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Development of a self-assessment instrument to evaluate the competency of home science teachers in classroom assessment

The problem and the aim of the study. Classroom Assessment (CA) is as part of School-Based Assessment (SBA), which reflects students' achievement in mastering Learning Standards. However, the issue of teacher competency is a significant concern in CA to ensure quality CA implementation. It is important for subject teachers to engage in self-evaluation and lifelong learning to enhance their assessment skills. While self-assessment is crucial for Home Science teachers, there is currently no standardized instrument available for this purpose. *This study aims* to develop a self-assessment instrument to evaluate the competency of Home Science Teachers in classroom assessment.

Research methods. This study utilizes qualitative and quantitative research methods. Qualitative research method is employed during need analysis and requirement analysis phase for self-assessment instrument development using semi-structured interviews with three experts in Home Science. With these data, the self-assessment instrument, in form of a questionnaire, is designed and developed. After the instrument development is completed, expert validation is obtained using qualitative and quantitative approach, namely using semi-structured interview with three experts and questionnaire respectively. A 10-likert scale questionnaire is distributed to the same experts to obtain the percentage of expert agreement to determine content validity of the developed instrument.

Results. The achievement of expert validity of each item in the developed instrument indicates the appropriateness of all items contained in the instrument, where 20.5% of the items obtained over 80% agreement score and 79.5% of the items obtained over 90% agreement score. The overall agreement among experts achieves 90.6%, which is above the acceptable level of agreement. Hence, the result indicates that the instrument is appropriate for Home Science teachers to evaluate their competency in classroom assessment.

Conclusion. In conclusion, a self-assessment instrument to evaluate the competency of Home Science Teachers in classroom assessment has been developed. With this instrument, Home Science teachers can execute their self-assessment and hence can identify their training needs in classroom assessment. As a result, competent teachers will be able to execute classroom assessment effectively and support one of United Nation's SDG namely quality education.

Keywords: instrument, competency, home science, classroom assessment

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INTRODUCTION

The United Nations Sustainable Development Goals (SDGs) are a set of 17 goals established by the United Nations in 2015 as part of the 2030 Agenda for Sustainable Development. These goals are designed to address a wide range of global challenges and guide efforts to achieve a more sustainable and equitable world by the year 2030. In education, UN's initiatives focus on promoting inclusive, quality education as part of the Sustainable Development Goals, specifically Goal 4: Quality Education. One of the initiatives includes promoting effective teaching and learning strategies, including appropriate assessment practices, to enhance the overall quality of education.

Classroom Assessment (CA) refers to the process of collecting, analyzing, and interpreting information about student learning in an educational setting. It aims to obtain information about the development, abilities, progress and achievements of students. CA can be conducted in formative and summative manners as learning, for learning and about learning. It plays a crucial role in informing instruction, guiding curriculum development, and evaluating the effectiveness of teaching methods. Correct implementation of CA can provide a good insight of students' mastery of the Learning Standards set in the curriculum.

In Malaysia, Classroom Assessment (CA) was first introduced in schools by the Ministry of Education in 2011 as part of School-Based Assessment (SBA) system. The whole SBA system is holistic in nature as it assesses cognitive (intellectual), affective (emotional and spiritual) and psychomotor (physical) aspects that are in line with the Malaysia's National Education Philosophy. There are four components in SBA as shown in Figure 1, which are Central Assessment, Physical, Sports & Co-curricular Activities Assessment, Psychometric Assessment and Classroom Assessment. The CA counterpart of SBA system determines students' proficiency levels in individual subjects by referring to the Performance Standards outlined in the Curriculum and Assessment Standard Document. These standards are applied to all subjects covered in the National Preschool Standard Curriculum (KSPK), Primary School Standard Curriculum (KSSR), Transitional Class Standard Curriculum (KSPK), and Standard Secondary School Curriculum (KSSM). The purpose of CA is not to compare one student's mastery level with another students, but rather to gauge a student's developmental progress in their learning journey. Moreover, it aids schools and parents in devising strategies to enhance students' mastery and achievements in their studies.

The implementation of CA relies significantly on teachers, who are responsible for establishing learning objectives aligned with the assessed Learning Standards. They also engage in activities such as designing assessment tools, administering assessments, documenting assessment outcomes, analyzing assessment data, reporting findings, and subsequently undertaking necessary follow-up measures [1]. The implementation of this CA takes place continuously, starting from Year 1 to Year 6 in primary school and from Form 1 to Form 5 in secondary school. CA is an important assessment because it can help teachers track the progress of students, identify the strengths and weaknesses of students in learning, know the effectiveness of teaching, plan teaching techniques and take appropriate follow-up actions immediately. CA is carried out continuously through several assessment methods. The methods are observation, writing and oral. In addition, CA also considers assignments such as course work, presentations and other learning activities conducted in the classroom based on Performance Standards and the teacher's professional judgment.

