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Ability adversity quotient and mathematical literacy using the cooperative, integrated learning model, reading, and composition (CIRC)

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Abstract
Previous research has implemented the adversity quotient and mathematical literacy, but none has combined it with the CIRC learning model. This research aims to determine the influence of the CIRC learning model on students' adversity quotient and mathematical literacy abilities—the research population at SMP Amal Bakti in South Lampung. The quasi-experimental research design uses random samples. Data instruments were collected through mathematical literacy tests and adversity quotient questionnaires. The prerequisite tests are the normality test and homogeneity test, and the hypothesis test uses the Multivariate Analysis of Variance (Manova) test with a significance level of 0.05. In the results of the analysis, it was found that there is an influence on adversity quotient and mathematical literacy abilities using the Cooperative, Integrated, Reading, and Composition (CIRC) learning model.
Keywords : *CIRC; Adversity quotient; Mathematical literacy*

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INTRODUCTION

Face difficulties in learning requires a "fighting spirit" so that you are able to solve problems and dare to take risks. Someone who has a strong fighting spirit both physically and mentally will be able to face competition, problems, and unexpected things, even facing temporary threats, they can survive and have bright hopes (Yuni, 2018). This leads someone to devote all their abilities and potential so that the problem can be resolved immediately. Conversely, individuals who have low fighting spirit will respond to difficulties as something that is permanent, cannot be changed, thus giving birth to an attitude of helplessness (Huda & Damar, 2021). Adversity quotient is a person's ability to overcome difficulties with the intelligence they have so that these difficulties can be overcome (Sari et al., 2022).

The results of interviews with teachers who teach mathematics for grade VIII at SMP Amal Bakti obtained information that 73 out of 90 grade VIII students always feel tense and anxious during mathematics learning, then some students also feel that they do not have advantages in mathematics, always worry if it is their turn to go to the front of the class, anxious when facing a test so that it has an impact on giving up easily when getting difficult questions.

Students also find it difficult to understand Adversity quotient intelligence and solve mathematical problems. Each student has different intelligence in dealing with problems (Depriwana et al., 2021). Adversity quotient is very important to have because during learning, students are required to use their mathematical abilities if at any time difficulties and obstacles arise in solving the mathematical problems (Rekma Mustika, 2018)**.** Adversity quotient is likened to climbing. People who climb are actually in the process of reaching the top, so people who don't want to go through the process don't want to tire themselves out climbing to reach the top (Zanirah et al., 2022). The high and low adversity quotient is divided into 3 categories, namely the quitters type (those who quit) which is a group of people who have less desire to accept challenges, the campers type (those who camp) which is a group of people who don't want to take risks, and the climbers type (those who climb) which is a group of people who have the courage to face problems and are ready to take risks (Komarudin et al., 2021). Students who have a high adversity quotient do not give up easily and continue to try to solve the problems they face until they are finished. On the other hand, students who have a low adversity quotient prefer to avoid the problems they face (Hulaikah et al., 2020).

Several previous research that have researched the adversity quotient are as follows: The effect of adversity quotient on students' mathematics learning achievement (Mayesty et al., 2023); Online learning adversity quotient and self-directed learning in students (Lilis Ratnasari & Asma Wardah Islamiyyah, 2023); adversity quotient on mathematical connection skills (Azizah, 2020); Adversity quotient on students' learning motivation (Fahmi et al., 2020); Adversity quotient on students' mathematical problem solving (Saharuddin, 2024); adversity quotient on student engagement (Fahira & Zulfiana, 2022). These previous researches both use Adversity Quotient as the method discussed. Relevant research that uses Adversity Quotient in its discussion helps this study to find the ability of the method itself.

In addition to having a high adversity quotient, in the learning process, students also need to have strong mathematical literacy (Utaminingsih & Subanji, 2021). The Program for International Student Assessment study organized by the Organization for Economic Cooperation and Development aims to determine student's mathematical literacy skills. Attention of the PISA study is students' ability to identify, understand, and use mathematical concepts needed in everyday life (Rahmawati, 2018). Mathematical literacy is an individual's ability to recognize and understand the role of mathematics plays in real life (Hidayat et al., 2021). Literacy greatly influences the learning outcomes achieved by students. The higher the literacy ability of students, higher the students learning achievement, otherwise (Harefa et al.,

2023). Student learning achievement is not only influenced by cognitive abilities, but also by affective abilities (Resti et al., 2024).

The results of Program for International Student Assessment study organized (PISA) 2015, Indonesia is included in the 10 countries with low literacy skills, occupying position 69 out of 76 countries surveyed (Alinda, 2018). PISA is an international standard assessment that includes the domains of mathematics, reading, and science (Lestari & Effendi, 2022). According to Lamada, et al. in (Ulfa & Puspaningtyas, 2020). Explained that literacy development is very important to pay attention to because literacy has benefits for each individual in living their life in the future so that literacy becomes an initial ability that must be possessed by each individual.

