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ADVANCEMENT OF MATHEMATICAL NON-TEST INSTRUMENTS

Abstrak

Kurikulum 2013 mengamanatkan penilaian berbasis kompetensi, menggantikan penilaian tes konvensional dengan penilaian otentik yang menganalisis pengetahuan, sikap, dan kemampuan. Metode yang digunakan adalah penelitian kepustakaan, yaitu pengumpulan data dengan cara mencari sumber dan mengkonstruksinya dari berbagai sumber seperti buku, jurnal dan penelitian yang sudah ada. Berbagai pendekatan dapat digunakan untuk mengumpulkan data kemajuan pendidikan siswa mengenai proses pembelajaran dan prestasi akademik. Metode pengumpulan data ini menilai kemajuan akademik siswa dengan mengukur pencapaian kriteria kemahiran mereka, yang mencakup kemampuan dasar yang ditentukan dalam Kurikulum 2013 dan kompetensi penting yang harus dipenuhi. Penilaian kecakapan dasar menggunakan indikator pencapaian kemahiran yang mencakup satu atau lebih bidang. Berdasarkan hasil penelitian, tanda-tanda tersebut dapat digunakan untuk memilih metode penilaian yang sesuai, seperti tes tertulis, observasi, penilaian praktik, dan tugas individu atau kelompok. Selama evaluasi kelas, tujuh prosedur khusus dapat digunakan: penilaian ujian tertulis/lisan, penilaian kinerja, penilaian sikap, penilaian proyek, penilaian produk, pemanfaatan portofolio, dan penilaian diri. Penilaian tertulis/verbal menggunakan tes, sedangkan enam prosedur evaluasi lainnya (non tes) menggunakan lembar observasi dan angket. Instrumen kontes dapat mencakup daftar periksa, skala, atau catatan observasi. Pada kesempatan kali ini kita akan fokus pada evaluasi kompetisi yang meliputi (1) proses pembuatan alat nontes, (2) macam-macam alat nontes, dan (3) penilaian kualitas alat nontes yang dihasilkan. alat non-tes.

Kata Kunci: Instrumen Non-Tes Matematika, Pengembangan Instrumen Catatan, Pengembangan Instrumen Evaluasi Non-Tes, Data Kualitatif

Abstract

The 2013 curriculum mandates competency-based assessment, replacing conventional test assessment with authentic assessment that analyses knowledge, attitudes, and abilities. The method used is library research, which collects data by searching for sources and constructing them from various sources such as books, journals, and existing research. Various approaches can be used to collect data on students' educational progress concerning the learning process and academic accomplishments. This data collection method assesses students' academic advancement by gauging their achievement of proficiency criteria, encompassing both fundamental abilities specified in the 2013 curriculum and essential competencies that must be fulfilled. A basic proficiency assessment utilises indicators of proficiency achievement that cover one or more areas. Based on research results, these signs can be used to choose appropriate assessment methods, such as written tests, observations, practical assessments, and individual or group assignments. During classroom evaluation, seven specific procedures may be used: written/oral exam assessment, performance assessment, attitude assessment, project assessment,

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product assessment, portfolio utilisation, and self-assessment. Written/verbal assessment uses tests, while the other six evaluation procedures (non-tests) use observation sheets and questionnaires. Contest instruments may include checklists, scales, or observation notes. On this occasion, we will focus on competition evaluation, which includes (1) the process of making non-test tools, (2) various types of non-test tools, and (3) an assessment of the quality of the non-test tools produced. Non-test tool.

Keywords: Non-Test Mathematics Instruments, Development of Note Instruments, Development of Non-Test Evaluation Instruments, Qualitative Mathematics Data

PENDAHULUAN

Assessing and participating in prayer are crucial responsibilities that a teacher must carry out to ascertain the level of proficiency that students have attained upon completing the learning process (Y. M. Cholily, 2019; Y. M. Cholily et al., 2019; Zahroh, 2012). Furthermore, assessment and evaluation activities can be a benchmark for gauging a teacher's ability to carry out learning evaluation tasks (Hasanah, Cholily, et al., 2023; Muniroh et al., 2019; Mutaqin et al., 2021). It is essential to do extensive study and exercise caution while assessing this issue in the design and implementation stage.