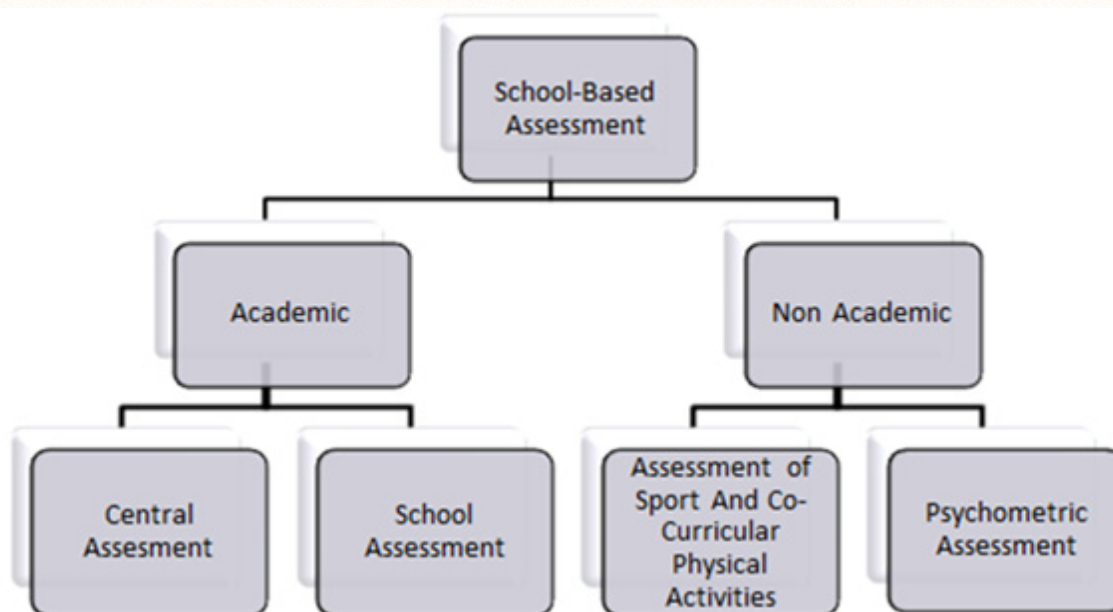


Figure 1 Components of School-Based Assessment (PBS) [1]

In Malaysia, the Home Science subject is a Professional Elective Subject (MPEI) in the Science, Technology, Engineering and Mathematics (STEM) group for the upper secondary of Forms 4 and 5, with a minimum time allocation of 160 minutes a week or 96 hours a year [2]. The Home Science subject was rebranded from the previous Home Economics (ERT) subject that has been implemented since 1992. The Home Science syllabus is divided into four main components, which are Family and Household Resource Management, Clothing and Sewing, Food and Nutrition, and Food Preparation and Serving [3].

According to the Ministry of Education Malaysia, the diversity of aspects of assessment in CA, such as aspects of value, competency, cognitive, affective and psychomotor development as well as the diversity of process levels in CA require teachers who are competent so that the quality of CA implemented is guaranteed. A quality CA implementation can reflect the actual level of achievement of students in mastering the goals set in the curriculum. In addition, professional judgment is judgment made using professional knowledge of the intended curriculum that includes knowledge, skills, values, evidence of achievement, teaching strategies, assessment methods, as well as criteria and standards that have been outlined, as shown in Figure 2. In this professional consideration, teachers need to make ethical and responsible decisions regarding the level of student mastery based on the analysis and summarization of information on learning [1].

It is important to provide ongoing training for teachers until their assessment skills are enhanced [4]. Furthermore, [5] proposed that the ministry should organize additional professional development initiatives and frequent training workshops for teachers to enhance their proficiency in executing CA effectively. Realizing this fact, in the Malaysian Education Development Plan 2013 – 2025, the ministry has developed a training programs portfolio to help teachers achieve the expected new competencies. In developing this portfolio, the Ministry focused more on school-based learning programs, which are the most effective form of professional development according to international research findings. In addition, the role of the School Improvement Specialist Counselor (SISC+) which was first introduced under the Government Transformation Program (GTP) 1.0, has been upgraded from part-time to full-time to guide teachers in various aspects, including assessment. They are placed in each District Education Office as the main liaison officers

between the Curriculum Development Division (BPK), the Examination Board and teachers. Teachers and principals/headmasters will be trained by SISC+ in their schools on how to prepare and implement SBA, especially on standard reference assessments. Regular monitoring routines will ensure that schools experiencing difficulties in implementing the new SBA are identified quickly [6].

