

E-Assessment for Character Evaluation in Elementary Schools

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ABSTRACT: This study investigates Elementary School teachers' responses to e-assessment tools for evaluating students' character traits of patriotism, tolerance, and discipline, and compares these traits across three schools. Utilizing a research and development methodology with quantitative data, the sample includes 55 students from Elementary School 034/I Teratai, 58 from Elementary School 045I Sridadi, and 61 from Elementary School 064/I Muara Bulian, selected through purposive sampling. Data were collected using a questionnaire and analyzed with descriptive statistics and one-way ANOVA, followed by Tukey HSD post-hoc tests. Findings reveal that Elementary School 034/I Teratai students scored highest in patriotism (89.11), Elementary School 045I Sridadi students in tolerance (88.41), and Elementary School 064/I Muara Bulian students in discipline (89.20). Significant differences in patriotism and discipline were observed between Elementary School 034/I Teratai and Elementary School 064/I Muara Bulian, and in tolerance between Elementary School 045I Sridadi and Elementary School 064/I Muara Bulian. The e-assessment tool developed was deemed highly valid and feasible for use. The impact of this e-assessment to make it easier for teachers to assess the character of high school students.

Keywords: e-assessment, character, elementary school.

I. INTRODUCTION

The fast advancement of digital technology and modern human life are inextricably linked. Education has been impacted by the rapid evolution of digital technology [1, 2]. The advent of digital technology has become a formidable challenge for the realm of education [3, 4]. To overcome these challenges, the education sector must begin to adjust educational strategies to the rapid development of digital technology at this time [5-7]. The rapid development of digital technology today has had a lot of influence on the realm of education [8-10]. The influence given by digital technology is not only a positive influence, but also a negative influence [11, 12]. With this influence, educators must be ready to assist students in utilizing digital technology [13, 14]. Digital technology does not only allow the transfer of knowledge. Digital technology also facilitates collaborative learning. Collaborative to help create and facilitate understanding between teachers and students [15, 16]. With digital technology, it will facilitate all human activities in accessing all information [17, 18]. The digital technology that can be used in the realm of education is e-assessment.

Currently, teachers are in an era of digitalization that is so sophisticated and rapidly developing. All educational activities cannot be separated from the use of digital technology [19, 20]. In the teaching and learning process in schools, the most important thing to do is assessment [21, 22]. At this time there are still many teachers who use the conventional assessment system. Assessment with the conventional system can be

said to be less effective in its use [23, 24]. The need for renewal of the assessment system that utilizes digital technology in the process [25, 26]. With the existence of a digital assessment system, it will create a more accurate and time efficient assessment system [27]. The digital technology that can be used by teachers in conducting assessments is by using e-assessment technology [28, 29]. E-assessment is a digital technology that refers to the assessment process [30, 31]. This e-assessment technology is a forum for learning and assessment process activities [32, 33]. The existence of e-assessment technology will facilitate the work of teachers in conducting assessments [34]. Digital e-assessment technology will greatly help teachers in the realm of education. This is supported by the rapid development of digital technology at this time [35, 36]. E-assessment technology can also provide feedback quickly and accurately [37]. That way, teachers will be able to save time in conducting assessments, and students will get their results in real time [38-40]. Therefore, digital e-assessment technology can be used as a technology that can be used by teachers in conducting the assessment process in schools.

In the realm of education, the main component that supports all activities in the educational process is assessment. Assessment using digital e-assessment technology provides its own benefits in supporting all learning activities. With the e-assessment, it will support and make it easier for teachers to assess student character [41]. Character assessment using e-assessment provides so many benefits [42]. One of the benefits of using this e-assessment is that it can save time and avoid excessive paper waste [43, 44]. Then, with the use of e-assessment, students and teachers interact with each other without having to meet [45, 46]. Furthermore, e-assessment technology will be able to store data automatically and permanently [47]. That way, teachers don't have to worry if student data will be lost [48, 49]. So, it can be said that the application of digital e-assessment technology provides a lot of convenience and helps teachers in conducting character assessments in the process of learning activities.

Character is an embodiment of controlled behavior, with this it is necessary to know how the competence of the embodiment of the character is. The character values possessed by students are the character of patriotism, tolerance, and discipline [50]. In order for the character of patriotism, tolerance, and discipline to be realized, it is necessary to evaluate the character in the form of an e-assessment [51]. Using e-assessment will assist teachers in assessing the character of patriotism, tolerance, and student discipline. With that, it will create the character of patriotism, tolerance, and student discipline in the process of learning activities [52-55]. From the explanation above, it can be said that with the existence of digital e-assessment technology, it is very necessary in the realm of education [37, 56-58]. E-assessment can be used as an assessment of the character of patriotism, tolerance, and student discipline and can also be used as a place to find out how the character of patriotism, tolerance, and discipline possessed by students during the learning process takes place.