The evaluation used is a genuine and legitimate examination (Rahmawati et al., 2023; Santoso et al., 2021; Sugianto et al., 2022). Authentic evaluation is more conceptually relevant than standardised multiple-choice examinations (Bača1 et al., 2005; Herdiansyah et al., 2019; Syarifah et al., 2017). Accurate assessment necessitates thoroughly evaluating the entire learning process and its results, encompassing cognitive factors and affective and psychomotor components (Abdillah et al., 2021; Astutik et al., 2022; Azizah et al., 2019). Like conventional instruments, mental competency evaluations utilize assessments to measure students' academic attainment (Cahyadi, Cholily, et al., 2023; Y. Cholily et al., 2021; Rachmawati et al., 2021). In addition to cognitive assessment tools (Angraini et al., 2019; Fatra et al., 2022; B. A. Setiawan et al., 2021), alternate instruments (Dimyati et al., 2023; Dwirahayu et al., 2023; Zahroh et al., 2022), usually non-test instruments (Aji et al., 2023; Maryanto et al., 2023; Rofiah et al., 2023), are available for assessing affective and psychomotor domains (P. V da Silva Santiago & Baiduri, 2023; Jayanti et al., 2023; Laila et al., 2023). School teachers seldom utilize this alternative evaluation instrument. Educators assess learning outcomes through the utilization of evaluation instruments. The document in question is titled "Permendikbud, 2014".

Instructors have primarily focused on creating evaluation instruments, such as multiple-choice questions and written explanations. However, there is a significant lack of non-test measures that can be used to assess affective and psychomotor abilities. The 2013 curriculum requires a thorough evaluation that covers the cognitive, emotional, and psychomotor aspects. Therefore, educators must be able to create assessment tools that include both traditional exams and alternate evaluation methods.

METODE

The method in this article uses library research, namely a method of collecting data by understanding and studying theories from various literature related to the research. There are four stages of library study in research, namely preparing the necessary equipment, preparing a working bibliography, organising time and reading or recording research material (Setiawati et al., 2023). This data collection uses the method of searching for sources and constructing them from various sources, for example books, journals and research that has already been carried out. Library materials from assorted references are explained critically and must be in-depth to support the propositions and ideas (Inganah et al., 2023; I. L. Sari et al., 2023). Various approaches can be used to collect data on students' educational progress concerning the learning process and academic accomplishments. This data collection method assesses students' academic advancement by gauging their achievement of proficiency criteria, encompassing both fundamental abilities specified in the 2013 curriculum and essential competencies that must be fulfilled. A basic proficiency assessment utilises indicators of proficiency achievement that cover one or more areas.

HASIL DAN PEMBAHASAN

The results are as follows:

Procedure for manufacturing non-experimental devices

The development process for non-test instruments involves a sequence of vital steps that must be rigorously followed (Astuti et al., 2023; Nisa et al., 2023a; Pratama et al., 2023a). The process consists of the following steps: defining the requirements of the agency, creating the devices, establishing the instrument's range, deciding on the scoring system, assessing the mechanisms, assembling the tools, conducting trials, analysing the test results, repairing the appliances, carrying out measurements, and interpreting the measurement results (Amany et al., 2023; P. V. da Silva Santiago & Baiduri, 2023; Putra et al., 2023).

a. Specifications of the instrument

Instrument specifications comprise clearly defined goals and instrument structures. Developing a non-test instrument depends on the data that needs to be gathered. Non-test devices encompass the domains of affective states and bodily gestures (Opeyemi & Sah, 2023; Pratama et al., 2023b; D. R. N. Sari et al., 2023). The tools within the affective domain are categorized into five groups based on their intended purposes: attitude, interest, self-concept, value, and moral instruments (Cahyadi, Ariansyah et al., 2023; Hasanah, Laila et al., 2023; A. Setiawan, Anwar, Wardana, et al., 2023). When developing instrument specifications, it is essential to examine four critical factors: the intended purpose of measurement, the instrument's grid, its shape and format, and its length.