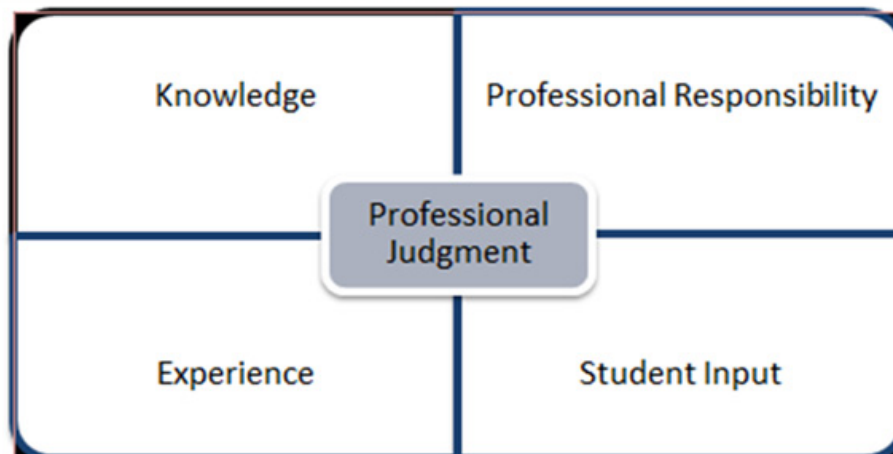


Figure 2 Professional Consideration Elements

While classroom assessment is a valuable tool for enhancing teaching and learning, several challenges persist for teachers when it comes to its implementation. The adoption of effective classroom assessment practices by teachers has indeed been a subject of research, and various studies suggest that the level of proficiency in implementing classroom assessment may fall below desired levels. Teachers' classroom assessment practices lean more towards conventional methods, hence, it indicates a reliance on traditional assessment approaches that may include tests, quizzes, and standardized exams. Moreover, some educators perceive the execution of CA as intricate and burdensome [7]. Certain teachers lack confidence in their ability to assess students effectively [8]. They also refrain from providing written feedback on student work and neglect to utilize CA outcomes to enhance student learning [9].

However, the central and critical aspect often discussed in studies about CA is teacher competency [5;10]. Subject teachers are key implementers and play a central role in the effective implementation of CA [5]. The Ministry of Education Malaysia has outlined several responsibilities of subject teachers in the implementation of CA, one of which is that teachers need to conduct a self-evaluation to improve assessment [1]. Apart from that, as agents of change in education, teachers need to engage in lifelong learning, such as self-learning [11]. Therefore, a reliable and validated self-assessment instrument can be of great benefit to teachers to identify aspects of excellence, progress and the need for improvement in their professional development [12].

As far as competency in CA is concerned, a self-assessment instrument was developed by [13] to study the relationship between teacher competency assessment and various variables such as experience, training, student level and subjects taught. However, the instrument used, which was the Assessment Practices Inventory 8.0, was developed based on the standards developed by American Federation of Teachers [14]. The tool categorizes the assessment of competency into seven factors, which deviates from the classification criteria established by the Ministry of Education Malaysia in 2014. For that reason [15], modified that instrument to develop a self-assessment instrument of teacher competency

in CA. However, their instrument only targets trainee teachers, namely future teachers, who have yet to implement CA in schools themselves.

The Home Science subject is one of the Professional Elective Subjects (MPEI) offered to students in daily secondary schools. Teaching and learning activities for this vocational subject includes theoretical and practical aspects, therefore, the assessment method is also different from that of other core subjects. According to [16], competency-based assessment in vocational subjects requires the collection of relevant and sufficient evidence of performance or experience as well as accurate and consistent assessment competency. Therefore, teachers need to have specific competencies to guarantee the quality of assessment for the Home Science subject. Although there is a need for Home Science teachers to carry out self-assessment, there is no standard instrument established by any party for teachers to use for that purpose. Therefore, this study aims to develop a self-assessment instrument to assess the competency of Home Science subject teachers in CA. The developed self-assessment instrument of Home Science teacher competency can provide information to the school and the State Education Department in terms of teacher training and guidance needs in the CA aspect. Continuous self-assessment by teachers will improve the quality of CA implementation in schools. Without a systematic self-assessment by teachers, the burden of teacher competency assessment on CA is borne entirely by school management and JPN. As a result, the process of developing teacher competency through training and guidance will take a long time. In addition, the use of this instrument can give confidence not only to the teacher but also to the school and parents regarding the quality of the assessment carried out.

