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THE EFFECTIVENESS OF USING ELECTRONIC STUDENT WORKSHEET WITH A CONTEXTUAL APPROACH ON STUDENT ADVERSITY QUOTIENT

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ABSTRACT

This study aims to inspect the effectiveness of using electronic student worksheets with a contextual approach on students' Adversity Quotient (AQ). The research design employed was quasi-experimental. It was conducted at Kotabumi during the academic year 2023/2024, involving 86 VII-th grade students as the population, focusing on the subject matter of social arithmetic. The independent variable in this study is electronic student worksheets with a contextual approach, and the dependent variable refers to the adversity quotient. The research sample was selected using random sampling technique, with 28 students from class VII B assigned to the experimental group and the control group consisted of 28 students from class VII C. The research employed a pre-post control group design. The instrument used was a questionnaire on adversity quotient, which had undergone validity and reliability tests. Data analysis involved descriptive and inferential analyses, with hypothesis testing conducted using independent sample t-tests. Based on the results of the n-gain hypothesis test, there was a difference in the improvement of students' AQ between the experimental and control groups. The findings of this study, as demonstrated through the n-gain test, indicate that the use of electronic student worksheets with a contextual approach is effective in enhancing students AQ.

Keywords: Electronic Student Worksheets, Contextual Approach, Adversity Quotient

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PRELIMINARY

The students' success in learning is inseperable from resilience (Mahayani et al., 2023). According Guci (2024) the students resilience and intelligence in facing challenges are essential as they are able to turn obstacles into opportunities when confronted with the difficult situation. *Adversity* also means difficulty (Echols & Shadily, 2003). Meanwhile *quotient* is interpreted as ability and intelligence (Huda & Damar, 2021). Adversity quotient is the ability to withstand and overcome life's problems and challenges (Espanola, 2016). Therefore, students need to have confidence, great minds, and great resilience in facing problems (Hidayati et al., 2020). *Adversity Quotient* introduced by Stoltz (2000) is the ability to observe and process difficult situations using ones' intelligence so that they

can be overcome. Additionally, the success of an individual are not only determined by the Intelligence Quotient (IQ) and Emotional Quotient (EQ), but also by other factors such as motivation and the attitude of not giving up, known as AQ (Stoltz 2000; Huda & Mulyana, 2017; Mahmudah & Zuhriah, 2021).

The adversity quotient has three types of AQ, namely: quitters (low), campers (moderate), climbers (high) (Khumairoh et al., 2020; Septianingtyas & Jusra, 2020). Futhermore, there are also 4 dimensions of AQ consisting of self-control, recognition, reach, and resilience (Hulaikah et al., 2020; Sari et al., 2022). These three types and four dimensions represent the level of students' AQ in solving the problems they face (Sadriah, et al., 2023; Puriani & Dewi, 2021). Every student deals with difficulties differently, depending on their level of intelligence (Hajar et al., 2018; Pratiwi & Alyani, 2022). According to Supardi (2015) students are success in learning depends on how they handle the difficulties. Therefore, AQ is crucial for students to have in order to achieve success in learning mathematics, so that when faced with challenging situations, students can overcome their problems (Putra & Roza, 2020; Leonard & Amanah, 2017; Naimnule, Kehi, & Bone 2022) .

Realizing the importance of AQ, teachers as facilitators should strive for effective learning (Fauzi & Mustika, 2022). However, the researchers obtained pre-survey results from 30 students, where the average score of students with high AQ (climbers) was only 26.6%, while the average score of students with low AQ (quitters) was 16.6%. The highest result in the average AQ score of students was in the moderate level (campers), which was 56.6%. Based on the survey results, it indicates that the average AQ of students predominantly falls into the medium level (campers). Moreover, through interviews with teachers, it was found that the use of student worksheets in teaching at school is still confined to the textbook, meaning that the questions used are solely sourced from the textbook and there is no integration of technology. Therefore, the Student Worksheets used by educators so far are not as suitable as expected.

