Vol. 15, No. 02, pp. 945-965, 2025 DOI: 10.23960/jpp.v15i2.pp945-965

Jurnal Pendidikan Progresif

e-ISSN: 2550-1313 | p-ISSN: 2087-9849

http://jurnal.fkip.unila.ac.id/index.php/jpp/

Development of a Web-Based Assessment of Pancasila Student Character in Senior High Schools

Salahuddin[1,*], Erniati[2], Wiwin Mistiani[2], Gusnarib[2], & A. Ardiansyah[3]

[1]Department of Teacher Professional Education, State Islamic University of Palu, Indonesia

[2]Department of Islamic Religious Education, Datokarama State Islamic University of Palu, Indonesia

[3]Department of Elementary School Teacher Education, State Islamic University of Palu, Indonesia

*Corresponding email: salahudinudin099@gmail.com

Received: 21 April 2025 *Accepted: 20 May 2025* *Published: 26 May 2025*

Abstract: Development of Web-Based Assessment for Pancasila Student Character in Senior High Schools. This study aims to develop a web-based student character assessment system oriented toward the Pancasila Student Profile for the Senior High School level. The system integrates three assessment methods teacher assessment, peer assessment, and self-assessment to gather comprehensive and objective data about student character. The instrument used in this system is based on six core dimensions of the Pancasila Student Profile: faith and devotion to God Almighty, global diversity, cooperation, independence, critical reasoning, and creativity. Each dimension includes five indicators, resulting in 30 items in total. Instrument development followed the Orindo & Antonio (1984) model, while the web system design adopted principles from Martin & Betrus (2019), emphasizing digital efficiency and functional design. Research findings show the developed system is valid, reliable, and efficient. Content validity testing yielded an average Aiken's index of 0.882, and construct validity was confirmed using Confirmatory Factor Analysis (CFA) with satisfactory model fit results (p e" 0.05; RMSEA d" 0.08; CFI, TLI, IFI e" 0.95; factor loadings > 0.3). All six dimensions showed Composite Reliability (CR) scores above 0.7, and Cronbach's Alpha reached 0.859, indicating strong internal consistency.The system was built using PHP, HTML, CSS, JavaScript, and MySQL. Expert validation yielded an average Aiken's index of 0.941, affirming its visual and functional quality. A practicality test with 50 teachers produced an average score of 86%, indicating the system is highly practical. Integration of multiple assessment types allows for data triangulation and comprehensive character evaluation. The system supports teachers in assessing and fostering character, simplifies the process, enhances transparency, and enables real-time data analysis, offering a scalable and effective digital solution for character education in Senior high schools.

Keywords: web based assessment, character, pancasila student, EFA, CFA.

To cite this article:

Salahuddin, Erniati, Mistiani, W., Gusnarib, & Ardiansyah, A. (2025). Development of a Web-Based Assessment of Pancasila Student Character in Senior High Schools. *Jurnal Pendidikan Progresif*, *15*(2), 945-965. doi: 10.23960/jpp.v15i2.pp945-965.

INTRODUCTION

Using computers/the Web as an assessment medium has many advantages compared to using paper. (Retnawati et al., 2017). believe the paper-based test assessment system could be more effective and efficient. Paper-based assessment requires expensive time and costs in checking questions and distributing and storing test device data (Bunderson et al., 1989). Therefore, an effective and efficient testing system is needed to facilitate the assessment process. Web-based assessment offers many new features that are not available in paper-based assessment systems, such as real-time data collection,

processing, analysis, and remote access (Abass et al., 2017) results can be taken at any time (Lilley et al., 2004); practical and up-to-date (Shilova et al., 2014); cost-effective, easy administration, more accurate, immediacy of assessment and reporting, and flexible scheduling and test locations (Choi & Tinkler, 2002; Kim & Kamphaus, 2018; Noyes & Garland, 2008); more convenient to use (O'Malley et al., 2005; Rokhaniyah & Putra, 2021). However, the use of the Web as an assessment medium is more dominant in measuring cognitive learning outcomes (Mei-Ju et al., 2014; Abidin et al., 2019; Alwi et al., 2018; Asmaranti & Dewi, 2016; Istiyono et al., 2020). Meanwhile, web-based assessments to measure student character are still very underused. Therefore, the use of the Web as a medium and measuring tool is the latest innovation to assess student character. Character development is significant in building a nation (Hidayat et al., 2022). Strengthening character through assessment is very important for countries, including Indonesia. Because the character greatly influences students' future (Agboola & Tsai, 2012). The study results show that students with good character qualities will benefit the nation and state (Yao & Enright, 2020). Good character can also affect the improvement of academic achievement (Nurhasanah & Nida, 2016) In 2020, the Indonesian government reconstructed the competencies that students must have to face the 21st century. According to Minister of Education and Culture Regulation No. 22 of 2020, the Strategic Plan of the Ministry of Education and Culture 2020–2024 aims to realize an advanced Indonesia that is sovereign, independent, and has personality through forming a Pancasila student profile.

According to Wahyuningsih et al., (2021), the Pancasila character values or student profile include the characteristics of Faith and devotion to God Almighty, noble morals, global diversity, independence, cooperation, critical thinking, and creativity. Strengthening character through a web-based assessment system is very important and significantly helps teachers understand the strengths and weaknesses of students (Mistiani, 2024). Strengthening students' character, as reflected in the Pancasila Student Profile (Wahyuningsih et al., 2021), requires objective and comprehensive assessment. In this context, Web-Based Assessment (WBA) is a relevant solution because it is able to facilitate multi-rater character assessment involving teachers, students, and peers efficiently. The WBA system allows flexible access, provision of standardized instruments, and integration of data from various sources in one digital platform. This greatly supports the data triangulation process, which is important for increasing the validity of character assessment (Panadero et al., 2016). In addition, WBA provides a transparent digital footprint that can be used for reflective feedback, thereby strengthening character formation in a sustainable manner (Pellegrino & Quellmalz , 2010; Mistiani , 2024).

Because in reality, there are still many teachers who have not carried out character assessments professionally, such as many teachers who do not use instruments when assessing character (Andrian et al., 2018; Imtihan et al,. 2017; Kartowagiran. & Jaedun, 2016). Teachers need help with more examples of instruments and technical guidelines for character assessment (Andrian et al., 2018). This study confirms that only a few teachers make character assessment instruments. A few teachers have prepared character assessment instruments, but the instruments developed have not yet been tested for validity and reliability.

Testing the validity and reliability of the instrument one of the most important things because the instrument has been tested for validity and reliability will be able to provide accurate data and describe the character of students (Faizah et al., 2019), provide holistic information

about educational achievements (Setiawan et al., 2019) and make it easier for users to access information that hinders the success of a program (Tooth et al., 2013). Therefore, it is essential to test the quality of this instrument. In addition, the method used in character assessment only uses one type of method, namely observation (Setiawan et al., 2019). The proper character assessment does not only use teacher observation but must involve students in the assessment, both in peer assessment and self - assessment. Several findings state that self-assessment and peer assessment have been proven to benefit student learning, including improving academic achievement (Yan, 2020) and training critical and reflective thinking (Austin et al., 2008). Likewise, student involvement in the assessment (self-assessment and peer assessment) will make students recognize their strengths and weaknesses, motivating them to plan and carry out the best strategies to improve their learning outcomes (Saepuzaman, 2023). Several assessment methods allow for more complete information related to student character. Existing character assessment instruments are not by school needs (not by the current curriculum), such as research on character assessment models in vocational schools (Julia & Supriyadi, 2018), social attitudes (Syamsudin et al., 2016), Pancasila attitudes (Kirana et al., 2019) and national values (Candra, 2022). The development of character assessment instruments by the independent curriculum is Supramono's research (Supramono, 2023). However, this research is limited to the development of instruments at the Elementary School level or phase B and still uses one type of assessment, namely self-assessment, and is still paper and pencil-based, not computer/ Web-based.