The objective of this study is to develop a self-assessment instrument to evaluate the competency of home science teachers in classroom assessment. This instrument serves a broader purpose beyond individual teacher development. The usage of this instrument can facilitate better teacher training and guidance requirements in the context of CA, ensuring that educators are better equipped to meet the demands of this assessment approach. It can also serve as an essential resource for school administrators and the State Education Department to gain valuable insights into the competencies of Home Science teachers and tailor support programs accordingly. As this study aims to fulfill this pressing need, it seeks to contribute significantly to the ongoing efforts to enhance the overall quality of education through evidence-based practices and continuous professional development. By empowering Home Science teachers with a reliable and validated self-assessment instrument, the research endeavors to create a positive ripple effect, impacting both teachers and students, and ultimately elevating the standards of education in the Home Science domain.

The anticipated outcomes hold the potential to revolutionize the teaching and assessment practices in Home Science education, ensuring that teachers are better equipped and motivated to provide students with enriching and impactful learning experiences. By undertaking this vital research, the study aims to contribute substantially to the educational landscape, fostering a culture of continuous improvement and professional growth among Home Science teachers and, by extension, the overall quality of Classroom Assessment implementation in schools.

The outcome of this study contributes towards addressing a critical gap in the realm of Classroom Assessment in Home Science education. By aiming to develop a self-assessment instrument for the competency evaluation of Home Science subject teachers,

the research sheds light on an unmet need in the educational landscape. Surprisingly, despite the importance of such an instrument, its development has not been initiated by any party, including the Ministry of Education Malaysia, until now. The creation of this self-assessment instrument holds immense potential in elevating the quality of CA implementation in schools. By providing Home Science teachers with a structured tool to assess their own competencies in CA, they can gain valuable insights into their strengths, areas for improvement, and professional growth opportunities. This self-awareness is pivotal in fostering continuous improvement and enhancing the overall effectiveness of Classroom Assessment in Home Science education.

METHODOLOGY

This study utilizes a mixed research method: qualitative and quantitative research method. Qualitative research method is employed during analysis phase. In this phase, need analysis as well as requirement analysis data for self-assessment instrument development was obtained using semi-structured interviews with experts in Home Science. With these data, the self-assessment instrument, in form of a questionnaire, is designed and developed. After the instrument development is completed, expert validation is obtained using qualitative and quantitative approach, namely using semi-structured interview and questionnaire respectively.

Analysis Phase

The first phase in this study is known as the need analysis and requirement analysis phase. This phase is important as it requires the researcher to identify every research question used in shaping the instrument that will be developed [17;18]. The requirements analysis can be obtained directly or indirectly from customers to identify arising issues and predict solutions for customer needs in the future [19]. In this study, experts consisting of Home Science teachers will be interviewed to investigate the need and requirements for developing a self-assessment instrument in classroom assessment. The method used is a qualitative method using semi-structured interviews. Interviews involve purposeful interactions where one person obtains information from another individual. Through interviews, instrument developers gain in-depth information that cannot be obtained through observation alone [20]. The interview sample consists of five experts, including four experts in the field of Home Economics and one expert in the field of language.

Design Phase

The Design Phase is a critical and crucial phase for studies that apply a design and development approach to a product or model [21]. The focus of this phase is to design and develop the self-assessment instrument through two sub-phases: the first sub-phase focuses on designing constructs and elements, while the second sub-phase focuses on developing the questions of this instrument.

Development Phase

This phase includes constructing the instrument's specification table and writing items of the instrument. The instrument's specification table is constructed based on data from experts in Home Science regarding the operational definitions, constructs, and

subconstructs to be measured, obtained in analysis phase. Then, two strategies were employed while developing these items. The first strategy involves reviewing and adapting existing instrument items considered relevant and appropriate to this study. The researcher also examined and assessed the suitability of the item format in 38 instruments as a guide for determining the item format. The second strategy involves creating items for each construct and subconstruct based on the interview results obtained from five experts. This step was taken to enable the researcher to select quality items that represent constructs and subconstructs, while unsuitable items were eliminated.

Then, expert review phase is executed by referring to experts to obtain evidence of validity. Therefore, the researcher obtained expert opinions and confirmation regarding the suitability of the developed items to be used as instrument items in this study. The consulted experts are experts in the field of Home Science and Curriculum Development. For the qualitative method, five experts were interviewed to obtain feedback on the developed instrument. The interviews were conducted based on the following interview protocol.