The impact of the content in the student worksheets can lead to a lack of students' resilience or AQ in solving problems, and students may not be able to apply the knowledge they have acquired outside the school environment. The lack of the real problem application in the student worksheets and the absence of technological integration for the current era are shortcomings of the worksheets used in the learning process . Despite the change in curriculum, the development of student worksheets designed by teachers or publishers does not seem to align with the students' characteristics (Sukmanasa et al., 2020;

Nasution & Fauzi, 2022). Therefore, there is a need for an approach to teaching that corresponds to the mathematics learning materials and students' lives (Arta et al., 2020).

A learning approach that deals with emerging problems and serves as an effective alternative is through a contextual approach because it truly mirrors real-life situations (Sinaga et al., 2021). The contextual approach defines concepts as innovative teaching processes that help students connect the content they have learned with the context of their lives (Hasruddin et al., 2015); (Komalasari et al., 2021). According Oktapia & Siregar (2023) contextual learning helps teachers connect subject matter with current realities. According to Johnson (2002); (Yuniar et al., 2020) contextual learning is the way that connects the subject matter with the daily life issues. In line with that, contextual learning is meaningful learning that facilitates students to interpret and gain mathematical understanding of the learning material according to the known context (Dasi & Putra 2022; Mahmudi et al., 2022).

This study aims to inspect the effectiveness of using electronic student worksheets with a contextual approach on students AQ. Several studies have been conducted to improve students AQ, one of which was conducted by Hidayat & Sariningsih (2018) showing that students AQ abilities can achieve learning completeness through open-ended learning. Furthermore, the study results from Sari (2022) indicate that PBL-STEAM learning influences the improvement of students' AQ. The different one conducted by (Komarudin et al., 2021) showed that the implementation of the open-ended model had no effect on AQ types. Additionally, research conducted by Mawaddah (2017) found that the contextual approach had no effect on improving students AQ. Therefore, based on the relevant previous research, it forms the basis for the research to be conducted.

The novelty of this research lies in the application of a contextual approach because previous research has not attained the expected results in improving AQ. Furthermore, the utilization of interactive media, specifically electronic student worksheet based on liveworksheet. Utilizing existing technological advancements, the student worksheets can be accessed online. Moreover, it will feature appealing visuals for students through the inclusion of images, audio, animations, and problem-solving videos. It is also worth noting that students' work results can be immediately assessed, including both grades and any mistakes made by students. Therefore, the use of electronic-based Student Worksheets with a contextual approach is expected to enhance students' AQ.

METHODS

The type of this study utilized is quasi-experimental. It was conducted at SMP Negeri 5 Kotabumi during the academic year 2023/2024, involving 86 VII-th grade students as the population with the scope of the material being social arithmetic. The independent variable in this study is electronic student worksheet with the contextual approach, while the dependent variable refers to the Adversity Quotient (AQ). Subject selection used the random sampling technique as long as the characteristic of the field is homogeneous. The study was conducted using a pre-post control group design. The sample obtained for the experimental group consisted of 28 seventh-grade students from class VII B, and the control group consisted of 28 students from class VII C. The study design can be seen in the following figure 1.