Based on the above facts, it is very important to develop a web-based assessment of Pancasila student character in Senior High Schools using three types of assessments, namely teacher, peer, and self-assessment, to obtain comprehensive assessment results that can be used as a reference for making improvements to the learning process and student character appropriately. The use of Web-Based Assessment (WBA) offers a number of advantages, such as multi-rater involvement, automatic data processing, and the provision of standardized instruments (Panadero et al., 2016; Alimorad & Saleki, 2022). However, its implementation also faces practical challenges, including limited internet access in some areas and data security issues related to student privacy (Alruwais et al., 2018). Therefore, this study not only develops a web-based character assessment system, but also tests its practical aspects to ensure that the system can be implemented effectively and is able to overcome these potential obstacles. This study aims to develop a Web for character assessment, an instrument for assessing the character of Pancasila students, analyze the validity and reliability, and test the practicality of web-based character assessment of Pancasila students.

METHOD

Research Design and Procedures

This study employs two developmental designs: the creation of evaluation instruments and the Web. Instrument development refers to the Oriondo and Antonio (1984) paradigm, which encompasses four stages: instrument design, instrument testing, establishing empirical validity, and assessing dependability. Web development refers to the Martin & Betrus (2019) approach, which includes (1) needs assessment and content analysis, (2) prototype construction (design), (3) prototype utilization (research), and (4) system installation and maintenance. The partnership between the two models yields four steps, specifically: The first stage is the development of the WBA instrument and system, which begins with an analysis of student character needs based

on the dimensions of the Pancasila Student Profile. In parallel, the grid and items of the character assessment instrument were compiled and the initial design of the WBA system prototype that will be used as an assessment medium. The second stage is the integration of the instrument into the WBA system. The developed instrument is uploaded to a web system designed to support assessments from various sources, namely teachers, peers, and oneself. This system allows for efficient data triangulation through an integrated digital interface. The third stage is the trial of the instrument through the WBA system. The instrument that has been integrated into the system is tested on respondents involving teachers and students. This trial includes analysis of content validity, construct validity, and instrument reliability, which are collected directly through the system. In addition, testing of the functionality and ease of use aspects of the platform is also carried out. The fourth stage is the analysis and refinement of the system and instruments. The results of the trial are analyzed to evaluate the quality of the instrument and the practicality of the system. Improvements are made based on user feedback and the results of technical analysis, which include system efficiency and data security.

Participant

This study involved 3 study groups, each of which was used to analyze the quality of the instrument, WBA, and the practicality of the model, each of which is described as follows:

Table 1. Participants

Data	Participant
Content Validity Instrument	9 Experts in character education, research and evaluation of education
W BA	5 Experts from Lecturers and 4 Teacher IT High School
Empirical trial Instrument and WBA	50 teachers in the fields of Religious Education, Civic Education, Guidance Counseling and Computers who have been teaching for 10 years from 5 high schools in Wonosobo Regency Grade X High School Students from 5 High Schools in Wonosobo Regency
Practicality of the WBA Model	50 teachers in the fields of Religious Education, Civic Education, Guidance Counseling and Computers who have taught for 10 years from 5 high schools in Wonosobo Regency

Instrument

The data collection instruments developed in this study consisted of three types: a self-assessment (SA) in the form of a Likert-scale questionnaire, as well as peer assessment (PA) and teacher assessment (TA) in the form of observation sheets. These instruments were developed based on the characteristics of Pancasila students, which include Faith and Devotion to God Almighty (IMTQ), Global Diversity (BKG), Mutual Cooperation (GTR), Independence (MDR), Critical Reasoning (BKRS), and Creativity (KRTF). The instruments comprise a total of 30 items, with five items assigned to each of the six characteristics. The instrument grid is presented in Table 2.

Data Analysis

Quantitative data related to quality instruments and the Web were obtained through FGD results from nine experts in character measurement and education and media using the Delphi method. The aspects assessed include material, construction, and language aspects. The

Table 2. Instrument grid

Dimensions	Element	Indicators	CODE
Faith and devotion to God Almighty	Religious morals	Perform worship routinely and independently	IMTQ1
		Actively participate in religious or belief activities	IMTQ2
	Personal morals	Be brave and consistent in conveying the truth or facts and understand the consequences for yourself and others.	IMTQ3
	Morals towards humans	Respect the beliefs/religions of others	IMTQ4
	Morals towards nature	Realizing gratitude by building awareness of caring for the natural environment	IMTQ5
Global Diversity	Knowing and appreciating culture	Promote cultural exchange and collaboration in an interconnected world and demonstrate it in behavior	BKG1
	Intercultural communication and interaction	Present a balanced view on issues that may give rise to conflicting opinions.	BKG2
		Willing to provide assistance when others are in difficult situations	BKG3
	Reflection and responsibility for the experience of diversity	Criticize and reject stereotypes and prejudices about the depiction of group and ethnic identity and take the initiative to invite others to reject stereotypes and prejudices.	BKG4
	Social Justice	Participate in determining choices and decisions for the common interest through a process of exchanging ideas carefully and openly independently.	BKG5
Mutual cooperation	Collaboration	Building teams and managing collaboration to achieve common goals according to predetermined targets	GTR1
		Using various communication strategies to solve problems in order to achieve various common goals.	GTR2
		Aligning and maintaining the actions of self and group members to be in accordance with each other	GTR3
	Concern	Respond to the social environment according to the demands of one's social role and contribute according to the needs of society to produce a better situation.	GTR4
	Share	Striving to provide things that are considered important and valuable to people in need in the wider community (country, world).	GTR5
Independent	Understanding yourself and the situation you are facing	Identifying the strengths and challenges that will be faced in the learning, social and work contexts that will be chosen in the future.	MDR1
	Self Regulation	Controlling and adjusting emotions appropriately when facing challenging and stressful situations in the context of learning, relationships and work.	MDR2

		Setting specific learning, achievement and self-development goals and designing appropriate strategies to face the challenges that will be faced in the learning, social and work contexts that will be chosen in the future.	MDR3
		Determine personal priorities, take the initiative to seek and develop specific knowledge and skills according to future goals.	MDR4
		Trying to overcome the challenges encountered.	MDR5
Critical Thinking	Obtaining and processing information and ideas	Asking questions to critically analyze complex and abstract problems.	BKRS1
		Critically clarify and analyze complex and abstract ideas and information from a variety of sources.	BKRS2
		Prioritize the most relevant ideas from the results of clarification and analysis.	BKRS3
	Analyze and evaluate reasoning and procedures	Analyze and evaluate the reasoning used in finding and seeking solutions and making decisions.	BKRS4
	Reflection of thoughts and thinking processes	Explaining reasons to support his thoughts and thinking about views that may be contrary to his thoughts and changing his thoughts if necessary.	BKRS5
Creative	Generating original ideas	Produce diverse ideas to express thoughts and/or feelings, evaluate ideas	KRTF1 KRTF2
	Produce original work	Explore and express thoughts and/or feelings in the form of work and/or actions	KRTF4
		evaluate it and consider its impact and risks to oneself and one's environment using various perspectives.	KRTF5

investigation of content validity was conducted using the Aikens methodology. The results of this analysis will produce a rater agreement index for item validity, which will be compared with the minimum limit of the Aiken table index (Aiken, 1985).

Subsequent to data collection, an analysis was conducted to assess the sample's adequacy and homogeneity using the Kaiser-Meyer-Olkin - Measure of Sampling Adequacy (KMO - MSA) and Bartlett tests. If the KMO - MSA exceeds 0.5 and the Bartlett Test of Sphericity significance is below 0.05, the data is homogeneous and satisfies sample adequacy (Zurqoni et al., 2018). The data is further examined by Confirmatory Factor Analysis. Examination The model fit can be assessed using the CFA results and corresponding model fit criteria.