1. Ask Dr/Sir/Madam to share their background.
 - i. Could you briefly describe your educational background and your current profession, Dr/Sir/Madam?
 - ii. May I know what field of expertise you have? (TVET/Education)
 - iii. Could you inform me about how long you have been teaching in that field?
2. Expert's opinion on the suitability of items in Section A (Knowledge).
 - i. What is your opinion regarding the items for each construct below?
 - ii. In your opinion, Dr/Sir/Madam, are there any items that need to be added for the KNOWLEDGE construct in Section B of this questionnaire?
3. Expert's opinion on the suitability of items in Section B (Skills).
 - i. What is your opinion regarding the items for each construct below?
 - ii. According to your opinion, Dr/Sir/Madam, are there any items that need to be added for the SKILLS construct in Section C of this questionnaire?
4. Expert's opinion on the suitability of items in Section C (Attitude).
 - i. What is your opinion regarding the items for each construct below?
 - ii. Based on your perspective, Dr/Sir/Madam, are there any items that need to be added for the ATTITUDE construct in Section D of this questionnaire?
5. Are there any other suggestions for improvement for this questionnaire instrument?

The instrument is then revised and modified based on the expert's interview finding.

Expert Validation

After the instrument was modified, the content validity of the research instrument is determined by the expert agreement percentage. Three experts were selected to determine validity, consisting of experts in the field of Home Science. Validity is determined through expert opinions during the item construction phase and through the informal item testing phase. Expert opinions are sought to assess the extent to which the content coverage of the constructed instrument is sufficient to represent the actual content to be tested. In this study, the degree of consistency in expert agreement is calculated using the formula proposed by [22]. Determining good content validity is based on the perspectives of [23], where an achievement level of 70% is considered to have reached a high level of attainment.

RESULTS

Analysis Phase

In this phase, semi-structured interviews are conducted to gather necessary information for need and requirement analysis to design the instrument. Findings from interviews with five experts indicate that there are indeed issues concerning teachers' competence in implementing classroom assessment in Home Science at schools. All experts agree that three main constructs in the instrument should be knowledge, skills and attitude, as quoted below.

"...then they need to understand various item formats, true-false items, matching items, fill-in-the-blank items, short-answer items, essay items, practical tasks, sewing tasks..." (P01)

"...the way a teacher poses a question requires students to clearly understand what the question is asking for..." (P02)

"...a teacher also needs to be a good observer..." (P03)

Furthermore, all the experts also raised the importance of ICT knowledge and skills in CA.

"...use computers for score analysis, item analysis..." (P01)

"...not only that, the use of the internet is also important. Because assessment materials can be obtained from certain websites..." (P02)

"...for assessment, a database is essential. So, when requested, they can provide it immediately. They can keep records. They can convert records into hard copies, soft copies. Because most teachers don't know how to convert data into softcopies..." (P03)

Based on the analysis of statements made by the five interviewed experts and a review of past studies, the addition of the subconstruct "Use of ICT in CA" to the construct of CA knowledge and skills was identified.

Design Phase

At this stage, to formulate a concept to be measured, instrument developers should engage in at least one of these activities: conducting literature reviews, seeking expert opinions, and performing critical incident analyses [24]. Instrument construction can also involve utilizing previous work by researchers to gain input on the behavior represented by specific items. In the context of this study, the researcher conducted a literature review related to teacher competency models in CA, theories related to competence, and existing CA-related instruments.

The instrument's items for the constructs of knowledge, skills, and attitudes used to measure the competencies of Home Science teachers in CA in this study was constructed based on the themes and sub-themes that were analyzed in previous phase. In addition, some items were also adapted and modified to suit this study from previous studies conducted for trainee teacher's competency in CA [25] and for teacher's competency in practical teaching of Building Technology in Vocational Colleges [26]. According to [27], basic competencies are the minimum competencies required to perform a task. This type of competency is easier to observe and measure as it involves knowledge and skills. This finding shows that knowledge, skills, and attitudes are essential for teachers to effectively implement CA activities, which aligns with competencies required at work [27], competencies required to be a competent manager [28] and competencies that are important to employees in a specific organization [29].

Analysis of seven CA competency models, such as the Standards for Teacher Competence in Educational Assessment of Students by American Federation of Teachers [14], the Malaysian Teacher Standard by [30], the Teacher Assessment Literacy and Practice model by [31], the Teacher Assessment Literacy model by [32], the Attitudes Toward Educational Assessment model by [33] and the Competency Assessment model by [34], assisted the researcher in identifying CA competency characteristics in the initial conceptual framework of this study. According to [35], previous studies, standards in CA, and expert opinions in the field can guide the determination of the CA competencies that teachers need to possess today. Additionally, the process of analyzing these CA competency models aligns with what previous researchers have done in constructing CA competency instruments, such as [13] in creating the Assessment Practices Inventory instrument by referencing previous studies and the Standards for Teacher Competence in Educational Assessment of Students [14].