The development of character assessment using digital e-assessment technology has been widely used in various studies. The research conducted by Jeynes shows that character education is emphasized on values that need to be understood and applied by students which include a sense of responsibility and discipline [54]. Then, research conducted by Alshehri, where the research shows that by using e-assessment in conducting character assessments, the results of the student character test show a good response [59]. Furthermore, the research conducted Taslidere explained that the character possessed by students can affect the activities of the learning process at school [60]. Furthermore, research conducted by Fitchett & Heafner, where in the research, student character assessment is carried out using e-assessment as a forum for assessing the character possessed by students [20].

Apart from Indonesia, character assessment has been widely studied in various countries. Research conducted by Zaman et al., explained that students in India are instilled with character values but because of the lack of teacher knowledge in identifying the character values possessed by students, there are still students who have minimal character values [61]. Then, research conducted by Chang et al., shows that the assessment of student character in New York is still using the conventional way, where with this, the teacher has difficulty in assessing the character possessed by students [62]. Furthermore, research conducted by Motlhabane shows that there are still many students in Africa who experience minimal character values due to the difficulty of teachers in conducting these character assessments [63].

From previous research that has discussed character to the use of digital e-assessment technology, it can be seen that there are still many studies that use conventional methods in conducting character assessments. Yet at this time, digital technology has developed very rapidly. Online assessment evaluation systems are very important because they allow more efficient, accurate and faster data collection than traditional

methods. With e-assessment, teachers can assess student character such as patriotism, tolerance and discipline in a more objective and structured manner [64]. In addition, e-assessment makes it easy to manage and analyze data, which helps in identifying individual student needs and designing more appropriate educational interventions. The use of technology in assessments also increases transparency and consistency, and allows for quicker feedback to students and parents. With this, it is necessary to evaluate the assessment system in schools in assessing the character of patriotism, tolerance, and discipline possessed by students. E-assessment technology will greatly assist teachers in assessing the character of patriotism, tolerance, and discipline possessed by students at school.

In this study, the main problem is how the e-assessment system can be used for the personal development and character of university students in a lively and better way. The following are considered as main objectives of this study:

- In the personality and character of university students, take the views of e-assessment and study the working method in a better way.
- Think more about the personality and character of university students using digital e-assessment technologies.
- The users of e-assessment in the system, provide assurances and reviews for the personality and character of university students.

II. LITERATUR REVIEW

Assessment technology has revolutionized the educational landscape by introducing innovative methods for evaluating student performance and understanding. Traditional paper-based assessments have been supplemented or replaced by digital tools that offer greater efficiency, accuracy, and flexibility [65]. These technologies include computer-based tests, online quizzes, e-portfolios, and formative assessment tools that provide immediate feedback. The advantages of using assessment technology are numerous: it enables the collection of a large amount of data in a short period, facilitates personalized learning experiences, and enhances the engagement and motivation of students through interactive and adaptive assessments [66]. Moreover, e-assessments can be analyzed using sophisticated algorithms, providing detailed insights into student learning patterns, strengths, and areas needing improvement [67]. The shift towards digital assessment tools aligns with the broader trend of integrating technology into education, preparing students for a digitally-driven world.

Character education is an essential component of holistic education, aiming to develop ethical, responsible, and caring individuals [68]. This educational approach focuses on instilling core values such as respect, responsibility, fairness, citizenship, and trustworthiness. Schools play a crucial role in character education by creating an environment that promotes positive behavior and ethical decision-making [69]. Effective character education programs integrate these values into the curriculum through activities, discussions, and role-playing exercises that reflect real-life situations [70]. Research indicates that character education not only improves students' moral development but also positively impacts their academic performance, social relationships, and emotional well-being [71]. By fostering a strong ethical foundation, character education helps students navigate complex social landscapes and contributes to the development of a cohesive and compassionate society.

E-assessment (e-assessment) is necessary because it prepares to monitor knowledge and well-being in a real and formal way. Online e-learning can give us the relevance of the world and the extra time we need to observe and understand the performance of our students. At the beginning of the development, e-understanding can make students look good and continuously, especially that it has the power to bring about the responsibility of participation and making someone's understanding. Also, e-understanding can provide the latest and innovative knowledge through relevance, to increase knowledge according to the way they want and the understanding of which one wants the best. In fact, e-comprehension offers great

advice for changing the responsibility of students, especially because it can give new challenges and feedback on character traits and rebellion.

III. MATERIAL AND METHOD

Development research is the kind of research used in this study. The development that has been done is the creation of an electronic assessment, or e-assessment, which is a web-based assessment. The present development employs R&D (research and development) methodology, specifically utilizing the ADDIE model. The ADDIE is a development model that supports systematic product development in the education [72]. The outline of the ADDIE development model is presented in figure 2. The ADDIE consists 5 five primary phases, that are: Analysis, Design, Development, Implementation and Evaluation [73]. Specifically, in order to bolster the ADDIE development model, this study employed the quantitative analysis method [74].

