous IOC evaluation fostered a culture of quality in assessment, encouraged professional development, and promoted collaboration between instructors, experts, and staff, ensuring that exams consistently align with intended learning outcomes and uphold educational standards.

7. Conclusion

The study demonstrated that the implementation of the Index of Item–Objective Congruence (IOC) effectively ensured the alignment of General Education exam items with course learning objectives over the academic years 2022–2024. Overall IOC scores consistently the standard IOC threshold of 0.60, showing that most test items were appropriate for assessing student learning. The progressive improvement in IOC scores from 95% in 2022 to 100% in 2024 indicates continuous enhancement in test quality and reflects the growing competency of instructors in designing assessments that accurately measure intended learning outcomes.

Furthermore, the study highlighted the broader benefits of IOC evaluation. Instructors received targeted feedback for improving test items, students experienced fairer and more transparent assessments, and academic administrators obtained a reliable tool for quality assurance and accreditation purposes. At the institutional level, IOC contributed to stronger assessment standards, evidence-based decision-making, and the promotion of a quality-focused culture in teaching and learning. Overall, the research confirms that IOC is a practical and effective mechanism for maintaining, monitoring, and improving the alignment between learning objectives and assessment items.

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