The purpose of the interest instrument is to gather data on students' preferences and inclinations towards different subjects. Moreover, the outcomes of interest measurement are utilized to enhance student engagement in the issue (Rachmawati et al., 2023; A. Setiawan, Anwar, & Ariansyah, 2023; Wati et al., 2023). The purpose of the attitude instrument is to ascertain students' perspectives and opinions toward a particular object—for instance, pupils' perspectives toward school activities, teachers, and other related matters. Individuals can hold either positive or negative attitudes toward learning specific disciplines. Attitude measures yield valuable insights toward identifying suitable learning tactics for students (Fauza et al., 2023; Muhammad et al., 2023; Nisa et al., 2023b). The self-concept instrument seeks to assess an individual's strengths and flaws. Students do a systematic assessment of their potential. The attributes of students' potential play a crucial role in shaping their career trajectory. Information regarding strength and power.

Identifying student deficiencies determines the most appropriate curriculum for the learner. Values instruments are specifically developed to reveal an individual's core values and beliefs. The obtained knowledge can have either advantageous or detrimental repercussions. Positive qualities are strengthened, while negative aspects are reduced and ultimately eliminated. Moral instruments clarify ethical principles (Darmayanti, 2023; Gunawan et al., 2023; Suharsiwi et al., 2023). An individual's honest information is obtained by observing their shown acts and self-disclosure, mainly by completing a questionnaire. Observational data, in conjunction with questionnaire responses, offer essential insights into an individual's moral values.

Once the purpose of measuring impact has been established, the subsequent stage involves constructing the instrument grid (Fatra et al., 2023; In'am, Darmayanti, Maryanto, et al., 2023; Sugianto, In'am, et al., 2023). The grid is commonly referred to as the blueprint. The grid is a matrix that displays the written specifications of the instruments. The initial stage of constructing the grid involves establishing the conceptual definition derived from theories acquired from many sources (Y. M. Cholily et al., 2016; Darmayanti et al., 2023; Hasanah et al., 2022). Subsequently, formulate a pragmatic interpretation that is grounded in the theoretical description. Next, determine the various elements or components that make up the instrument now being developed. The characteristics or aspects are subsequently transformed into indicators that guide the device's construction. Every hand must comprise a minimum of two or more instrument components. The table below visually depicts the grid layout for the instruments of interest (Cahyadi, Maryanto, et al., 2023; In'am, Darmayanti, Hariyadi, et al., 2023; Sugianto, Darmayanti, et al., 2023).

Tabel 1. Instrument Grille Students' Interest In Attending Lectures

Aspects/Dimensions	**Indicator**	**Item Number**	**Amount**
Involvement in lectures	1. Possess written records 2. Endeavour to comprehend the content the talk.	1, 2 3, 4, 5	2 3
Fulfillment infrastructure	3. Have a reference book	6, 7, 12	3
Exertions undertaken	4. Lecture attendance 5. Engage in conversatiwithacquaintances 6. Library visit	8, 9 10 11	2 1 1
Total number			12

b. Pens and pencils

The instruments are organized according to the established grid. Instruments can manifest as either declarative statements or interrogative queries. When drafting instrument items, it is essential to adhere to the following rules: a. Avoid words that are open to several meanings, b. Creation of concise statements/queries, c. Each sentence consists of a single coherent idea, d. Statements are expressed using straightforward and uncomplicated language, e. Refrain from utilizing absolute terms such as always, all, never, and similar expressions, f. Refrain from making assertions that are verifiable or could potentially be construed as verifiable.

When creating a practical instrument, it is crucial to identify the declarative sentence that conveys the intended message. There are two types of statements: favourable and unfavourable. These two statements pertain to the determination of the scale. The scale for good reports is inverted with a negative outcome. Incorrectly determining the ranking will lead to erroneous conclusions.

c. Determining the scale of the instrument

Several scales are commonly used to measure the affective domain, including the Likert, Thrustone, and Semantic Difference scales. Scale development steps:

1) Determine the attitude object for which the ranking will be developed
2) Arranging an instrument grid (attitude scale)
3) Write statement items
4) Complete the statement items with an attitude scale (can be even, 4 or 6, and can be odd, 5 or 7)

Illustration of a Likert Scale: Evaluation of one's disposition toward science lessons