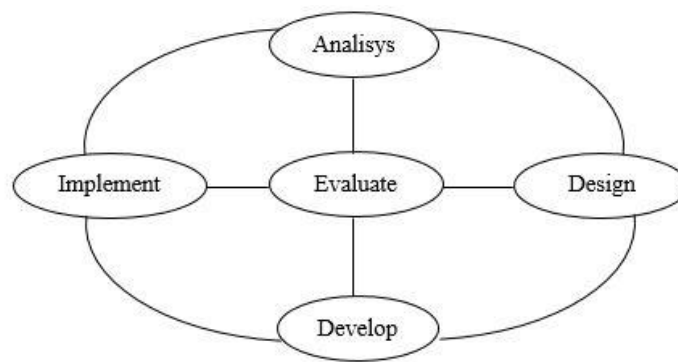


FIGURE 1. ADDIE development model

1. PARTICIPANTS

The population in this study were all students at Elementary School (Public Elementary School), Elementary School 034/I Teratai, Elementary School 045i Sridadi, Elementary School 064/I Muara Bulian. The consisted of high grades, that are grades four, five, and six at Elementary School 034/I Teratai as many as 55 students, at Elementary School 045I Sridadi as many as 58 students, and at Elementary School 064/I Muara Bulian as many as 61 students obtained by using purposive sampling technique. For the selection of samples using purposive sampling, namely a sampling technique that goes through certain stages of consideration and then selected through the consideration of researchers that the sample is a source that provides quality information. Researchers have certain criteria that the sample must meet, such as being in fourth, fifth and sixth grades. This criterion is important because researchers want to assess the character of students at the same educational level to obtain more consistent and relevant results.

2. INSTRUMENTS

The instruments in here were used to collect quantitative data. Quantitative data comes from character assessment and validation of media experts. The instrument utilized in this study attempts to ascertain how the outcomes of students' character assessments regarding their discipline, tolerance, and patriotism relate to e-assessment-based character assessment in schools. The questionnaire grid for the character of patriotism, tolerance, and discipline is shown in the Table 1.

Table 1. Character questionnaire grid

Variable	Sub Variable	Items
Patriotism	Loyalty to the country	1, 2, 3, 4
	Deep feelings towards the homeland of blood	5, 6, 7, 8
	Awareness of a call to the country	9, 10
	Open minded	11, 12
	Feeling as one nation	13, 14
	Loyalty to the country	15, 16
	Recognizing diversity	17, 18
	Agreement to live together	19
	The same hope in the future	20
	Feeling have the same fate	21
Tolerance	Care	1, 2, 3
	Fearlessness	4, 5
	Love	6, 7, 8
	Respect each other	9, 10
	Appreciate the differences of others	11
	Appreciate yourself	12, 13
	Appreciate the kindness of others	14, 15
	Open minded	16
	Receptive	17
	Comfort and life	18, 19
Discipline	Comfort with others	20, 21
	Time discipline	1, 2, 3, 4, 5, 6, 7
	Discipline enforce the rules	8, 9, 10, 11, 12
	Attitude discipline	13, 14, 15, 17
	Discipline of worship	18, 19, 20, 21

Meanwhile, to validate the product, a media expert validation questionnaire was used, where the media expert validation questionnaire was adapted from research Hanum which contains 35 statements with 5 Likert scales, while the grid from the media expert validation questionnaire can be seen in table 2.

Table 2. Media expert grid

Variable	Indicator	Item
Functionality	1. Suitability	3, 7, 8, 9
	2. Accuracy	4, 5, 6
	3. Fulfillment	1, 2
Reliability	1. Maturity	15, 16
	2. Fault tolerance	10, 11, 12
	3. Recovery	13, 14
Usability	1. Ability to understand	18, 19, 20, 23
	2. Ability to learn	26, 27
	3. Operation	17, 21, 22, 24, 25
Efficiency	1. Time	28, 29
	2. Real time	31, 32, 34
	3. Resources	30, 33, 35

After the expert validation questionnaire was collected, the results from the validator for media validation will be obtained according to the variables that have been in accordance with the grid. Then conduct interviews with teachers as users of the developed e-assessment to complete validation of product.

3. DATA COLLECTION AND ANALYSIS

Following the acquisition of the questionnaire responses, both descriptive and inferential data were used in the analysis of the results. A method of gathering data that is related to breaking down and giving information about data is called descriptive data. Because descriptive includes the mean, median, mode, maximum, and minimum frequencies, it can be used to explain the current status of the data. Frequency is a series of numerical data based on their quantity and qualities which are arranged sequentially [75]. The mean is the average value of the data to see how the overall data [76, 77]. The median is the middle value of the data after the data is sorted and the average when viewed from its location in the data sequence [78], [79]. The mode is the value that occurs most often [80]. The maximum value is the highest value while the minimum value is the lowest value from the data that has been obtained [81, 82].