Development Phase

Based on the analysis of interviews with three Home Science experts, as well as referencing literature in CA, indicators to measure each construct and subconstruct have been identified. Indicators represent behaviors or characteristics that reflect the construct or subconstruct to be measured. Defining constructs and the content to be measured is a crucial feature of the item construction process. This process is carried out before constructing the items for their trainee teacher CA competency instrument.

Then, an instrument specification table is constructed, as shown in Table 1. Developing this table ensures that the content coverage for each construct and subconstruct is represented by the constructed items and guarantees the instrument's content validity [24]. Constructing an instrument specification table also aligns with the process of CA competency instrument construction by previous researchers when developing Assessment Practices Inventory [13] and when using Angoff method [36], who employed a similar approach in constructing their instruments. Additionally, through this instrument specification table, the content for each construct, subconstruct, and item can be determined easily and accurately.

Table 1

Instrument Specifications Table

Construct	Subconstruct	Subconstruct Definition	Reference
Curriculum Knowledge	Curriculum Planning Knowledge	Determining CA objectives, informing students of learning standards, preparing assessment plans, determining desired student achievements, creating a test specification schedule, selecting appropriate assessment methods.	Self-Report Questionnaire [37]
	Curriculum Assessment Construction Knowledge	Creating multiple-choice test items, matching items, fill-in-the-blank items, short-answer items, and essay items. Providing test instructions, arranging items and answer choices, and preparing item spaces.	Teacher Assessment Practice Inventory [31]Self-Report Questionnaire [37]Educational Assessment [38]
	Curriculum Assessment Administration Knowledge	Providing motivation to students, selecting a conducive assessment environment, preparing adequate assessment tools and materials, adhering to assessment procedures, understanding the impact of fraud on assessment, and adjusting assessment activities according to student needs.	Self-Report Questionnaire [37] Educational Assessment [38]

	Performance Assessment Knowledge	Using observation methods, question and answer techniques, portfolios, practical tasks, practical activities, projects, student self-assessment, peer assessment, and adhering to assessment criteria.	
	Scoring and Grading Knowledge	Communicating scoring criteria to students, creating and using scoring guidelines, reviewing test papers, adhering to scoring guidelines, allocating sufficient time for scoring, providing justifications for scores/grades, and explaining to students how scores/grades are determined.	Self-Report Questionnaire [37] Educational Assessment [38]
	Utilization of CA Results Knowledge	Providing feedback to students, measuring student achievements, identifying student potentials, identifying student learning needs, planning teacher instruction, and assisting students in setting learning goals.	Teacher Assessment Practice Inventory [31]Self-Report Questionnaire [37]Educational Assessment [38]
	Utilization of ICT in CA Knowledge	Using ICT for the purpose of analyzing test scores, analyzing test items, obtaining assessment information, printing learning reports, and creating copies of assessment records in PDF format.	Experts
Classroom Assessment Skills	Curriculum Planning Skills	Determining CA objectives, informing students of learning standards, preparing assessment plans, determining desired student achievements, creating a test specification schedule, selecting appropriate assessment methods.	Self-Report Questionnaire [37]
	Curriculum Assessment Construction Skills	Creating multiple-choice items, matching items, fill-in-the-blank items, short-answer items, and essay items. Providing test instructions, arranging items and answer choices, and preparing item spaces.	Teacher Assessment Practice Inventory [31]Self-Report Questionnaire [37]Educational Assessment [38]
	Scoring and Grading Skills	Communicating scoring criteria to students, selecting appropriate scoring procedures, creating and using scoring guidelines, reviewing test papers, adhering to scoring guidelines, assigning scores based on evidence.	Self-Report Questionnaire [37] Educational Assessment [38]
	Utilization Skills of CA Results	Using assessment results to motivate students, providing feedback to students, measuring student achievements, identifying student potentials, identifying student learning needs, planning teacher instruction, assisting students in setting learning goals, aiding students in making reflections, helping students recognize quality assessment results, effective descriptive feedback characteristics, using easily understandable language, informing parents of actions taken, and providing suggestions to parents.	Teacher Assessment Practice Inventory [31]Self-Report Questionnaire [37]Educational Assessment [38]
	Utilization Skills of ICT in CA.	Using ICT for analyzing test scores, analyzing test items, obtaining assessment information, recording assessment data, printing student learning reports, and creating copies of assessment records.	Experts
	Ethical Skills in CA	Maintaining evidence, conducting assessments fairly, assigning scores/grades based on performance, differentiating achievement factors from non-achievement factors, adhering to assessment implementation regulations, and distinguishing ethical assessment practices from unethical ones.	Experts
Attitude Towards Classroom Assessment	Attitude towards the importance of CA	Importance of assessment courses, benefits of assessment courses, benefits of assessment, willingness to implement assessment, and the significance of assessment.	Attitude Toward Educational Measurement Inventory (ATEMI) [33]
	Attitude towards CA courses	Importance of assessment courses, feelings about attending assessment courses, feelings towards assessment courses, and willingness to implement assessment.	Attitude Toward Educational Measurement Inventory (ATEMI) [33]