Indicator	Information			
1) Mathematics classes are beneficial	SS	S	N	TS
2) Mathematics lessons are challenging for so students.	SS	S	N	TS
3) It is not obligatory for everyone to engage in study of mathematics	SS	S	N	TS
4) Mathematics lessons should be simplified SS	S	N	TS	TS
5) Enjoyable mathematics lessons	SS	S	N	TS

Information:
SS = strongly agree = score 4
S = agree = score 3

N = neutral/no opinion = score 2
TS = not agree = score 1

Tabel2. Example of the Thurstone scale:

No	Statement	Skor						
		7	6	5	4	3	2	1
1	I derive great pleasure from engaging in the study mathematics.							
2	Mathematics classes are beneficial.							
3	I endeavour to participate in mathematics classes.							
4	I strive to possess mathematics textbooks.							
5	Mathematics lessons are tedious.							

Tabel 3. Example of a semantic difference scale: Mathematics

	7	6	5	4	3	2	1	
Pleasant								Boring
Difficult								Easy
Beneficial								Vain
Challenge								Mediocre
Lots								A little
Complicated								Simple

The scoring mechanism used depends on the chosen scale. The Thrustone scale utilizes a numerical rating system spanning 1 to 7 for each component. Following that, an assessment is carried out at both the personal student level and the class level, specifically by determining the average and variability of the outcomes using the mean and standard deviation (Khoiriyah et al., 2022; Muh et al., 2022; Syaifuddin et al., 2022). The analysis results assess the emotional aspect of individual students and the entire class about an object. The instructor should modify their teaching approaches and employ instructional resources after examining and comprehending the outcomes.

d. Assessment of Instruments

The instrument review encompasses several activities, such as assessing the suitability of the questions/statements and indicators, evaluating the effectiveness of the language employed, verifying the grammatical accuracy, identifying any potential bias in the questions/statements, evaluating the attractiveness of the instrument format, and ensuring that the instrument items are adequate to prevent monotony. The evaluation was carried out by highly skilled professionals in the field being assessed, and it would be advisable to engage subject matter experts in the evaluation process. Colleagues can also conduct reviews. The length of the instrument is associated with the problem of monotony. The charging process must be completed within a maximum time limit of 30 minutes. The questions/statements should be unbiased, ensuring that they do not influence the respondent's answers toward a particular outcome, whether positive or negative.

The findings of the investigation are then utilized to enhance the tool. The instrument's design was improved, focusing on the structure of phrases, the time required for completion, and the directions for completing it.

e. Assembly of Instruments

After the instrument has been repaired, it is constructed, considering the format, layout, sequence of statements, and questions. The design must be aesthetically pleasing. The succession of words corresponds to the particular aspects that require assessment.

f. Instrument testing

Following its construction, the device is subjected to testing. A representative sample is selected to mirror the attributes of the population under assessment precisely. A minimum sample size of 28 persons, which can be chosen from either a single or many educational institutions, is necessary. During the testing phase, it is crucial to pay attention to the feedback given by participants regarding the understandability of the instructions for completing the instrument, the clarity of phrases, and the time required, among other criteria.

g. Analysis of Test Results

The process of test result analysis is carefully examining the inconsistencies in responses to specific questions or statements. Responses falling within the range of 1 to 5 on the instrument's scale reflect a quality that is deemed satisfactory. However, the device is classified as unsatisfactory if all respondents' replies are identical, such as all 3. The metric used quantifies the extent of discrepancy or correlation between the score of the item and the overall score. A device is deemed satisfactory if the disparity in grain power is 0.3 or lower. Another crucial aspect to take into account is the reliability index. The minimum acceptable value for the reliability index is 0.7.

h. Instrument Maintenance and Restoration

Revisions are made to inadequate questions or statements—enhancements derived from test outcomes and participant input recommendations.

i. Implementation of measurements.