Model fit was evaluated through Confirmatory Factor Analysis (CFA), referring to widely accepted model fit criteria in the literature. CFA was conducted to ensure that the constructed model aligns with the empirical data obtained. The model fit criteria used in this analysis include several statistical indicators: a p-value e" 0.05 and RMSEA d" 0.08 (Brown, 2020; Zhang & Kline, 2021), indicating that the model does

not significantly deviate from the observed data. Additionally, a Chi-square to degrees of freedom ratio (÷²/df) < 2, as well as CFI, TLI, NNFI, and IFI values e" 0.95, reflects a very good model fit (Zhang & Kline, 2021). The SRMR index d" 0.08 was also used as an additional indicator to assess residual fit (Hair et al., 2020). Furthermore, each indicator in the model is required to have a standardized factor loading greater than 0.30 to ensure a significant contribution to the measured construct (Hair et al., 2020).

In addition, the practicality of the model was assessed based on the criteria developed by Widoyoko (2011) , the practicality value interval ranges from 0% to 100%, categorized into five levels: very practical (85%–100%), practical (72%–84%), quite practical (58%–71%), less practical (44%–57%), and not practical (0%–43%). These criteria are used to provide a comprehensive assessment of the model's feasibility not only statistically, but also in terms of its practical applicability.

■ RESULT AND DISCUSSION

The initial development step began with an analysis of the needs of Web Based Assessment in Senior High Schools. Based on the facts in the field, it was found that. Character assessment in senior high schools (SMA) currently still faces various challenges, especially in terms of instrument accuracy and effectiveness of its implementation. The results of initial observations in five senior high schools in Wonosobo Regency showed that most teachers still assess students' character subjectively without using standard instruments. Teachers tend to rely on general impressions or personal experiences in giving character scores, without clear indicator guidelines. This is in line with the results of an interview with one of the Pancasila and Citizenship Education teachers at SMA Negeri 1 Wonosobo, who stated: "We know the character of the students, but we don't have a specific measuring tool. Sometimes we only assess based on daily behavior in class." Furthermore, the results of an interview with a Guidance and Counseling teacher at the same school revealed that although there is a character assessment module in the Merdeka Curriculum, its implementation has not been optimal due to lack of training and the unavailability of valid and ready-to-use instruments. Several teachers admitted that they had never conducted peer-assessment or self-assessment-based character assessments due to limited media and the absence of structured technical guidelines. On the other hand, the use of technology in assessments is still limited. Observations of assessment practices in the classroom show that assessments are still carried out manually using paper, which results in the input, processing, and reporting of grades being slow and prone to errors. Teachers also expressed the need for a digital system that can help simplify the character assessment process. An ICT teacher said:

"We need an application that can immediately summarize the assessment results from students, teachers, and their friends. If everything is still manual, it's troublesome and time-consuming."

Therefore, the need for the development of a standardized and web-based character assessment instrument is very urgent. The instrument must be able to measure the six dimensions of Pancasila Student character (IMTQ, BKG, GTR, MDR, BKRS, KRTF) comprehensively and validly, and be able to integrate assessments from various sources. The developed Web-Based Assessment (WBA) system must be able to simplify the assessment process, provide multi-assessor engagement features (teachers, students, peers), and produce fast and accurate data to support decision making by teachers and schools. The results of this analysis indicate that the development of WBA instruments and systems is not only a technological innovation, but also a real solution to basic field needs, both in terms of instruments, methods, and

the effectiveness of the student character assessment process. Web-based assessments of good quality can be seen from the aspects of the instruments and the Web that are developed

Character Assessment Instruments for Pancasila Students

A quality instrument is one of the main requirements for obtaining accurate data (Setiawan et al., 2019). Because a good quality instrument will be able to obtain data that accurately describes the traits of the research subjects (Faizah et al., 2019), the character assessment instrument can meet the quality standards of the instrument, namely valid, reliable, and fair in defining the actual character of students (Finch, WH, & French, 2019; Kubiszyn & Borich, 2013) so that the assessment results produce minor errors (Lane et al., 2016). An instrument must prove its validity (Allen, 1979), Validity refers to the function of the instrument (Nitko & Brookhart, 2011) and the meaning of the assessment results (Gable, 1986). The validity of the instrument is proven if the instrument can measure according to the measurement objectives (Reynolds et al., 2013). The validity of the instrument is proven if the instrument can measure according to the measurement objectives (Reynolds et al., 2013). Validity testing is measured using two approaches, namely content validity and construct validity.

Determination of content validity is measured from the results of the assessment of 9 experts in the field of character education and the field of educational research and evaluation. Based on the results of the development of the Pancasila student character assessment instrument in senior high Schools which consists of 30 instrument items developed from 6 aspects of character: Faith and Devotion to God Almighty (IMTQ), Global Diversity (BKG), Mutual Cooperation (GTR), Independent (MDR), Critical Reasoning (BKRS), and Creative (KRTF), each consisting of 5 instrument items. Table 3 shows the review analysis results conducted by nine experts in measurement and evaluation and character education.

Table 3. Content validity of the pancasila student character assessment instrument

Assessment Indicators	Aiken's index			Decision
Material aspects	**TA**	**PA**	**SA**	**>0.7 6**
The dimensions measure assessment instrument indicators.	0.944	0.944	0.944	Valid
Instrument items, according to the indicators	0.806	0.806	0.806	Valid
Material by the objectives of the assessment measurement	0.944	0.944	0.944	Valid
Construction Aspects				
Instructions for answering the Pancasila student instrument are written clearly	0.917	0.917	0.917	Valid
instrument items are formulated clearly	0.889	0.889	0.889	Valid
Instrument principles formulated				
The assessment scale used is appropriate to the assessment objectives.	0.889	0.889	0.889	Valid
the Pancasila student character assessment instrument is interesting to read.	0.806	0.806	0.806	Valid
The number of items and length of sentences are appropriate so that they are exciting to read/answer.	0.778	0.778	0.778	Valid

Language aspects				
Sentence formulation in the points is communicative and clear	0.917	0.917	0.917	Valid
Sentence formulation in instrument items does not give rise to multiple interpretations	0.806	0.806	0.806	Valid
The formulation of sentences in the assessment instrument uses common language or words.	0.944	0.944	0.944	Valid
Statement on instrument items using standard and easy-to-understand Indonesian	0.944	0.944	0.944	Valid
Average	0.882	0.882	0.882	Valid

Table 2. shows that all items are declared valid from material, construction, and language aspects, as evidenced by the average value of the Aiken index test > 0.70. Furthermore, the reliability between raters in providing assessments can be determined using the Intraclass Correlation Coefficients (ICC). The results of the ICC, TA, PA and SA analysis output were 0.76 with a good category. The assessment given by the experts is reliable or consistent because the ICC value is more than 0.70, so the assessment results can be accounted for (Herwin & Mardapi, 2017). This shows that the three character assessment instruments exceed the minimum requirements specified (Kubiszyn, T., & Borich, 2013). In other words, character assessment instruments can be relied on as assessment tools because they contain tolerable error values or indices (Kaplan & Saccuzzo, 2018). So, these assessment instruments can measure students' character consistently.

The next validity test is construct validity. This test involved 200 high school students in Wonosobo district. The results of student and teacher responses to the results of student character assessments were analyzed with CFA. The initial stage before conducting the construct validity test with CFA. Then, the KMO-MSA and Bartlett's tests were first carried out. The KMO-MSA test aims to see the adequacy of the sample Meanwhile, the Bartlett test functions to prove data homogeneity. The results of the KMO-MSA test and the Bartlett test are presented in Table 4.

Table 4. KMO test and bartlett's test

KMO and Bartlett's Test		**TA**	**PA**	**SA**
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.805	0.810	0.785
Bartlett's Test of Sphericity	Approx. Chi-Square	2426. 6	2414.7	2550. 9
	df	435	435	435
	Sig.	.000	.000	.000

Table 4. Shows the values of *Kaiser-Meyer-Olkin Measure of Sampling Adequacy* character assessment instruments consisting of Teacher Assessment (TA), peer assessment (PA), and Self Assessment (SA) are more significant than 0.5, and the significance value of 0.000 is less than 0.05. Thus, the 200 samples in the trial meet the assumption of sample adequacy, and the data is homogeneous. Thus, the test can be done with confirmatory factor analysis. Based on the results of the CFA test, the appropriate model for this is the 2nd ^{Order} Confirmatory factor analysis model. The model fit test can be seen in Table 5.