Inferential data management techniques consist of hypothesis testing. Before implementing the hypothesis, the data that has been obtained should be tested for requirements using normality and homogeneity tests. The Normality Test is carried out to ensure that the data obtained has a normal distribution. The Homogeneity Test is carried out to ensure that the variance between groups of data being compared is homogeneous or uniform. After testing the prerequisite data, the next step is to test the hypothesis using the ANOVA test. ANOVA is used to compare means between three or more groups to determine whether there are significant differences. After that, data was collected through interviews which were used to complement and strengthen the quantitative data.

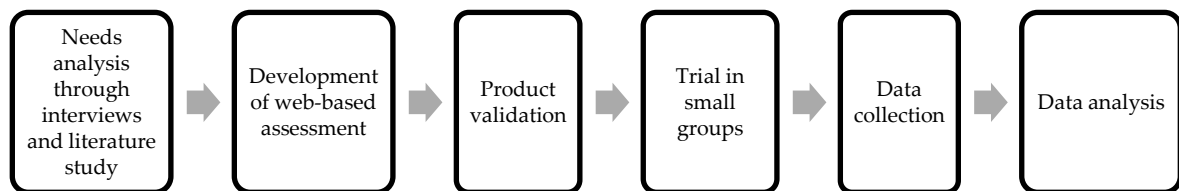


FIGURE 2. Data collection procedure

In our priority, all the statistical methods with which we collect our data are relevant. We use statistical methods with thousands of models of statistical methods, for example ANOVA and Tukey HSD tests, in order to reduce the positivity of all a little, especially the shares that research in understanding. All of our studies are based on the proposed details about the definition of normality and homogeneity and their acceptance, which is necessary for the positiveness of the data by following all the recommendations of this model. On the local statistical properties, we will be in competition with the following signs of the determination of normality and homogeneity. We also support the significant features of the effect size in the ANOVA and Tukey HSD results. Our research is not limited to the cognitive positive proposition. We have not learned about these shortcomings with the characteristics of reading and finance and their two additional methods.

IV. RESULTS AND DISCUSSION

1. FINDINGS

E-assessment was developed to measure the character specifically for the character of patriotism, tolerance, and discipline has been tested in three different Elementary Schools. Analysis of research data conducted to examine the results of assessing student character when using e-assessment can be seen from the description of the mean, median, mode, minimum and maximum score. The result of the students' character when using the e-assessment is shown in Table 3.

Table 3. The result of the students' character

Variable	Sub Variable	School		
		Elementary School 034/I Teratai	Elementary School 045i Sridadi	Elementary School 064/I Muara Bulian
Patriotism	Loyalty to the country	Mean: 89.11	Mean: 87.22	Mean: 86.28
	Awareness of a call to the country	Median: 90	Median: 88	Median: 87
	Open minded	Mode: 91	Mode: 89	Mode: 86
	Feeling as one nation	Min score: 76	Min score: 73	Min score: 73
	Loyalty to the country	Max score: 101	Max score: 95	Max score: 92
	Recognizing diversity			
	Agreement to live together			
Tolerance	The same hope in the future			
	Feeling have the same fate			
	Care	Mean: 87.15	Mean: 88.41	Mean: 86.05
	Fearlessness	Median: 87	Median: 89	Median: 87
	Love	Mode: 86	Mode: 89	Mode: 88
	Respect each other	Min score: 75	Min score: 74	Min score: 70
	Appreciate the differences of others	Max score: 100	Max score: 95	Max score: 93
Discipline	Appreciate yourself			
	Open minded			
	Receptive			
	Comfort with others and life			
	Time discipline	Mean: 87.60	Mean: 85.88	Mean: 89.20
	Discipline enforce the rules	Median: 87	Median: 86	Median: 89
	Attitude discipline	Mode: 86	Mode: 85	Mode: 88
Discipline	Discipline of worship	Min score: 76	Min score: 71	Min score: 70
		Max score: 102	Max score: 95	Max score: 97

The researchers conducted prerequisite tests in the form of a normality test to determine whether the data is normally distributed or not and also homogeneity test to determine whether the data is normally distributed or not, and also to prove some populations have the same variance or not. The results of the normality test are shown in the Table 4.

Table 4. Normality and Homogeneity test results

Character	School	Sig. Normality test results	Sig. Homogeneity test results
Patriotism	Elementary School 034/I Teratai	.103	.174
	Elementary School 045i Sridadi	.091	
	Elementary School 064/I Muara Bulian	.081	
Tolerance	Elementary School 034/I Teratai	.079	.197
	Elementary School 045i Sridadi	.098	
	Elementary School 064/I Muara Bulian	.088	
Discipline	Elementary School 034/I Teratai	.093	.181
	Elementary School 045i Sridadi	.083	
	Elementary School 064/I Muara Bulian	.200	

Based on the data analysis in Table 4, that the significance value (Sig.) of the third character > 0.05 , as the basis for decision making in the homogeneity test, it can be concluded that the variance of the data on the character of the three schools is the homogeneous. After the data is normally distributed and homogeneous, a hypothesis test is carried out, namely the ANOVA test. The results of the ANOVA test can be observed in Table 5.