Measurements should be conducted when the respondent is not fatigued. The location used for measurements must be representative, encompassing factors such as the room's condition, seating arrangements, and other relevant considerations. An endeavour was made to ensure respondents refrained from asking each other questions throughout the measurements. Completing the instrument commences with an elucidation of the objective of filling it out, advantages for the responders, and instructions for filling out the device.

j. Interpretation of Measurement Results

The measurement outcomes are expressed as scores or numerical values. The process of analyzing measurement outcomes is referred to as assessment. To make sense of measurement findings, it is necessary to have a criterion. The criteria employed are contingent upon the magnitude and quantity of the things utilized. For instance, student attitudes are measured using a Likert scale consisting of 5 options:

Favorable:	SS (5)	S (4)	N (3)	TS (2)	STS (1)
Unfavorable:	SS (1)	S (2)	N (3)	TS (4)	STS (5)

Attitudes or interests can be categorized into discrete groups based on measurement outcomes. To enhance accuracy, it will be categorized into four unique classifications: exceedingly high, high, low, and extremely low. The following table presents the allocated scores for each category.

Tabel 3 Categories of Student Attitudes or Interests for 10 Questions

No	**Student Scores**	**Attitude or Interest Category**
1	$33 \leq X \leq 40$	Very positive/Very high
2	$25 \leq X < 33$	Positive/High
3	$18 \leq X < 25$	Negative/low
4	$10 \leq X < 18$	Very negative/Very Low

These categories can also be utilized to ascertain class attitudes or interests. The score used is the mean score of the class. The outcomes of assessing students' interest levels in all courses can be utilized to establish the class interest profile. Moreover, this profile is associated with the learning achievement profile.

3. Classification of non-test instrument

The introduction defined non-test assessment strategies as class assessments encompassing performance, attitudes, projects, products, portfolios, and self-assessments.

a. Evaluation of performance

Performance evaluation evaluates students' engagement in performing musical instruments, singing, and reciting poetry or declamation. The authenticity of this assessment approach surpasses that of written tests as it more accurately reflects the pupils' genuine talents.

Performance observations must be conducted in several circumstances to ascertain the extent of proficiency in specific skills. To evaluate students' scientific ability, various assessments are performed, including tasks such as equipment preparation, experiment setup, and observation of experimental outcomes. To assess students' performance, they can utilize tools or instruments such as checklists, rating scales, and observation notes.

Check List (Checklist)

Performance assessment can be done using a checklist (sound good). By using a list, students receive a score if the assessor can observe the criteria for mastering specific competencies. If it cannot be observed, students do not get a grade. The weakness of this method is that the assessor only has two absolute choices, for example, right-wrong, observable-unobservable, good-bad. Thus, there is no middle value, but a checklist is more practical for observing large numbers of subjects.

Example of a checklist for assessing Physics practicum activities:

Name of student: .....

Class:.....

No	Rated aspect	Good	No
1 2 3 4 5	Knowledge of work procedures Accuracy in select tools and materials Accuracy in how to operate to Observation results Accuracy in compiling reports		
	Score achieved		
	Maximum score		

Information

Good gets a score of 1. Not good receives a score of 0

The assessment criteria can be carried out as follows. Maximum score: 5

Score achieved: total score for each aspect Value = (score achieved/maximum score) x 10

Determination of Criteria:

A score of 4-5 can be determined as competent

Scores 3-4 can be defined as reasonably intelligent.

Scores 1-2 can be chosen as incompetent.

Rating Scale

Performance assessment using a rating scale allows the assessor to give a middle value for mastery of specific competencies because the matter is provided on a continuum where there are more than two value categories to choose from. The rating scale ranges from imperfect to very perfect. To minimize the subjectivity factor, it is necessary to assess by more than one person so that the assessment results are more accurate. So that the assessors have the same frame, an assessment rubric needs to be created. Assessment rubrics can be generic and specific. Examples of rating scales and headers can be seen in the following description.

Example of a Rating Scale

Mathematis Practical Assessment Format

Student's name :

Class :

No	Rated aspect	4	3	2	1
1	Knowledge of work procedures Accuracy in selecting to				
2	and materials Accuracy in how to operate tools Observat				
3	results				
4	Accuracy in compiling reports				
5					
	Score achieved				
	Maximum score				

Assessment rubric:Knowledge of work procedures

Score 4 = Understands work procedures and applies them correctly and precisely. Score 3 = Can apply work procedures correctly by reading instructions. Score 2 = can apply work procedures with guidance from others.