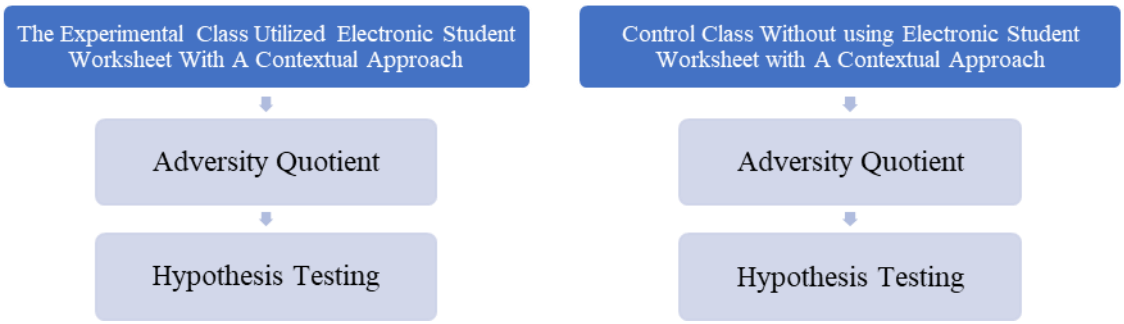

Figure 1. The Study Design

The instrument employed in this study is the Adversity Quotient (AQ) assessment questionnaire, comprising 21 items/questions, administered to ascertain the AQ scores attained by the students. Enclosed here in is the content outline detailing the AQ assessment questionnaire, which is accessible through the provided table.

Table 1. Questient Grid Adversity Quotient

Indicator	Description	Questionary items	
		Positive	Negative
Self Control	Capable of managing oneself when confronted with undesirable difficulties	1 & 2	3, 6 &11
Origins and Ownership	Perceiving success as the hard work	4 & 5	13 & 16
	Responsible for the occurrence of a difficulty	7	19
	Experiencing guilt in a normal manner	8	20
Reach	Capable of understanding various conditions	9 & 10	15 & 17

Indicator	Description	Questionary items	
		Positive	Negative
	experienced."		
Endurance	The limitations are also interconnected with other issues	12 &14	18 & 21

The questionnaire items consist of both positive and negative questions, referring to the four dimensions of AQ. Prior to the dissemination of this AQ questionnaire instrument, a series of tests must be conducted, including the validation of questionnaire items and the reliability test of the questionnaire through the results of the AQ questionnaire trial. The next Nurlaelah (2021) categorized the types of AQ as follows.

Table 2. AQ Questionnaire Categorization

Score Range	Category
$\mu - \sigma \geq X$	Quitters
$\mu - \sigma > X > \mu + \sigma$	Campers
$X \geq \mu + \sigma$	Climbers

Description:

X = Total score of AQ

μ = Mean score AQ

σ = Standard deviation of AQ score

The result of students' completion of the AQ questionnaire will be classified into categories of AQ types. Whether the students fall into the climbers, campers, or quitters category. Then, prerequisite tests will be conducted, including normality test and homogeneity test. Additionally, an *n-gain* test will also be conducted to determine if there is an improvement in students' AQ scores. The n-gain coefficient obtained can be classified according to Hake (1998) as follows.

Tabel 3. Classification of *N-Gain*

Coefficient $(\bar{g})$	Category
$0.71 - 1.00$	High
$0.31 - 0.70$	Medium
$0.00 - 0.30$	Low

The classification of n-gain will serve as a reference for comparing the increase in AQ scores between the experimental and control groups. Wheter learning through the use of electronic student worksheets with a contextual approach result in significantly higher AQ score improvements compared to learning without the use of electronic student worksheets with a contextual approach. After fulfilling the prerequisites, hypothesis testing (Independent sample T-test) will be conducted to inspect the effectiveness of using electronic student worksheets with the contextual approach.

RESULTS AND DISCUSSION

The utilization of electronic student worksheets with a contextual approach was implemented in 5 sessions for the experimental class and deployed via the Liveworksheet platform. These student worksheets are designed to be completed online by students, and their results can be viewed in real-time. These are no longer in print form, eliminating the need for educators to print them on paper, instead they can be distributed through links or barcodes. The usage of electronic student worksheets through Liveworksheet by students is depicted in the following figure.

Figure 2. Application of Electronic Student Worksheets among Students in the Experimental Class

The utilization of electronic student worksheets is performed by students in small groups consisting of 2 or 3 students each. Each student utilizes a smartphone to access the Liveworksheet website and engage in the activities provided in the electronic student worksheets. The sequence of activities in the electronic student worksheets is tailored to the learning objectives of the material. Subtopics within the scope of social arithmetic learning include selling price, buying price, profit, loss, percentage, simple interest, tax, gross, net, and tare.