Table 5. One way ANOVA test results

Character		Sum of Squares	df	Mean Square	F	Sig.
Patriotism	Between Groups	237.783	2	118.892	5.119	.007
	Within Groups	3971.694	171	23.226		
	Total	4209.477	173			
Tolerance	Between Groups	166.357	2	83.179	3.461	.034
	Within Groups	4109.758	171	24.034		
	Total	4276.115	173			
Discipline	Between Groups	327.212	2	163.606	6.660	.002
	Within Groups	4200.995	171	24.567		
	Total	1528.207	173			

Table 5 indicates that a significance value (Sig.) of 0.007 corresponds to the patriotism result. There is a significant difference in the average result of the patriotism character in Elementary School 034/I Teratai, Elementary School 045i Sridadi, and Elementary School 064/I Muara Bulian because the value of Sig. < 0.05 . On the other side, the tolerance character yields a significance value (Sig.) of 0.034. There is a significant difference in the average tolerance character result in Elementary School 034/I Teratai, Elementary School 045i Sridadi, And Elementary School 064/I Muara Bulian due to the value of Sig. < 0.05 . The results of additional analysis indicate that the discipline character received a significance value (Sig.) of 0.002. Since

Sig. < 0.05, there is a significant difference in the average discipline character results across Elementary School 034/I Teratai, Elementary School 045i Sridadi, and Elementary School 064/I Muara Bulian. After the tests of normality and homogeneity were obtained, a hypothesis test was performed with ANOVA. It is the follow-up that the blood places of the success test are between the boards of the example of visiting the card. Additional testing is required to determine which schools use e-assessment to measure character in a way that differs significantly on average. Further testing can be done by post hoc test with Tukey HSD test. The results of the Tukey HSD patriotism character are shown in the table 6.

Table 6. Tukey HSD test results on the character patriot, tolerance, discipline

(I) School	(J) Scholl	Patriotism		Tolerance		Discipline	
		Mean Difference (I-J)	Sig.	Mean Difference (I-J)	Sig	Mean Difference (I-J)	Sig
Elementary School 034/I Teratai	Elementary School 045i Sridadi	1.885	.097	-1.268	.356	1.721	.158
	Elementary School 064/I Muara Bulian	2.830*	.005	1.096	.456	-1.597	.196
Elementary School 045i Sridadi	Elementary School 034/I Teratai	-1.885	.097	1.268	.356	-1.721	.158
	Elementary School 064/I Muara Bulian	.945	.534	2.365*	.025	-3.317*	.001
Elementary School 064/I Muara Bulian	Elementary School 034/I Teratai	-2.830*	.005	-1.096	.453	1.597	.196
	Elementary School 045i Sridadi	-.945	.534	-2.365*	.025	3.317*	.001

Based on Table 6 the average difference in the character of patriotism is between Elementary School 034/I Teratai and Elementary School 064/I Muara Bulian. The difference in the average tolerance character when using e-assessment is significantly different at Elementary School 045i Sridadi and Elementary School 064/I Muara Bulian. The difference in the average discipline character when using e-assessment at Elementary School 034/I Teratai and Elementary School 064/I Muara Bulian is significantly different. To determine the validity of the developed character e-assessment, it is necessary to do a product validation test. Product validation tests are carried out by experts to assess the products developed so that later the product is ready for use. The product validation test results are shown in Table 7.

Table 7. Product validation test results

N o.	Assessment Aspect	Validator I			Validator II		
		Mean	Percentage	Category	Mean	Percentage	Category
1.	Functionality	3.44	86%	Very Good	3.33	83.33%	Very Good
2.	Reliability	3.33	83.33%	Very Good	3.14	78.57%	Good
3.	Usability	3.28	82%	Very Good	3.40	85%	Very Good
4.	Efficiency	3.20	80%	Good	3.33	83.33%	Very Good
	Overall average	3.31	82.90%	Very Good	3.30	82.56%	Very Good

The results of the e-assessment product to measure the character of Elementary School students are shown in the Figure 3 and 4.