Score 1 = unable to implement work procedures

a. Accuracy in choosing tools and materials

Score 4 = Choose tools and materials, and do it correctly and precisely. Score 3 = Choose tools and materials correctly by asking friends

group

Score 2 = Choose your tools and materials, but not entirely correct

Score 1 = selecting tools and materials with guidance from other people (teacher/laboratory)

Etc.

The assessment criteria can be carried out as follows. Maximum score: 5 x 4 = 20

The score achieved: total score for each aspect

Value = (score achieved/maximum score) x 10 Determination of Criteria:

A score of 16-20 can be determined as very competent. A score of 12-15 can be determined a competent

A score of 8-11 can be determined as quite competent. A score of 4-7 can be determined as incompetent.

Example of Performance Assessment:

Scientific Performance Assessment Format

No	Student's name	Rated aspect												Total score
		Prepare tools and materials				Stringing test				Observe the results test				
		1	2	3	4	1	2	3	4	1	2	3	4	
1														
2														
3														
4														
5														
6														

Assessment rubric:

Prepare tools

Score 4: If the tools and materials are prepared perfectly, according to the activity steps

Score 3: If the tools and materials are prepared but incomplete

Score 2: If the laboratory assistant prepares the tools and materials but also guides in determining the tools and materials

Score 1: If you don't participate in preparing tools and materials, you passively wait for someone else to prepare them

Setting up experiments
Score 4: If the tool is assembled correctly
Score 3: If the tool is assembled but not correctly
Score 2: If someone else assembled the tool but actively paid attention. Score 1: If he did not participate in assembling the tool and ignored Observing the results of the experiment

Score 4: If experimenting, observe all variables and record the results carefully
Score 3: If you experiment, observe the experiment, but some variables are not observed and record the results carefully

Score 2: If you only observe and record the results carefully
Score 1: If you only transfer notes from other people's observations.
Maximum score = 3 x 4 = 12
Total score achieved
Value = ---------- x10
Maximum score

b. Attitude Assessment

Attitude evaluation is a fundamental aspect of psychological assessment. Measurement results never achieve total perfection due to the influence of human attitudes. Evaluating attitudes is a challenging undertaking, and attaining a high degree of validity, reliability, and impartiality may be impossible to do. There are multiple factors contributing to this, including the invisibility of psychological attributes, the scarcity of available behavioural indicators, the impact of irrelevant variables like mood and surrounding conditions, and the existence of various sources of error in the assessment process, such as the assessor, the individual being assessed, the tools utilized, and the method of analysis.

For example, we will assess the scientific attitude scale. The following table presents an observation sheet that can be used to determine the scientific attitudes of individual students.

No	Student's nar	Attitude Indicator							Total score
		Let's open itn	objecti ve f	Thor ou gh i	Kedis i -plan	Work The same	Hones ty	Resilient answerd	
1									
2									
3									

The scores for each attitude above are averaged and converted into qualitative form. The assessment scale is made with a range from 1 to 5. The interpretation of these numbers is as follows: 1 = very poor, 2 = poor, 3 = sufficient. 4 = good, and 5 = very good. Maximum score = max score of each indicator X number of indicators = 5 x 7 = 35.

Scientific attitude scores can be given in letter form. Therefore, the total score obtained must be converted.

Total score of student answers
Value Conversion = 100
Maximum score
So a student who gets a score of 28 after converting his score becomes:
28 - 100 = 80
35

There are many ways to convert scores into grades, one of which is simple, namely using the following criteria.

Total Score	CONVERSION VALUE	Category

	Number	Letter	
29 – 35	81 - 100	A	Very good
21 – 28	61 - 80	B	Good
14 – 20	41 - 60	C	Enough
7 – 13	20 - 40	D	Not enough

Evaluation of the project

Project assessment refers to the evaluation process of a work that needs to be accomplished within a specified timeframe. This task entails conducting an inquiry that involves the stages of planning, data gathering, organization, processing, and presentation of data. Project evaluation can be utilized to evaluate students' comprehension, proficiency in applying knowledge, aptitude for doing investigations, and capacity to effectively communicate information on specific subjects. Project assessment requires consideration of a minimum of three factors:

Leadership skills. The student's capacity to select subjects, do research and effectively allocate time for gathering data and composing reports.

a. Significance. Relevance to the topic, considering the individual's degree of knowledge, comprehension, and abilities in the learning process.
b. Genuine nature or quality. Student projects should be the outcome of their efforts while acknowledging the teacher's role in providing guidance and assistance.