Based on the validity test results of the AQ questionnaire instrument, it is found that out of 21 statement items, 17 items fall into the valid category, while 4 items are categorized as invalid. The reliability test calculation of the AQ questionnaire instrument yielded a coefficient value (r_{11}) of 0.812. This obtained value surpasses the table value (r_{table}), which is 0.444. Therefore, the AQ instrument demonstrates very high reliability. Consequently, the AQ questionnaire instrument is deemed suitable for use as a research instrument in this study.

The AQ questionnaire instrument was administered as a pretest before the commencement of the learning sessions, specifically during the first meeting, and as a posttest after the completion of the learning material, specifically during the fourth meeting. Based on the learning activities' outcomes, the details of pretest and posttest AQ scores in both the experimental and control class are presented as follows:

Table 4. The Percentage Result of Pretest and Post Test of *AQ*

No.	AQ Tipe	Pretest		Postest	
		Experimental Class	Control class	Experimental Class	Control class
1	*Climbers*	15 %	25%	40%	17%
2	*Campers*	60%	54 %	28%	54%
3	*Quitters*	25%	21 %	32%	29%

The percentage of pretest and posttest AQ scores in the experimental class for Climbers exhibited a significant increase. This increase could stem from transitions from Campers to Climbers, Quitters to Campers, or even from Quitters directly to Climbers. Furthermore, in the control group, the percentage of pretest and posttest scores for Climbers showed a decline. This decline may occur due to transitions from Climbers to Campers, Campers to Quitters, or Climbers directly to Quitters. This is evidenced by the comparison of the percentage gains in the experimental group for Climbers, which increased by 15%, while conversely, in the control class, there was a decrease of 8%. Thus, the learning process in the experimental class had a positive impact on the frequency of transitions toward Climbers in the AQ types. Subsequently, the pretest and posttest score results will be analyzed through the n-gain test first. A summary of the n-gain test results for AQ scores in the experimental and control class is provided below.

Table 5. The Result of *N-Gain* Adversity Quotient Testing

Groups	The Averange of N-Gain Score	Criteria	The Percentage Averange of N-Gain Score	Criteria
Experimental	0.61	Moderate	61%	Sufficiently Effective
Control	0.47	Moderate	47%	Less Effective

Based on the *n-gain* AQ test results, it was found that the experimental class had an average n-gain score of 0.61, falling into the high criteria and effective compared to the control class. It can be concluded that the average AQ scores for the experimental class experienced a similar high level of improvement. The percentage of n-gain score criteria, the control group obtained less effective results in improving students' AQ scores. This indicates that the use of electronic student worksheets with a contextual approach influences the improvement of students' AQ with high and effective. The next step will be to conduct a normality test to determine whether the data distribution within a dataset is normal or not. A summary of the normality test results can be seen below.

Table 6. Summary of Adversity Quotient Normality Test Results

Group	Data	*Sig*	Siginificance Level	Description
Experimental	*Pretest*	0.193	0.05	Normal Data
Control	*Pretest*	0.852	0.05	Normal Data
Experimental	*Postest*	0.242	0.05	Normal Data
Control	*Postes*	0.515	0.05	Normal Data
Experimental	*N-Gain*	0.735	0.05	Normal Data
Control	*N-Gain*	0.572	0.05	Normal Data

Based on Table 6, the results of the normality test for AQ using the *Shapiro-Wilk* method show that the probability values (sig) for pretest, posttest, and *n-gain* scores exceed the significance level of 0.05. Therefore, the decision to accept the H_0 is done. Hence, it can be stated that the pretest and posttest AQ scores are normally distributed. The next step will be to conduct a homogeneity test to determine whether the sample data used from a population has equal variances. A summary of the homogeneity test results for pretest, posttest, and n-gain AQ scores can be seen below.