Then, the construction of items for each construct and subconstruct of this study's research instrument was formed based on a constructed specification table. The formulated items should reflect the constructs and subconstructs while fulfilling the purpose of developing this research instrument. Additionally, the item statements were ensured to be clear and easily comprehensible. As a result, a total of 121 items were developed. All these items were crafted using positive statements to prevent the occurrence of systematic errors when respondents provided responses to the items in this instrument.

The results of the analysis of existing CA competency instruments such as Assessment Practices Inventory [13], Teacher Assessment Practice Inventory [31] and Attitude Toward Educational Measurement Inventory (ATEMI) [33] revealed that the response format for self-reporting was a 4-point Likert scale. Therefore, a 4-point Likert scale response format is also adopted in this instrument. The options were "Strongly Agree" on a scale of 4, "Agree" on a scale of 3, "Disagree" on a scale of 2, and "Strongly Disagree" on a scale of 1. However, "Uncertain" or "Neutral" responses were not included, as there was concern that such responses might provide an opportunity for respondents who do not understand or do not wish to participate in the study to choose those responses [39].

Subsequently, all the items were then reviewed by three experts in the field of CA and Home Science. Referring to experts in this manner is consistent with approach in [40] in developing the Assessment Practices Survey instrument. According to [41], consulting experts helps researchers identify errors and appropriateness of the constructed items. In other words, the purpose of consulting experts is to gather evidence regarding the validity of the instrument.

Based on the conducted interviews, there are several items that need to be modified or removed for specific reasons. For Section B (Knowledge) under the construct of Knowledge in Developing CA Instrument, the experts stated:

"...The examination board outlines that test items should be on the same page. This item can be removed..." (P01)

For the construct of Skills in Home Science, the item '4.6 I know how to prepare fabric and properly arrange patterns on fabric' needs to be removed as it is not relevant.

"...This item can be removed because fabric is not provided..." (P02)

There are also some items that need to be revised due to inappropriate wording. The item '4.13 I know how to estimate the cost of producing a vest/blouse and set the selling price' needs to be modified due to inappropriate wording.

"...The wording is not appropriate. Remove the word 'estimate' because the cost calculated should be precise, not estimated..." (P03)

For Section C (Skills) under the construct of CA Planning, the item '1.6 I am proficient in determining appropriate assessment methods according to the Assessment Specification Table' needs to be removed.

"...The Assessment Specification Table does not need to be prepared by teachers. It is prepared by the Examination Board or the District Education Department. This item needs to be removed..." (P01)

Also, the item '4.1 I am proficient in using assessment results to provide feedback to students' needs to be removed as it is not relevant, as suggested by second expert. There are also items that need to be removed because they are similar to other items in the instrument.

For Section D (Attitude) under the construct of CA Planning, most experts agree with the items in this section. However, a few items need to be removed to prevent the

instrument from becoming too lengthy, which might cause boredom for teachers filling out the instrument, as suggested by the first informant.

The item '4.2 Studying the assessment field is just a waste of time' needs to be revised due to the use of negative phrasing.

"...This statement is in negative form. Change it to a positive statement or remove this item..." (P02)

For the item '5.5 I am prepared to implement assessments even without attending any assessment courses,' the sentence structure needs to be adjusted to make it more appropriate.

"...Change the phrasing slightly to be positive, like - I am prepared to implement assessments even without attending any assessment courses..." (P03)

As a result, from the experts' reviews, a total of 39 items were eliminated from the 121 items that were initially developed. All these items were removed as they did not receive agreement from the two (majority) experts interviewed. The eliminated 39 items include 16 items from the Knowledge construct of CA, 11 items from the Skill construct of CA, and 12 items from the Attitude construct towards CA were removed. All three experts also suggested that a total of 13 items within the Knowledge construct of CA to be revised in terms of structural aspects and writing style to better represent the items measuring the Knowledge construct of CA.