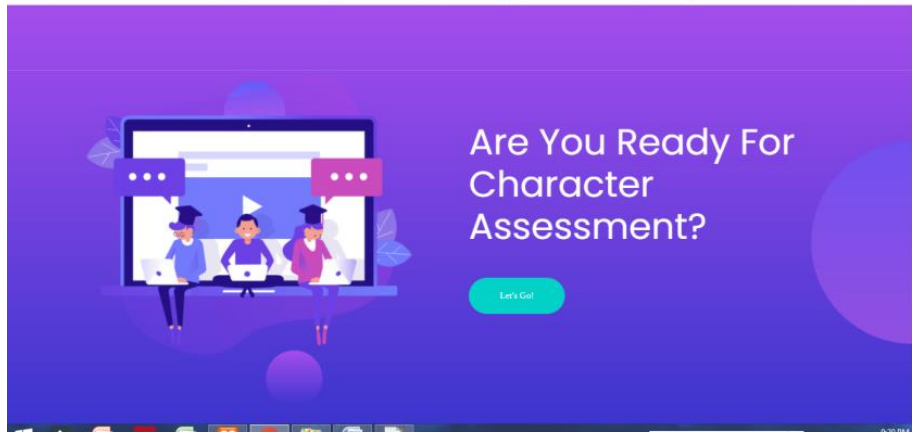


FIGURE 3. View of the Home page of the e-assessment on website



FIGURE 4. View of student character assessment results on website

2. DEVELOPMENT RESULTS FROM ADDIE'S STEPS

2.1 Descriptive Analysis

Descriptive analysis that has been carried out on the character data of patriotism, tolerance, and discipline at Elementary School 034/I Teratai, Elementary School M 045i Sridadi, Elementary School 064/I Muara Bulian were analyzed by comparing the percentages obtained by students based on predetermined criteria so that they can a conclusion is drawn. The outcomes of an e-assessment of the character of patriotism in three Elementary Schools are presented in Table 3. In the very good category, 35 students (63.6% of the total) were enrolled at Elementary School 034/I Teratai, while 20 students (36.4%) were enrolled at the good level. Subsequently, the mode is 91, the minimum score is 76, and the maximum score is 101; the mean is 89.11. Conversely, among the 30 students enrolled in Elementary School 045I Sridadi, 28 students (or 48.3%) achieved a grade of very good, representing a percentage of 51.7% in the good category. Subsequently, the mode is 89, the minimum score is 73, and the maximum score is 95; the mean is 87.22. In addition, Elementary School 064/I Muara Bulian received 43 students (70.5% of the total) rated as good, and 18 students (29.5% of the total) rated as very good. The resulting values are as follows: 86.28 for the mean, 87 for the median, 86 for the mode, 73 for the minimum, and 92 for the maximum.

The result of tolerance character as determined by e-assessment in three the Elementary School (Table 3) explained further. Elementary School 034/I Teratai got 37 students with a percentage of 67.3% in the good category and 18 students with a percentage of 32.7% in the very good category. Then the mean is 87.15, the median is 87, the mode is 86, the minimum score is 75, and the maximum score is 100. Thereunto, Elementary School 045I Sridadi got 37 students with a percentage of 63.8% in the very good category and 21 students with a percentage of 36.2% are in the good category. Then the mean is 88.41, the median is 89, the mode is 89, the minimum score is 74, and the maximum score is 95. Moreover, Elementary School 064/I Muara Bulian got 41 students with a percentage of 67.2% in the good category, 18 students with a percentage of 29.5% in the very good category, and 2 students with a percentage of 3.3% in the sufficient category. Then the mean is 86.05, the median is 87, the mode is 88, the minimum score is 70, and the maximum score is 93.

The result of the measurement discipline character in three Elementary Schools utilizing e-assessment (Table 3) is explained further. Elementary School 034/I Teratai have a total of 36 students. Among them, 65.5% fall into the good group, which amounts to 23 students. Additionally, 34.5% of the students, which is equivalent to 13 students, are classified in the very good category. The average is 87.60, the middle value is 87, the most frequently occurring value is 86, the lowest score is 76, and the highest score is 102. In addition, Elementary School 045I Sridadi has a total of 36 students, with 62.1% falling into the good group and 36.2% falling into the very good category. The average is 85.88, the middle value is 86, the most frequently occurring value is 85, the lowest score is 71, and the highest score is 95. Moreover, Elementary School 064/I Muara Bulian has a total of 31 pupils, with 50.8% of them falling into the very good group, 47.5% falling into the good category, and 1 student (1.6%) falling into the sufficient category. The average is 89.20, the middle value is 89, the most frequently occurring value is 88, the lowest score is 70, and the highest score is 97.

2.2 Normality and Homogeneity

The preliminary analysis was also carried out in this study, which are normality test and homogeneity test. The normality test carried out on the character of patriotism showed that Elementary School 034/I Teratai obtained a Sig. of 0.103, Elementary School 045I Sridadi obtained a Sig. of 0.091, and Elementary School 064/I Muara Bulian obtained a Sig. of 0.081. So, the character of patriotism in the three schools is normally distributed with a significance value of > 0.05 . The normality test carried out on the tolerance character showed that Elementary School 034/I Teratai obtained a Sig. of 0.079, Elementary School 045I Sridadi obtained a Sig. of 0.098, and Elementary School 064/I Muara Bulian obtained a Sig. of 0.088. So, the tolerance character in the three schools is normally distributed with a significance value > 0.05 . Then, the normality test that was carried out on the discipline character showed that Elementary School 034/I Teratai obtained a Sig. of 0.093, Elementary School 045I Sridadi obtained a Sig. of 0.083, and Elementary School 064/I Muara Bulian obtained a Sig. of 0.200. So, the character of patriotism in the three schools is normally distributed with a significance value of > 0.05 .