Table 5. Results of the 2nd Order CFA instrument model fit test

Testing	Criteria	TA	PA	SA
P-value	≥ 0.05	0.207	0.1467	0.0813
RMSEA	≤ 0.08	0.017	0.019	0.023
Chi-Square	< 2df	413< 2df (391)	420< 2df (391)	430< 2df 391
Comparative Fit Index (CFI)	≥0.95	0.98	0.98	0.98
SRMR	≤ 0.09	0.055	0.056	0.060
Incremental Fit Index (IFI) =	≥0.90	0.98	0.98	0.98
Non-Normed Fit Index (NNFI)	≥0.95	0.98	0.98	0.97

Table 5. presents the results of the model fit test for three types of assessments: Teacher Assessment (TA), Peer Assessment (PA), and Self-Assessment (SA). The evaluation of model fit was based on several established statistical criteria. The p-value for all assessment types met the minimum requirement of e" 0.05 (TA = 0.207; PA = 0.1467; SA = 0.0813), indicating that the models did not differ significantly from the observed data, thus supporting overall model fit (Brown, 2014; Harrington, 2009; Thompson, 2004). The RMSEA values for TA (0.017), PA (0.019), and SA (0.023) were all below the threshold of d" 0.08, which indicates a strong model fit. RMSEA is considered one of the most informative indicators of model fit (Yuniarti & Soenarto, 2016). The Chi-Square values for all three assessments were less than 2 times the degrees of freedom (e.g., TA = 413 < 2df (391)), satisfying the criterion for a small Chi-Square value (Arbuckle, 1997). The Comparative Fit Index (CFI) for all assessment types was 0.98, well above the acceptable minimum of 0.95, indicating a very good fit (Arbuckle, 1997). Similarly, the Standardized Root Mean Square Residual (SRMR) values for TA (0.055), PA (0.056), and SA (0.060) met the criterion of d" 0.09 (Hair et al., 2010). The Incremental Fit Index (IFI) and Non-Normed Fit Index (NNFI) also showed strong results, each reaching or approaching the threshold of e" 0.95. indicating excellent model fit (Bentler & Bonett, 1980; Hu & Bentler, 1999). Since all goodness-of-fit indicators support the model, the next step involved analyzing the loading factor values of each manifest variable. The results showed that all loading factors exceeded the critical value of 0.3 (Hair et al., 2010), indicating that all items were valid and effectively measured their respective latent variables. This confirms that the instrument items are statistically reliable and appropriate for character assessment.

In addition to being valid, the instrument must exceed the minimum reliability coefficient; reliability is the instrument's stability when repeatedly used as a measuring instrument (AERA., 2014; Gregory, 2015). An instrument with a good reliability coefficient means that the instrument is stable as an assessment tool; stability is needed so that it can be carried out at any time and someone can produce the same value; reliability is defined as referring to the level of freedom of a test from measurement error (Kaplan & Saccuzzo, 2018). Construct reliability is related to the instrument's consistency in measuring a person's ability empirically. It is estimated by considering the loading factor value (5Øß) and the measurement error index or error of each manifest. One formula for finding the construct reliability index is the *Composite Reliability* (CR) analysis. The results of construct reliability estimation with CR analysis can be seen in Table 6.

Table 6. Composite reliability of character assessment instruments

Model	CR Specific						CR Total
	IMTQ	BKG	GTR	MDR	BKRS	KRTF	
Teacher Assessmen	0.82	0.82	0.84	0.85	0.81	0.81	0.80
Peer-Assessment	0.75	0.79	0.79	0.79	0.80	0.83	0.80
Self-Assessment	0.83	0.81	0.80	0.85	0.82	0.81	0.77

*p>0.7

The composite reliability *of student character assessment* instruments (Moore & Brown, 2012).) in the 2nd order model is more significant than 0.70, meaning that the *character assessment instrument item* has met the minimum requirements of a construct to be said to be reliable because its value is above 0.7 (Nunnally & Bernstain, 1994). The internal consistency calculated by the Cronbach's alpha coefficient is 0.859 which is reliable, the instrument is worthy of being used for further research.

Web-Based Assessment Development

Web-based character assessment is developed based on the system workflow by considering user access rights, assessing steps, and analyzing results. Users consist of admins, namely system managers, teachers, system managers, users, and students, each with different access rights. Furthermore, the design that has been made is combined with existing Web development *tools*. In this Web application, the programming language used on the server side is PHP, while for the client side, it uses HTML, CSS, and Javascript, and from the database side, it uses MySQL. The WBA flowchart can be seen in Figure 3. Next, the media will be implemented by inputting the instrument into the WBA and conducting a trial on the media that has been developed. The results of this trial are used to identify the weaknesses and strengths of the WBA so that further improvements and developments can be made. *Web-based Assessment media developer* s conduct quantitative assessments by testing the algorithm, performance or use, and media display by asking nine experts in the field of web media to assess the quality of the WBA, the results of which can be seen in Table 7.

Table 7. Web-based assessment validation results

Assessment indicators	Aiken Index	Information
The program script has been compiled according to the design	0.972	Valid
The program script has been compiled according to its algorithm.	0.972	Valid
The formulas and formulas are based on the theory and are believed to give correct results.	0.944	Valid
The procedures, functions, and user interfaces that were built are pretty straightforward.	0.806	Valid
Procedures, functions, and user interfaces are built communicatively and quickly.	0.972	Valid
Completeness of facilities that support model operations	0.972	Valid
Use of language used	0.972	Valid
The suitability of character assessment models for measuring student character	0.833	Valid

Accurate text size is used	0.944	Valid
Clarity of text size for reading	0.972	Valid
Accuracy of text form	0.972	Valid
Text color accuracy with *background*	0.972	Valid
Average	**0.941**	**Valid**