Table 7. The Adversity Quotient Homogenity Test Result

Score	*Sig*	Significance Level	Description
Pretest	0.062	0.05	Homogeneous
Postest	0.654	0.05	Homogeneous
N-gain	0.311	0.05	Homogeneous

Based on Table 7 regarding the homogeneity test results for AQ, it can be observed that the probability values (sig) for pretest, posttest, and *n-gain* are greater than 0.05, thus leading to the acceptance of the null hypothesis (H0). Therefore, the pretest, posttest, and *n-gain* AQ scores have homogeneous variances. After the data meets the prerequisites, the next step will be to conduct hypothesis testing using SPSS version 25.

Table 8. *T-Test* Results of Adversity Quotient Pretest, Postest and *N-Gain* Score

Score	F	t	Df	Sig. (2-tailed)
AQ Pretest Score	3.623	0.060	54	0.952
AQ Postest Score	0.203	4.638	54	0.000023
AQ *N-Gain* Score	1.761	2.273	54	0.027

The results of the t-test on the pretest AQ scores show that both class samples exhibit equal initial proficiency levels in AQ knowledge. The significance value (2-*tailed*) listed is 0.952, which exceeds the significance level of 0.05. Thus, the decision to accept the H_0 is made. Therefore, it can be concluded that there is similarity in the initial proficiency (pretest) between the two class samples regarding AQ. After undergoing the sequence of learning activities using electronic student worksheets with a contextual approach, a posttest will be administered to the samples of both classes. The results of the testing show that the significance value (2-*tailed*) is 0.000023, which is lower than the significance level of 0.05. Thus, the decision to reject H_0 is made. Therefore, it can be concluded that there is a difference in the posttest between the samples of the two classes regarding students AQ. The test results of t-test *n-gain* score, that the significance value (2-*tailed*) is 0.027 which is lower than the significance level of 0.05. Thus, the decision to reject the H_0 is made. Therefore, it can be concluded that there is a difference in the improvement of students' AQ between the experimental and control class.

The findings of this study are in line with the study conducted by Jannah (2024) which stated that the use of learning media based on google sites is capable of improving AQ to a moderate level. Additionally, the findings from Syafitri (2022) indicated that the use of autograph learning media in mathematics education resulted in a significantly higher increase in students' AQ abilities compared to learning without the use of autograph media. Research conducted by Mawaddah (2017) and Kartikaningtyas (2018) found that the contextual approach had no effect on improving students AQ and no interaction between contextual approach and AQ. However, the use of contextual approach with using media has shown a positive contribution, as evidenced by the researcher's findings. The obtained results align with Johnson (2002) and statement that a contextual approach provides a pathway to academic success for all students. Therefore, to achive academic success, one of the aspects that needs improvement is student' adversity quotient, which can be enhanced through a contextual approach.

The use of electronic student worksheets by students facilitates their learning activities with the assistance of technological advancements. With the support of the liveworksheet website, interactive learning experiences are created, featuring engaging elements such as images, animations, sound, and even videos. Additionally, the convenience of accessing electronic student worksheets through links or barcodes, as well as the immediate feedback on student performance, enhances the learning process. The utilization of media as interactive learning tools in this study aligns with Nurmawati (2020); (Sumarni et al., 2018) statement that interactive learning media can influence the quality of student learning outcomes.

Despite the advantages of media usage outlined, this study, like any other, is not without its challenges. Limitations arise from the requirement for a stable and reliable internet connection. The selection of research locations also influences the availability of infrastructure and facilities. The smoothness of the learning process with interactive media through websites heavily relies on a stable internet connection. Furthermore, limitations in this study are also attributed to the chosen instructional approach and the topic of social arithmetic. For future research endeavors, alternative instructional approaches or models could be explored and paired with the use of electronic student worksheets in mathematics education to potentially enhance students' AQ.

CONCLUSION

Based on the results of the conducted study, a conclusion can be drawn from the posttest hypothesis testing. There is a difference in students' Adversity Quotient (AQ) between experimental and control groups. Additionally, according to the results of the hypothesis testing for n-gain scores it can be concluded that there is a difference in the improvement of students' AQ between the experimental and control groups. This research has demonstrated through n-gain testing that the use of electronic student worksheet with contextual approach is effective in enhancing students AQ.

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