In addition, the data in this study also went through a homogeneity test. Homogeneity test on the character of patriotism shows the value of Sig. of 0.174. Because the value of Sig. > 0.05 then the variance of data on the character of patriotism at Elementary School 034/I Teratai, Elementary School 045i Sridadi, Elementary School 064/I Muara Bulian is the same or homogeneous. Hereinafter, the tolerance character shows the value of Sig. of 0.197. Because the value of Sig. > 0.05 then the variance of tolerance character data at Elementary School 034/I Teratai, Elementary School 045i Sridadi, Elementary School 064/I Muara Bulian is the same or homogeneous. Discipline character shows the value of Sig. of 0.181. Because the value of Sig. > 0.05 then the variance of the discipline character data at Elementary School 034/I Teratai, Elementary School 045i Sridadi, Elementary School 064/I Muara Bulian is the same or homogeneous. Furthermore, because the two prerequisite tests have been met, a hypothesis test will be carried out.

2.3 Analysis of Hypothesis

Hypothesis analysis is aided in this study by the ANOVA test. The purpose of ANOVA test was to compare the average values of the character variables of discipline, tolerance, and patriotism in the three research locations—Elementary School 034/I Teratai, Elementary School 045i Sridadi, And Elementary School 064/I Muara Bulian. Table 5 indicates that a significance value (Sig.) of 0.007 corresponds to the patriotism result. There is a significant difference in the average result of the patriotism character in Elementary School 034/I Teratai, Elementary School 045i Sridadi, And Elementary School 064/I Muara Bulian because the value of Sig. < 0.05. On the other side, the tolerance character yields a significance value (Sig.) of 0.034. There is a significant difference in the average tolerance character result in Elementary School 034/I Teratai, Elementary School 045i Sridadi, And Elementary School 064/I Muara Bulian due to the value of Sig. < 0.05. The results of additional analysis indicate that the discipline character received a significance value (Sig.) of 0.002. Since Sig. < 0.05, there is a significant difference in the average discipline character results across Elementary School 034/I Teratai, Elementary School 045i Sridadi, and Elementary School 064/I Muara Bulian. Further analysis is possible regarding the noteworthy average variations amongst the three schools concerning discipline, tolerance, and patriotism values. To determine which schools have a statistically significant difference in average, a more thorough analysis is conducted. A post hoc follow-up test in the form of the Tukey HSD test can be used to observe this significant difference in greater detail.

2.4 Analysis of Post Hoc

The Tukey HSD test was used to clarify and analyse more deeply the results of the main analysis of the hypothesis test. The Tukey HSD test is performed by comparing two or more groups in pairs. This assists in identifying significant differences between the groups after the results of the main analysis indicate a significant effect or relationship. Based on Table 6 the average difference in the character of patriotism is between Elementary School 034/I Teratai and Elementary School 064/I Muara Bulian. This is indicated by the average difference of 2.830. Then, the significance value (Sig.) of the two Elementary Schools is $0.005 < 0.05$. So, it can be concluded that the average difference in the character of patriotism when using e-assessment is found in Elementary School 034/I Teratai and Elementary School 064/I Muara Bulian are significantly different. In addition, the asterisk in the results of the average difference also indicates that the two have a significant average difference.

The results of the Tukey HSD test for tolerance characters provide informations about the difference in the average tolerance character is between Elementary School 045I Sridadi and Elementary School 064/I Muara Bulian. This is indicated by the average difference of 2.365. Then, the significance value (Sig.) of the two Elementary Schools is $0.025 < 0.05$. So, it can be concluded that the difference in the average tolerance character when using e-assessment is significantly different at Elementary School 045i Sridadi and Elementary School 064/I Muara Bulian. In addition, the asterisk in the results of the average difference also indicates that the two have a significant average difference.

The results of the Tukey HSD test for disciplined characters describe information about a difference in the average disciplinary character between Elementary School 045I Sridadi and Elementary School 064/I Muara Bulian. This is indicated by the average difference of 3.317. Then, the significance value (Sig.) of the two Elementary Schools is $0.001 < 0.05$. So, it can be concluded that the difference in the average discipline character when using e-assessment at Elementary School 034/I Teratai and Elementary School 064/I Muara Bulian is significantly different. In addition, the asterisk in the results of the average difference also indicates that the two have a significant average difference.