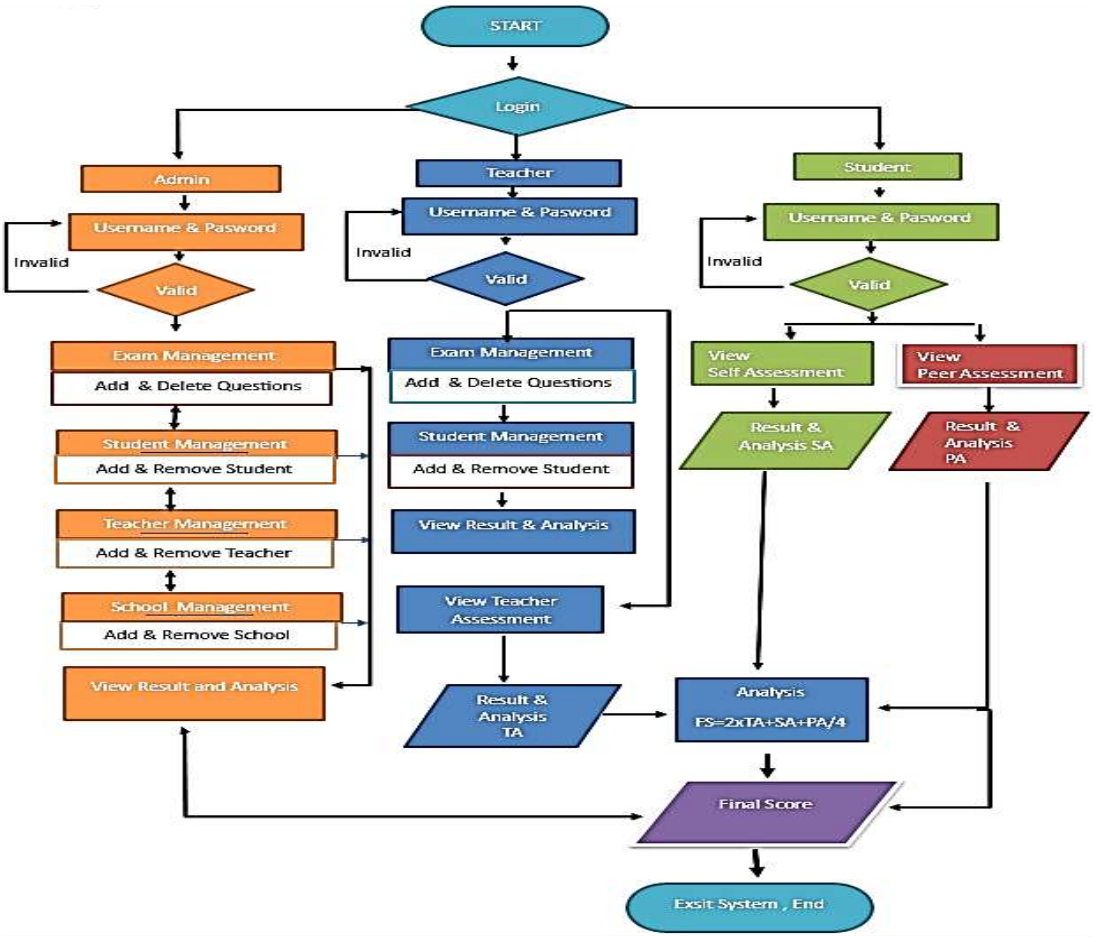

Figure 1. WBA flowchart

Shows the results of the assessment of WBA media experts on character assessment, which is categorized as valid in terms of logarithmic functionality, usage performance, and appearance. The average content validity of 0.941 is more significant than V-table = 0.74. So, WBA media is a valid character assessment tool that can be used in the character assessment process in high school. Estimates of inter-rater reliability in providing assessments can be determined using *Intraclass Correlation Coefficients (ICC).* The output results of the ICC analysis obtained a value of 0.889 > 0.7, which means it is reliable. Figure 2. shows the Web-based Assessment of CharactEr after improvements have been made and implemented.

The home page displays information related to the measured character profile, developer data, assessment guide, and log-in/Sign-up page. For more details, please visit the website https://www.cbt - character.com.

The second page displays the Log-in/Sign-Up page. Figure 4 shows the Teacher & Peer Assessment Assessment page.

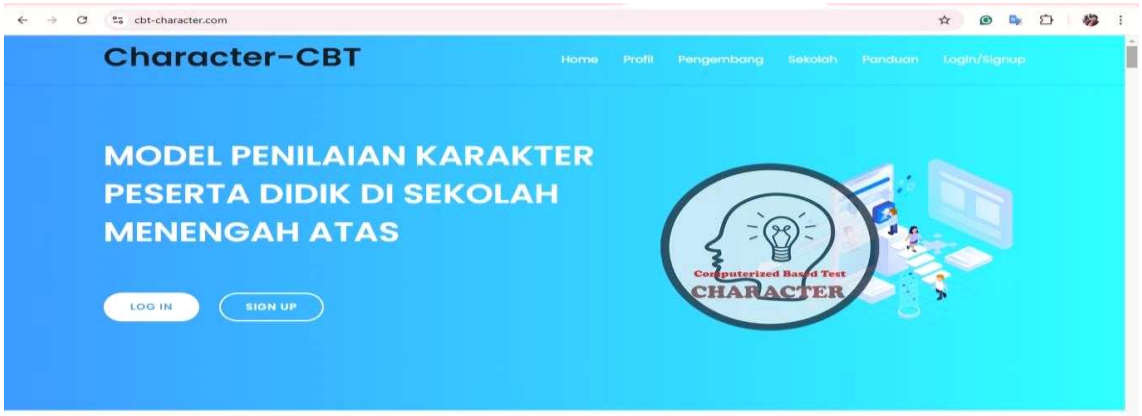

Figure 2. Home page view

Figure 3. Second page view

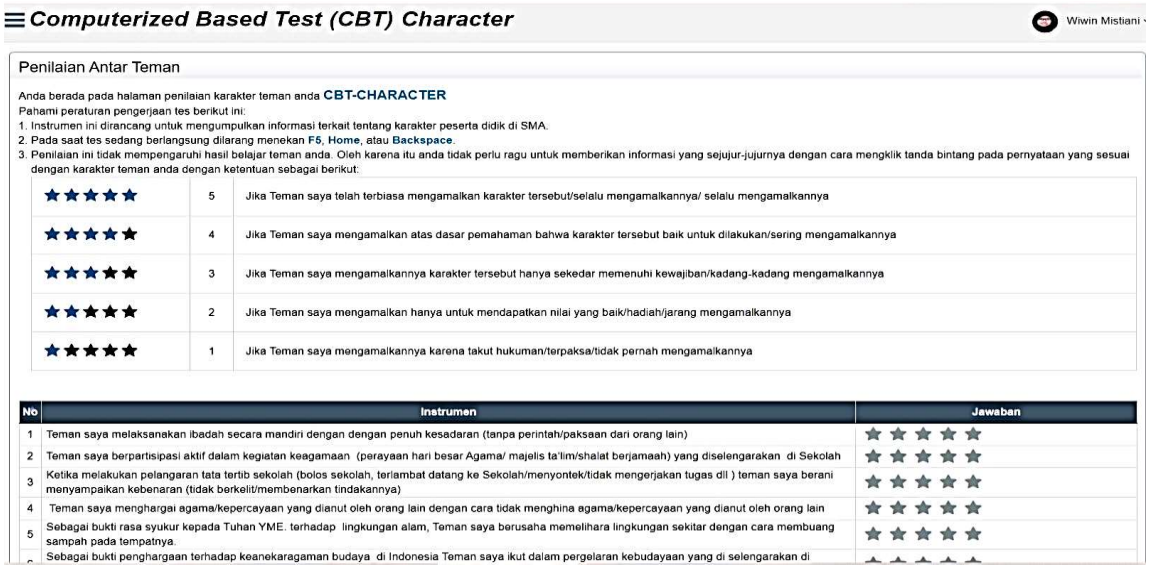

Figure 4. View of the teacher assessment & peer assessment page

The instrument displayed on teacher and peer assessment is observation, with a star rating of 1-5 stars. The criteria are five stars if it is customary/always done, four stars often, three stars sometimes, two stars rarely, and one star never done. The appearance of the Self-Assessment assessment page can be seen in Figure 5.

The self-assessment page is a Questionnaire with 5 assessment scales. The assessment result report page can be seen in Figure 6.

The assessment results report page displays the results from the three types of assessments carried out, namely teacher assessment, peer assessment, and self-assessment, so that the results are more comprehensive.