Project assessment involves the examination of many stages, such as planning, work process, and final project outcomes. In order to ensure a successful evaluation, teachers need to pinpoint the precise components or stages that necessitate assessment, such as the development of designs, gathering of data, analysis of data, and the compilation of written reports. Poster presentations provide a platform to exhibit assignment reports or research findings. Evaluation can be carried out using evaluation instruments, such as checklists or assessment scales. Student activities in project assessment encompass tasks such as performing empirical research on power usage in households and examining new advancements in basic food expenses.

c. Evaluation of the product

Product assessment refers to the evaluation of the production process and the quality of a product. The product evaluation evaluates students' proficiency in creating technological and artistic creations, encompassing several categories such as food, apparel, works of art (sculptures, paintings, drawings), as well as items crafted from wood, ceramics, plastic, and metal. Product development consists of three distinct stages, each of which necessitates an evaluation. These stages are as follows:

a. The preparation stage encompasses evaluating students' capabilities, strategizing, brainstorming, and creating prototypes.
b. The product production stage involves evaluating students' proficiency in choosing and utilizing materials, tools, and processes.
c. The product assessment stage involves evaluating the goods created by pupils based on predetermined criteria.

Product evaluation often employs either holistic or analytical approaches (Choirudin et al., 2021; Rizdania et al., 2023; Utomo et al., 2023): a) An analytical approach, specifically focused on product attributes, is typically conducted by evaluating all criteria during the various stages of the development process (preparation, product creation, product assessment), b) The holistic approach, which involves evaluating the product based on its entire impression, is typically conducted solely during the product assessment stage (appraisal).

d. Portfolio Evaluation

Portfolio assessment is an ongoing evaluation method that emphasizes the compilation of data demonstrating the progress of students' abilities over a specific timeframe. The information may include outstanding student work, test answer sheets that indicate both

answerable and unanswerable questions (excluding grades), or other types of information on specific competencies within a particular subject.

Portfolio evaluation is a systematic strategy to appraise the academic progress of individual pupils in a particular subject within a set period. After a time, the teacher and students gather together to evaluate the outcomes of their efforts. Teachers and students can assess student's skills and make necessary adjustments based on this data on their progress. A portfolio can effectively demonstrate the evolution of students' academic growth by showcasing a wide range of their work, including essays, poetry, letters, musical compositions, drawings, photos, paintings, book/literature reviews, research reports, synopses, and other samples.

Key considerations and criteria for implementing portfolio evaluation in schools include: 1) Ensuring student work is genuinely the product of their efforts.

1. Teachers research students' work, which serves as the basis for portfolio assessment, ensuring that the work is solely the product of the student's efforts.
2. It is establishing a reciprocal trust between educators and learners. In the evaluation process, teachers and students must develop joint confidence, rely on one another, ensure the educational process's smooth functioning, and provide a shared commitment to maintaining confidentiality between teachers and students.
3. The preservation of the confidentiality of student development information is crucial to prevent unauthorized disclosure, which could detrimentally affect the educational process.
4. Students and teachers share co-ownership. Both teachers and students must possess a sense of ownership over portfolio files, as this will instil a feeling of personal ownership in students regarding the work they have accumulated. Consequently, students will be motivated to enhance their skills continuously.
5. Contentment. Portfolio work results should provide compelling information and evidence that motivates students to enhance their skills and abilities.
6. Applicability. The collected work outcomes are aligned with the competencies specified in the curriculum.
7. Evaluation of procedures and outcomes. Portfolio evaluation incorporates the fundamental concepts of both processes and products. For instance, the assessment of the learning process is derived from the teacher's observations and documentation of students' performance and work.
8. Evaluation and acquisition of knowledge. Portfolio evaluation is an integral component of the learning process. The primary advantage of this evaluation is its profound diagnostic value for teachers to identify pupils' aptitudes and deficiencies.