In line with the removal and addition of items, the instrument's specification table was also improved and referred to experts. Once the experts agreed with the construct definitions and the alignment between the items and the construct definitions stated in the instrument's specification table, three more demographic items were added: gender, years of teaching experience in the field of Home Science and teaching area. The final instrument developed consists of four parts: Part A is demographic information, Part B related to the knowledge construct, Part C related to the skill construct, and Part D involved the attitude construct. In total, the questionnaire contained 81 items, including three questions in Part A. The distribution and items of the questionnaire based on the constructs are shown in Table 2.

Table 2

Questionnaire Items Based on Constructs

Section	Construct	Total of Item
A	Demographic	3
B	Knowledge	21
C	Skill	34
D	Attitude	23
TOTAL	81	

Expert Validation

In this phase, experts' opinions were quantitatively sought to assess the extent to which the content coverage of the constructed instrument is sufficient to accurately represent the actual content to be tested. The degree of consistency in expert agreement was calculated using a formula proposed by [22]. The Likert scale of 1-10 was used to facilitate the percentage of expert agreement. Determination of good content validity is based on the perspectives of [23], where an achievement level of 70% is considered to have reached a high level of

achievement. Based on expert validity, 20.5% of the items received over 80% agreement score from the experts, and 79.5% of the items received over 90% agreement score from the experts. This indicates that each item obtained a high agreement score from all experts, demonstrating that this instrument can be used consistently. The overall agreement among experts is 90.6%, indicating an acceptable level of agreement among experts regarding the appropriateness of the items contained in the instrument.

DISCUSSION

This study aims to develop a self-assessment instrument to evaluate the competency of Home Science Teachers in classroom assessment. The main research question is “what is the level of expert agreement on each item in the instrument and overall instrument”. This study utilizes qualitative and quantitative research methods. After the instrument development is completed, expert validation is obtained using qualitative and quantitative approach, namely using semi-structured interview with three experts and questionnaire respectively. A 10-likert scale questionnaire is distributed to the same experts to obtain the percentage of expert agreement to determine content validity of the developed instrument.

In the analysis phase, findings from semi-structured interviews with five experts indicate that there are indeed issues concerning teachers' competence in implementing classroom assessment in Home Science at schools. Experts mentioned that some teachers are not able to assess students effectively. This finding agrees with the results presented by authors of [8]. Moreover, teachers lack skills in formulating feedbacks to students for improvement. This statement aligns with the findings in [9]. In terms of teachers' attitude, experts mentioned that some teachers developed negative attitudes towards CA implementation. This finding agrees with the findings of [7], where they found that teachers perceive the execution of CA as intricate and burdensome.

In the design and development phase, the self-assessment instrument is developed, where the items are divided into the constructs of knowledge, skills and attitudes based on the themes and sub-themes that were analyzed in previous phase. The three constructs obtained in this study agrees with the constructs presented by authors [27] for competencies required at work, by authors [28] for competencies required to be a competent manager and by authors [29] for competencies that are important to employees in a specific organization.

In the expert validation phase, experts agree with author [13] that a 4-point Likert scale should be used in this self-assessment instrument. The overall agreement among experts is 90.6%, indicating an acceptable level of agreement among experts regarding the appropriateness of the items contained in the instrument.

Hence, a self-assessment instrument has been developed in this study to evaluate Home Science teachers' competency in executing classroom assessment. Assessment is divided into three main areas of teachers' competency namely knowledge, skills and attitude revolving around both classroom assessment and Home Science. The developed instrument can be used as a tool to identify teachers' competency in two opposite spectrums: their invaluable strength and their significant weaknesses. Both inputs are crucial to improve CA training strategies for teachers, where they should be sent for training in the areas that they are weak in, as emphasized by authors [12]. Apart from that, the teachers' strength can improve CA training planning by the District Education Department, where these teachers can be mentors or instructors for other teachers in

that area. As a result, an efficient training ecosystem can be realized. In the long run, this ecosystem will build and sustain a quality classroom assessment implementation, since teachers' competency in CA is consistently assessed, monitored and improved. Execution of CA by competent teachers will improve students' assessment and will then indirectly lead to quality education, supporting UN's SDG.

CONCLUSION

In conclusion, this study aims to develop a self-assessment instrument to evaluate the competency of Home Science Teachers in classroom assessment. The developed instrument consists of 81 items and is divided into 4 parts. Three constructs involved in this 4-likert scale self-assessment instrument namely knowledge, skills and attitude related to classroom assessment. The achievement of expert validity of each item in the developed instrument, as well as validity of overall instrument, indicated that the instrument is appropriate for Home Science teachers to evaluate their competency in classroom assessment. As future work, a pilot study can be executed to further investigate usability of this instrument among Home Science teachers to improve quality of classroom assessment in schools and support the UN's initiative to provide quality education.

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