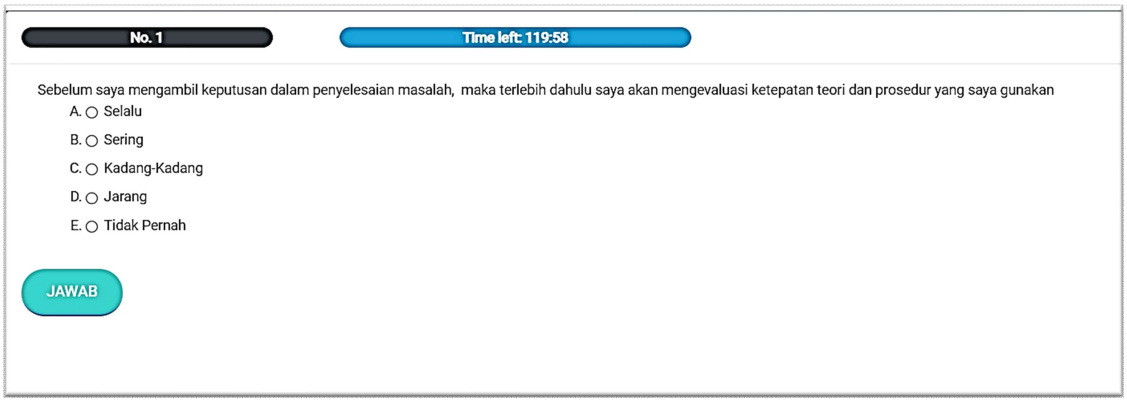

Figure 5. Self assessment page view

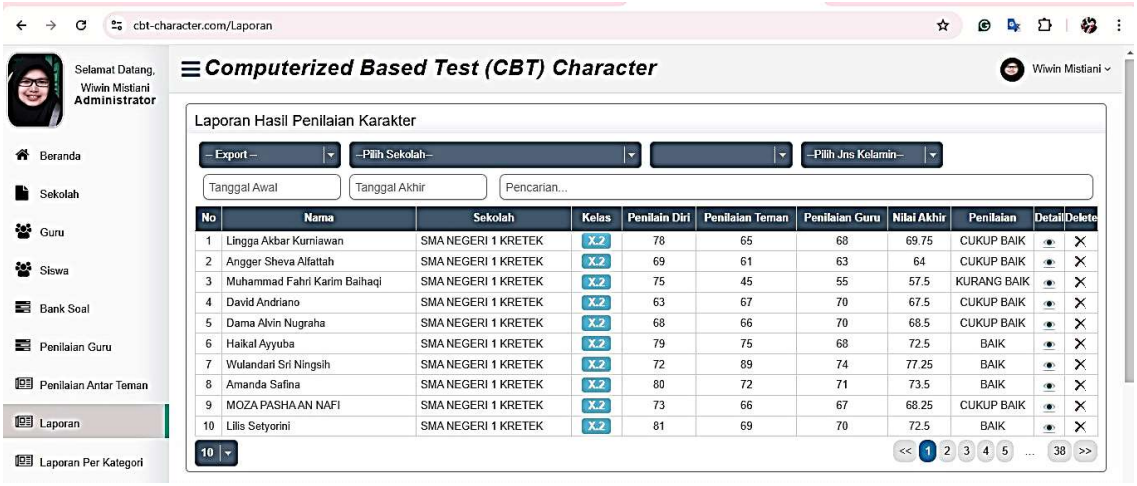

Figure 6. Assessment report view

Practicality of Web-Based Assessment

The practicality of Web-based character assessment to be implemented is one aspect of Web quality testing (Nieveen, 1999; Plomp & Nieveen, 2010). There are several indicators of model practicality, including a model that is said to be practical if the product can be applied by users (Nieveen, 1999) meets aspects of ease, flexibility and, adaptiveness, and efficiency (Akbar, 2013; Hobri, 2010), friendly and easy-to-use interface (Yaumi, 2018). Practicality measurement is based on the opinions of 50 high school teachers in Wonosobo Regency as users of Web Based AssessmentThis assessment involved 50 Web-using teachers. The data collected based on the assessment results are shown in Table 8.

Table 8. Practicality of web-based assessment

Model Indicator	%Value	Information
Facilities (convenience)		
The WB A model can be accessed easily and quickly without requiring high technical skills.	85	Practical
A user interface model is simple and easy to use.	86	Very practical
Automation of the WBA model facilitates collecting, managing, and analyzing assessment results.	86	Very practical
Administration of assessment results can be done easily	88	Very practical
Flexibility		
A model instrument format can be changed according to assessment needs.	86	Very practical
Scheduling of research time and location can be adjusted to user needs.	86	Very practical
The WBA model can adapt to a variety of devices (computers, tablets, and smartphones)	86	Very practical
Efficiency		
Speed in obtaining assessment results	85	Practical
Speed in providing feedback on assessment results	87	Very practical
Reducing paper usage	87	Very practical
Save on energy usage	85	Very practical
Average	86	Very practical

Table 8. The practicality indicators covering ease, flexibility, and efficiency of the model have proven to be very practical for measuring student character, with an average value of 86%. This result indicates a high level of practicality, especially when compared to similar studies in the field of web-based assessment. For example, a study by Antal & Koncz (2011) evaluating a web-based self-assessment tool for student discipline showed a practicality rating of 78%. These comparisons suggest that the model developed in this study demonstrates a superior degree of practical usability, particularly in terms of teacher-perceived ease of use and efficiency. Moreover, this level of practicality supports the model's feasibility for widespread implementation in classroom settings. The consistently high ratings across different indicators align with the key recommendations in previous WBA development literature, which emphasize simplicity of interface, user adaptability, and time-saving features as crucial components for teacher adoption (Muller et al., (2023).). In summary, the practicality rating of 86% places this model within the "very practical" category, and even slightly ahead of benchmarks reported in related studies, highlighting its promising potential as a scalable tool for character assessment in educational contexts.

Although the Web-Based Assessment (WBA) model has been rated as very practical, several potential challenges may arise in large-scale implementation. One major concern is the digital divide the gap in internet access and device availability across schools and students, particularly in rural or under-resourced areas. According to Warschauer and Matuchniak (2010), disparities in digital access remain a significant barrier to the equitable adoption of educational technology. Similar findings were reported by Haryati & Sukarno (2021) who noted that inconsistent internet connectivity hindered the implementation of online assessments in several Indonesian provinces. Another challenge is the need for ongoing teacher training and support. While the model is designed

to be user-friendly, effective and consistent implementation requires that teachers possess adequate digital literacy (Jayadi et al., 2023). Research by Kennedy, G. (2025) shows that lack of ICT competence among educators can lead to underutilization or misapplication of digital assessment tools.

Therefore, capacity building and professional development must be integral to the implementation plan. Furthermore, the risk of assessment dishonesty particularly in self- and peer-assessment is an important concern. Studies by Yan et al., (2022) indicate that students may exhibit bias in peer assessments, or provide insincere responses in self-evaluations. Without adequate supervision or verification mechanisms, these practices may compromise the integrity of the data collected. To mitigate this, hybrid models combining teacher evaluation with digital assessment are recommended (Alimyaningti et al., 2024). In conclusion, while the developed WBA model demonstrates a high level of practicality and user acceptance, its effective implementation on a broader scale must address these structural and pedagogical challenges. Ensuring equitable access, supporting teacher readiness, securing data management systems, and maintaining assessment integrity are all critical components for sustainable deployment.

■ CONCLUSION

The results of this investigation indicate that the web-based character assessment for Pancasila students in senior high schools that was created was both practical and of high quality. Content validation by experts and empirical testing results demonstrate the Web-Based Character Assessment's reliability and validity, as well as its practicality. Character assessment using three types of teacher, peer, and self-assessment assessments can provide comprehensive information on the characters being measured. This study produces a character assessment instrument that is both valid and dependable for Pancasila students. so that teachers can use it as a guide in character assessment. Apart from that, this research also produces a web-based evaluation that can be used to collect data quickly and accurately, making it easier for teachers to work on taking, collecting, checking, analyzing, and reporting results and making decisions.

However, this study has several limitations, including that it has not presented the results of character assessment using the three categories of assessment (Teacher, peer, and self-assessment).

■ REFERENCES

Abass, O. A., Olajide, S. A., & Samuel, B. O. (2017). Development of web-based examination system using open source programming model. *Turkish Online Journal of Distance Education*, *18*(2), 30–42. https://doi.org/10.17718/tojde.306555

Abidin, A. Z., Istiyono, E., Fadilah, N., & Dwandaru, W. S. B. (2019). A computerized adaptive test for measuring the physics critical thinking skills. *International Journal of Evaluation and Research in Education*, *8*(3), 376–383. https://doi.org/10.11591/ijere.v8i3.19642

AERA. (2014). Standards for educational and psychological testing. American Education Research Association.

Agboola, A., & Tsai, K. C. (2012). Bring character education into classroom. *European Journal of Educational Research*, *1*(2),163–170. https://doi.org/10.12973/eu-jer.1.2.163

Aiken, L. R. (1985). Three coefficients for analyzing the reliability and validity of ratings. *Educational and Psychological Measurement*, 45(1), 131-142.

Akbar, S. (2013). *Instrumen Perangkat Pembelajaran*. Rosda Karya.