2.5 Validation of Product

The e-assessment developed to measure the character of patriotism must go through a product validation test before it can be used in the assessment process. The product validation test was carried out

by two media expert validators. The results of the assessment by validator I obtained an overall average score of 3.31 with a percentage of 82.90% which was in the very good category so that the e-assessment product for the Patriotism character that was developed could be declared valid. Aspects of the assessment of functionality obtained an average score of 3.44 with a percentage of 86%. The reliability aspect obtained an average score of 3.33 with a percentage of 83.33%. The usability aspect obtained an average score of 3.28 with a percentage of 82%. The efficiency aspect obtained an average score of 3.20 with a percentage of 80%. Based on the average score for each of these aspects, three of the four aspects of the assessment are in the very good category. Thus, the results of product validation by validator I get very good results.

The results of the assessment by validator II obtained an overall average score of 3.30 with a percentage of 82.56% which was in the very good category so that the e-assessment product for the Patriotism character developed was declared valid. The functionality aspect got an average score of 3.33 with a percentage of 83.33%. The reliability aspect got an average score of 3.14 with a percentage of 78.57%. The usability aspect obtained an average score of 3.40 with a percentage of 85%. The efficiency aspect obtained an average score of 3.33 with a percentage of 83.33%. Based on the average score for each of these aspects, three of the four aspects of the assessment are in the very good category. Thus, the results of product validation by validator I and validator II get very good results so that the e-assessment product for the Patriotism character can already be used for the process of assessing the Patriotism character in schools.

The use of e-assessment to measure the character of patriotism, tolerance, and discipline will bring up the teacher's response as the user of the e-assessment. The teacher gave a positive response regarding the application of e-assessment in assessing the character of patriotism, tolerance, and discipline. Through interviews conducted, the results of the interviews are shown as follows.

- I really like the appearance of the developed e-assessment because it is very attractive when used.
- The use of e-assessment made me interested in filling out questionnaires and made it very easy for me to enter student character data.
- The features available in the e-assessment are very easy to use.
- This e-assessment is better than conventional paper-based assessments because there is no need to print out an assessment sheet each time you make an assessment.
- There is a guide to the use of the e-assessment, either in Portable Document Format (pdf) or video form, making it easier for me to learn how to use the e-assessment.
- The application of e-assessment which is used to measure the character of patriotism, tolerance, and discipline is very helpful for teachers in making assessments because it provides very detailed and real-time data processing results.

Many researches on character assessment have been carried out, including research conducted by Setiawan which describes the development of authentic assessment instrument to expand the character values of citizenship education at primary school [83]. In the other hand, research conducted by Rosyida and Saputri explain the importance of prospective teachers to be able to apply character education in schools because character education will be able to lift and improve the morale of the nation's successors so it is very necessary to implement character education [58]. Moreover, research conducted by Komalasari and Saripudin explains the effectiveness of authentic assessment in evaluating the character of students at the Elementary School level where with this assessment the teacher will be able to improve skill and character of students [84]. Forward, research conducted by Jeynes, which explains that student achievement at school is related to the character of the students themselves besides that character will also affect the daily behavior of a student and is more related than the character of high school students [54]. In addition, research conducted by researching the character of a high school student can be measured using a web assessment and in using this website it is also influenced by the student's own response with the aim of the website being to make it easier for teachers to assess the character of high school students.

Implementing e-assessment in evaluating student character such as patriotism, tolerance and discipline can increase the efficiency and accuracy of assessment compared to traditional methods. In addition, the use of e-assessment allows teachers to provide fast and more structured feedback, helping in the overall character development of students. For future implementation, it is recommended that schools improve technological infrastructure and provide training to teachers on the use and analysis of e-assessments. In addition, the integration of e-assessment in the curriculum must be carried out in stages, starting from pilot projects in several classes or schools to identify and overcome challenges that may arise. Thus, e-assessment can be an effective tool in supporting character education and helping students develop values that are important for life in the future.

V. CONCLUSION

Teachers as users have a very good response to the application of e-assessment which is used to measure the character of patriotism, tolerance, and discipline in Elementary Schools. Schools that have differences in the average results of patriotism when using e-assessment are found in Elementary School 034/I Teratai And Elementary School 064/I Muara Bulian. Schools that have differences in the average results of tolerance characters when using e-assessment are found at Elementary School 045i Sridadi and Elementary School 064/I Muara Bulian. Schools that have differences in the average results of discipline characters when using e-assessment are found in Elementary School 034/I Teratai and Elementary School 064/I Muara Bulian. It is recommended to explore the use of artificial intelligence and big data analysis in e-assessment to improve the accuracy and personalization of assessment. Further improvements could include integrating e-assessments with broader learning platforms, ensuring accessibility and inclusivity for all students, including those with special needs. Thus, future research can provide more comprehensive and practical insight into implementing e-assessment for character education.

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Author contribution

All authors made an equal contribution to the development and planning of the study.

Conflict of Interest

The authors declare no conflicts of interest.

Data Availability Statement

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