Subjects : Mathematics
Time Allocation : 1Semester
Collected samples : Project work report
Student Name :
Class : XII/1

No	Standard	Criteria					Description-
	Competent	Period	Systematics	Complete-	Sharpness	Kesim	an
	i/		report	and data	discussant	home	
	Competent				an		
	i Basic						

Notes:

Each student's work according to the Competency Standards/Basic Competencies included in the portfolio list is collected in one file (place) for each student as proof of their work. The score

for each criterion uses a 0 rating scale - 10 or 0 - 100. The better the results seen from the student's writing, the higher the score given.

The information column is filled with the teacher's notes about the weaknesses and strengths of the writing being assessed.

Self Assessment (self-evaluation)

Self-assessment is a method of evaluation where students are tasked with evaluating their progress, process, and level of performance in specific areas. This evaluation is based on predetermined criteria or references. The primary objective of self-assessment is to facilitate or enhance the learning processes and outcomes. Nevertheless, teachers may utilize the results of self-assessment as a factor in determining grades. The significance of self-assessment increases as the focus of learning transitions from teachers to students, in accordance with the principle of autonomous learning. Various forms of self-assessment exist, such as:

Direct and specific assessment refers to the evaluation of certain competency features of a subject through direct examination, either during or after the completion of a task.

Indirect and holistic evaluations refer to assessments that are conducted over an extended duration in order to provide a comprehensive review.

Socio-affective assessment refers to the evaluation of affective or emotional components. For instance, students can be prompted to compose prose that articulates their emotions around a specific object.

Employing this methodology can yield a beneficial influence on an individual's character growth. The benefits of utilizing self-assessment in the classroom are as follows: 1) It Enhances students' self-assurance by empowering them to evaluate their performance. 2) Promotes students' self-awareness of their strengths and weaknesses through the process of introspection during assessments. 3) Cultivates a sense of honesty and objectivity in students as they are expected to provide truthful and unbiased evaluations.

Assessing the calibre of the non-test instrument under development

The newly constructed tool must adhere to instrument quality standards, including reliability, validity, and discriminant capacity. Non-test agents do not evaluate the accuracy of the respondent's replies. Hence, there is no requirement to gauge the level of difficulty of the questions, unlike with test instruments.

Dependability

Reliability determination procedures encompass test-retest, parallel tests, and split tests. Some formulas that can be utilized include the product-moment correlation Sperm Brown—alpha, and so on. The instrument's reliability is assessed based on the magnitude of the correlation coefficient. The reliability coefficient quantifies the correlation between the obtained scale score (X) and the accurate score (pure score). A reliability value of 0.9 indicates that 90% of the variability in the scores may be attributed to the actual score discrepancies.

Accuracy

The validity of the non-test instrument can be determined by assessing its content and the underlying theoretical idea. Precision in establishing conceptual definitions operational definitions, and identifying planned characteristics and indications. Factors that diminish validity

1. The identification of the measuring area lacks clarity.
2. The operationalization of the concept (the formulation of indicators) is inadequate.
3. The writing of items does not adhere to the guidelines.
4. Inadequate execution of scale administration (subject conditions, testing conditions)
5. The scoring is imprecise.
6. Misinterpretation

Varying Power

Queries or assertions on non-experimental tools should possess the ability to distinguish between favourable and unfavourable dispositions. The differential power index serves as an indicator of the level of harmony or consistency between the function of individual items and the overall operation of the scale. Applicable formulas include interval scores and Pearson product-moment correlation.

SIMPULAN

The process of creating non-test instruments involves several essential steps, including: establishing instrument specifications, composing the instruments, determining the instrument's scale, defining the scoring system, reviewing the instruments, assembling the instruments, conducting trials, analyzing the test results, repairing the instruments, performing measurements, and interpreting the measurement results. Non-test assessment approaches encompass various class assessments such as performance evaluations, attitudes assessments, project evaluations, product evaluations, portfolio assessments, and self-assessments. Questions/statements on non-test instruments must be able to differentiate between positive and negative attitudes. The differential power index is also an indicator of harmony or consistency between item function and the overall scale function. Formulas that can be used include interval scores, Pearson product moment correlation.

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