Alimorad, Z., & Saleki, A. (2022). Challenges and opportunities of web-based

assessment in EFL courses as perceived by different stakeholders. *Applied Research on English Language, 11*(2), 177–200. https://doi.org/10.22108/are.2021.129367.1874

Allen, M. J. dan W. M. Y. (1979). Introduction to measurement theory (1st ed.). Waveland Press.

Alruwais, N., Wills, G., & Wald, M. (2018). Advantages and challenges of using eassessment. International Journal of Information and Education Technology, 8(1), 34–37. https://doi.org/10.18178/ijiet.2018.8.1.10 08

Alwi, A., Mehat, M., Izza Arshad, N., Mohd Ariffin, M., & K. Sugathan, S. (2018). Empowering the teaching of malaysian indigenous language via knowledge sharing. *International Journal of Engineering & Technology*, *7*(3.20), 21. https://doi.org/10.14419/ijet.v7i3.20.18725

Andrian, D., Kartowagiran, B., & Hadi, S. (2018). The instrument development to evaluate local curriculum in Indonesia. *International Journal of Instruction*, *1*(14), 921–934. https://doi.org/https://doi.org/10.12973/iji.2018.11458a

Antal, M., & Koncz, S. (2011). Student modeling for a web-based self-assessment system. *Expert Systems with Applications*, 38(5), 5559–5566. https://doi.org/10.1016/j.eswa.2010.10.05

Arbuckle, J. L. (1997). Amos user's guide version 3.6. SmallWaters Corporation.

Asmaranti, W., Syafdi, M. & Dewi, R. (2016). *Pengembangan computer based test (cbt) untuk mengukur kemampuan pemahaman instrumental pada materi segiempat dan segitiga siswa kelas VII SMP.* Universitas Bengkulu.

Austin, Z., Gregory, P. A. M., & Chiu, S. (2008). Use of reflection-in-action and self-assessment to promote critical thinking among pharmacy students. *American Journal of Pharmaceutical Education*, *72*(3).

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness-of-fit in the analysis of covariance structures. *Psychological Bulletin*, *88*(3), 588–606.

Brown, T. A. (2014). *Confirmatory factor analysis for applied research* (2nd ed.). The Guilford Press.

Brown, T. A. (2014). *Confirmatory factor analysis for applied research* (2nd ed.). The Guilford Press.

Bunderson, C.V., Inouye, D.K., & Olsen, J. B. (1989). The four generation of computerized educational measurement. *In Educational Measurement* (3rd ed., p. 28). American Council on Education/ Macmillan Publishing.

Candra. (2022). *Pengembangan instrumen asesmen nilai kebangsaan mata pelajaran pendidikan pancasila dan kewarganegaraan di SMP*. In *Universitas Negeri Yogyakarta*. Universitas Negeri Yogyakarta.

Choi, S. W., & Tinkler, T. (2002). Evaluating comparability of paper-and-pencil and computer-based assessment in a K-12 setting. *Paper Presented at the Annual Meeting of the National Council on Measurement in Education*, *October*, 1–19.

Faizah, U., Zuchdi, D., & Alsamiri, Y. (2019). An authentic assessment model to assess kindergarten students' character. *Research and Evaluation in Education*, *5*(2), 103–119. https://doi.org/10.21831/reid.v5i2.24588

Finch, W. H., & French, B. F. (2019). Psychological, educational and measurement.title. Routledge.

Gable R. K. (1986). Instrumen development in the affective domain. Springer Science and Business Media, LLC.

Hair, J. F. J., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Multivariate data analysis (7th Edition) by Joseph F. Hair, William C. Black, Barry J. Babin, Rolph E. Anderson (z-lib.org).pdf (p. 761).

Harrington, D. (2009). Confirmatory factor analysis. Oxford University Press.

Herwin, H., & Mardapi, D. (2017). An emotion assessment model for Elementary School students. *Jurnal Penelitian dan Evaluasi Pendidikan*, *21*(1), 80–92. https://doi.org/10.21831/pep.v21i1.14504

Hidayat, M., Kurniawan, D. A., Sandra, R. O., & Iqbal, M. (2022). Misconception materials tool: web-based assessment of buoyancy. *6*(2), 237–246.

Hobri. (2010). *Metodologi penelitian pengembangan*. Pena Salsabila.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling: *A Multidisciplinary Journal*, *6*(1), 1–55.

Imtihan, N., Zuchdi, D., & Istiyono, E. (2017). *Analisis problematika penilaian afektif peserta didik madrasah aliyah. Schemata*, *6*(1), 63–80.

Istiyono, E., Dwandaru, W. S. B., Erfianti, L., & Astuti, W. (2020). Applying CBT in physics learning to measure students' higher order thinking skills. *Journal of Physics: Conference Series*, *1440*(1). 1742-6596. https://doi.org/10.1088/1742-6596/1440/1/012061

Jayadi, U., Harahap, A. ., & Aslan, A. (2024). Educational Landscape in Indonesia in 2023: Challenges and Opportunities. *International Journal of Education and Digital Learning (IJEDL)*, *2*(2), 49–58. https://doi.org/10.47353/ijedl.v2i2.266

Julia, & Supriyadi, T. (2018). The implementation of character education at senior high school. *SHS Web of Conferences*, *42*, 00085. https://doi.org/10.1051/shsconf/20184200085

Kaplan, R. M., & Saccuzzo, D. P. (2018). Psychological testing: Principles, applications, and issues. Cengage Learning.

Kartowagiran, B., & Jaedun, A. (2016). Model asesmen autentik untuk menilai hasil belajar siswa sekolah menengah pertama (SMP). *Jurnal Penelitian dan Evaluasi Pendidikan.*, *20*(2), 132–141.

Kennedy, G. (2025). Integrating ICT in higher education in liberia: a review of challenges, best practices, and opportunities. *Journal of Education and Practice*. *16*(3),14. https://doi.org/ 10.7176/JEP/16-3-14.

Kim, J., & Kamphaus, R. W. (2018). Investigation of factor structure and measurement invariance by gender for the behavioral and emotional screening system among high school students. *Psychological Assessment*, *30*(2), 231–240. https://doi.org/10.1037/pas0000469

Kirana, K., Studi, P., Dan, P., Pendidikan, E., Pascasarjana, P., & Yogyakarta, U. N. (2019). *Pengembangan instrumen penilaian sikap keberpancasilaan siswa sekolah dasar*.

Kubiszyn, T., & Borich, G. (2013). Educational testing and measurement. John Wiley & Sons, Inc.

Lane, S., Raymond, M. R., Haladyna, T. M., & Downing, S. M. (2016). Test development process. (& T. M. H. Lane, M. R. Raymond (ed.). Routledge.

Lilley, M., Barker, T., & Britton, C. (2004). The development and evaluation of a software prototype for computer-adaptive testing. *Computers and Education*, *43*(1-2 SPEC ISS.), 109–123. https://doi.org/10.1016/j.compedu.2003.12.008

Martin, F., & Betrus, A. K. K. (2019). *Digital media for learning: Theories, processes, and solutions.* https://doi.org/10.1007/978-3-030-33120-7.

Martin, Florence., and Anthony Karl Betrus. (2019). Digital media for learning. Switzerland: Springer Nature Switzerland AG.

Mei-Ju, C., Chen-Hsin, Y., & Pin-Chen, H. (2014). The beauty of character education on preschool children's parent-child relationship. *Procedia - Social and Behavioral Sciences*, *143*, 527–533. https://doi.org/10.1016/j.sbspro.2014.07.431

Mistiani, W., Istiyono, E., Syamsudin, A., & Ghazali, N. H. (2024). Developing a Pancasila students' character instrument: Proof of construct validity and estimation of construct reliability. *REID (Research and Evaluation in Education), 10*(2). https://doi.org/10.21831/reid.v10i2.44920

Moore, M. T., & Brown, T. A. (2012). Hoyle cfa chapter - final running head/ : confirmatory factor analysis confirmatory factor analysis Timothy A . Brown and Michael T . Moore Correspondence concerning this chapter should be addressed to Timothy A . Brown , Center for Anxiety & Related Disor. July 2012.

Muller, I., Lown, M., Smith, K. A., Woods, C., & Maund, E. (2023). *Internet tool to support self-assessment and self-swabbing of sore throat: development and feasibility study. Journal of Medical Internet Research, 25*, e39791. https://doi.org/10.2196/39791

Nieveen, N. M. (1999). Prototyping to reach product quality. In *Design approaches and tools in education and training* (pp. 125-135). Kluwer.

Nitko, A. J., & Brookhart, S. M. (2011). Educational assessment of student. Pearson Education, Inc.

Noyes, J. M., & Garland, K. J. (2008). Computer- vs. paper-based tasks: Are they equivalent? *Ergonomics*, *51*(9), 1352–1375. https://doi.org/10.1080/00140130802170387

Nunnally, J.C., & Bernstain, I. . (1994). Psychometric theory (3th Ed). In *McGraw-Hili, Inc*.

Nurhasanah, N., & Nida, Q. (2016). Character building of students by guidance and counseling teachers through guidance and counseling services. *Jurnal Ilmiah Peuradeun*, *4*(1), 65. https://doi.org/10.26811/peuradeun.v4i1.86

O'Malley, K. J., Kirkpatrick, R., Sherwood, W., Burdick, H. J., Hsieh, M.C. &, Sanford, E. E. (2005). Comparability of a Paper Based and Computer Based Reading Test in Early Elementary Grades. *Paper Presented at the AERA Division D Graduate Student Seminar*.

Oriondo, L. L. & Dallo-Antonio, E. M. (1984). Evaluating educational outcomes (tests, measurement and evaluation). Philippiness: Rex Book Store.

Oriondo, L. L., & Antonio, E. M. (1984). Evaluating educational outcomes (Tesis, measurement and evaluation). Manila: REX Printing Company, INC.

Panadero, Ernesto & Brown, Gavin & Strijbos, Jan-Willem. (2016). The future of student self-assessment: a review of known unknowns and potential directions. *Educational Psychology Review. 28*(2), 803-830. https://doi.org/10.1007/s10648-015-9350-2.

Pellegrino, J. W. & Quellmalz, E.S. (2010) 'Perspectives on the Integration of Technology and Assessment'. *Journal of Research on Technology in Education*, 43 (2), 119-134.

Plomp, T., & Nieveen, N. M. (Eds.) (2010). *An introduction to educational design research: Proceedings of the seminar conducted at the East China Normal University, Shanghai (PR China),*

November 23-26, 2007. (3rd print ed.) Stichting Leerplan Ontwikkeling (SLO).

Retnawati, H., Hadi, S., Nugraha, A. C., Arlinwibowo, J., Sulistyaningsih, E., Djidu, H., Apino, E., & Iryanti, H. D. (2017). Implementing the computer-based national examination in Indonesian schools: The challenges and strategies. *Problems of Education in the 21st Century*, *75*(6), 612–633.

Reynolds, C.R., Livingston,Ronald B., & Willson, V. (2013). Measurement and assessment in education. In *Pearson*. https://doi.org/10.2307/1502911

Rokhaniyah, H., & Putra, O. V. (2021). Developing Web-Based Online Test System To Boost Ielts Academic Reading Score. *English Review: Journal of English Education*, *9*(2), 235–244. https://doi.org/10.25134/erjee.v9i2.4348

Saepuzaman, D. (2023). Model asessment as learning berbasis pemahaman dan hots pada pembelajaran fisika dasar bagi mahasiswa program studi pendidikan fisika. In *eprint.uny*. Universitas Negeri Yogyakarta.

Setiawan, A., Mardapi, D., Supriyoko, & Andrian, D. (2019). The development of instrument for assessing students' affective domain using self- and peer-assessment models. *International Journal of Instruction*, *12*(3), 425–438. https://doi.org/10.29333/iji.2019.12326a

Shih, C.-C., Chiang, D. A., Lai, S.-W., & Hu, Y.-W. (2009). Applying hybrid data mining techniques to web-based self-assessment system of Study and Learning Strategies Inventory. *Expert Systems with Applications*, 36(3), 5523–5532. https://doi.org/10.1016/j.eswa.2008.06.132

Shilova, T. V., Artamonova, L. V., & Averina, S. Y. (2014). Computer-based tests as an integral component of an efl course in moodle for non-linguistic students. *Procedia - Social and Behavioral Sciences*, *154*(October), 434–436. https://doi.org/10.1016/j.sbspro.2014.10.187

Supramono, A. (2023). *Pengembangan instrumen penilaian karakter profil pelajar pancasila untuk peserta didik fase b jenjang Sekolah Dasar.* In *UNY*. Universitas Negeri Yogyakarta.

Syamsudin, A., Budiyono, B., & Sutrisno, S. (2016). Model of affective assessment of primary school students. *Research and Evaluation in Education*, *2*(1), 25. https://doi.org/10.21831/reid.v2i1.8307

Thompson, B. (2004). Exploratory and confirmatory factor analysis: Understanding concepts ad application. *American Psychological Association*. https://doi.org/ 10.2478/s11600-010-0006-9

Tooth, J. A., Nielsen, S., & Armstrong, H. (2013). Coaching effectiveness survey instruments: Taking stock of measuring the immeasurable. *Coaching*, *6*(2), 137–151. https://doi.org/10.1080/17521882.2013.802365

Wahyuningsih, S., Zuchron, D., & Purnawinarni, E. (2021). *Tunas pancasila sebagai duta profil pelajar pancasila di sekolah dasar. Direktorat Sekolah Dasar, Kementerian Pendidikan Kebudayaan, Riset Dan Teknologi*, 1–12.

Warschauer, Mark & Matuchniak, Tina. (2010). New technology and digital worlds: analyzing evidence of equity in access, use, and outcomes. *Review of Research in Education.* 34. 179-225. https://doi.org/10.3102/0091732X09349791.

Widoyoko. E. P., (2011). *Teknik penyusunan instrumen penelitian.* Yogyakarta: Pustaka Pelajar

Yan, Z. (2020). Self-assessment in the process of self-regulated learning and its relationship with academic achievement. *Assessment and Evaluation in Higher Education*, *45*(2), 224–238. https://doi.org/10.1080/02602938.2019.

1629390

Yan, Z., Lao, H., Panadero, E., Fernández-Castilla, B., Yang, L., & Yang, M. (2022). *Effects of self-assessment and peer-assessment interventions on academic performance: A meta-analysis. Educational Research Review, 37*, 100484. https://doi.org/10.1016/j.edurev.2022.100484

Yao, Z., & Enright, R. (2020). The influence of moral stories on kindergarteners' sharing behaviour. *Early Child Development and Care*, *190*(6), 891–901. https://doi.org/10.1080/03004430.2018.1499098

Yaumi. (2018). *Media dan Teknologi Pembelajaran*. Kencana.

Yuniarti, Felintina, Pramesti Dewi, R. Susanti. (2012). *Pengembangan virtual laboratory sebagai media pembelajaran berbasis komputer pada materi pembiakan virus. Unnes Journal of Biology Education. 1* (1), 86-94.

Zaenal Arifin. (2020). *Metodologi penelitian pendidikan. Jurnal Al-Hikmah*, *1*(1). Retrieved from https://alhikmah.stit-alhikmahwk.ac.id/index.php/awk/article/view/16

Zhang, M. F., Dawson, J. F., & Kline, R. B. (2021). Evaluating the use of covariance-based structural equation modelling with reflective measurement in organizational and management research: a review and recommendations for best practice. *British Journal of Management,* 32, 257– 272.

Zurqoni, Retnawati, H., Apino, E., & Anazifa, R. D. (2018). Impact of character education implementation: A goal-free evaluation. *Problems of Education in the 21st Century*, *76*(6), 881–899. https://doi.org/10.33225/pec/18.76.881