Relevant research that examines mathematical literacy skills and relates them to other learning models, namely: Problem-based instruction (Fatwa et al., 2019); Problem-based learning (Ade, Jajang, & Rifki, 2019); Interactive multimedia (Fajriati & Murtiyasa, 2023); Discovery learning (Sugianto et al., 2022); Accelerated learning cycle (Fajriah et al., 2021); Creative problem solving (Rohana et al., 2021); Realistic mathematics education (Istiqomah et al., 2021). These previous researches both use literacy skills as the models discussed. Relevant research that uses this models in its discussion helps this study to find the ability of the literacy skills in this researches.

The supporting factor to improve students' mathematical literacy skills is the Cooperative, Integrated, Reading, and Composition (CIRC) learning model. because the CIRC model is an innovation in learning where students' thinking skills are truly optimized through a systematic group or team work process, so that students can empower, hone, test, and develop their thinking skills continuously (Nabilah & Wardono, 2021). CIRC has developed not only to be applied in language learning, but also in learning exact sciences such as mathematics (Ariyana & Suastika, 2022). With the CIRC learning model, the learning process will come alive because students are involved in it to improve their reading ability and comprehensively understand the material being taught (Nasution et al., 2021).

RESEARCH METHODS

Quasi-experimental design research aims to see the effect of the CIRC learning model in improving students' *adversity quotient* and *mathematical literacy*. Sampling using cluster random sampling. The population of students in SMP Amal Bakti South Lampung class VIII are 90 students, Data instruments was collected through mathematical literacy tests and

adversity quotient questionnaires. The prerequisite test uses normality and homogeneity tests. After the prerequisite test is met, it is continued with the Manova test. The collected mathematical literacy ability data was analyzed using SPSS 25 α = 0.05 (Lena & Netriwati, 2019). The instrument trial was conducted with 30 students as respondents and the level of significance used was α = 0.05 so that the was $r_{tabel} = 0{,}361$. It can be concluded that the test instrument is valid and suitable for use in data collection.

RESULTS AND DISCUSSION

Model Implementation CIRC learning is illustrated by Table 1.

Table 1. Descriptive Statistical Analysis

	N	Min	Max	Mean	Std. Deviation
AQ_Ex	31	70	94	78.65	6,611
LM_Ex	31	50	92	77.10	10,130
AQ_Kon	29	63	84	71.72	6,106
LM_Kon	29	40	85	69.41	9,481
Valid N (listwise)	29				

Table 1 descriptive analysis *of the adersity quotient* of the experimental class is a mean of 78.68, a standard deviation of 6.611, minimum and maximum values of 70 and 94 respectively. Meanwhile, for the mathematical literacy of the experimental class, the mean value is 77.10, a standard deviation of 10.130, minimum and maximum values of 50 and 92 respectively. Next analysis descriptive adversity quotient of the control class, namely the mean is 71.72, standard deviation is 6.106, minimum value and maximum each of 63 and 84, while for the mathematical literacy of the control class the mean value was 69.41, the standard deviation of 9,481, the minimum value and maximum each of 40 and 85. So it can be concluded that there is a difference in ability *adversity quotient* And *literacy mathematical* participant educate between class experiment and control class. However, the differences need to be tested further whether the differences are significant or not using Manova analysis.

The prerequisite test of the analysis is the normality test for the adversity quotient data and mathematical literacy of students for the experimental class and the control class. The following are the results of the normality test on the sample data of the adversity quotient and mathematical literacy.

Table 2. Normality Test

	Learning model	Kolmogorov- Smirnov[a]			Shapiro Wilk		
		Statistics	Df	Sig.	Statistics	df	Sig.
Adversity	Experiment	,161	31	,080	,919	31	,023
Quotient	Control	,136	29	,181	,945	29	,136
Literacy	Experiment	,137	31	,142	,935	31	,060
Mathematical	Control	,154	29	,076	,916	29	,024

a. Lilliefors Significance Correction

Table 2 show analysis calculation test normality for the analysis of *the adversity quotient ability* of the experimental class and the control class each obtained a sig. = 0.80 > 0.05 and sig. = 0.181 > 0.05. So it can be concluded that *the adversity quotient* data in the experimental class and the control class are normally distributed. And for the mathematical literacy variables of students in the experimental class and the control class each obtained a sig. = 0.142 > 0.05 and a sig. = 0.076 > 0.05 so it can be concluded that the normally distributed. Related to the homogeneity test of the Box's M value, the following results were obtained.

Table 3. Box 's M Homogeneity Test

Box's Test of Equality of Covariance Matricesa	
Box's M	1,393
F	0,447
Df_1	3
Df_2	711811,014
Sig.	0,719

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.
a. Design: Intercept + Learning Model

The homogeneity test of the convariance matrix, it can be concluded that the data of the adversity quotient and mathematical literacy results from both classes are homogeneous because they have a sig. value of 0.05, which is 0.719 in accordance with the homogeneity test criteria at the significance level $\alpha = 0.05$ which if sig. ≥ 0.05 then H_0 is accepted, after being continued with the Manova test the results were shown in the following table.

Table 4 . Results MANOVA test

	Effect	Value	F	Hypothesis df	df error	Sig.
Intercept	Pillai's Trace	,995	5300,552b	2,000	57,000	,000
	Wilks ' Lambda	,005	5300,552b	2,000	57,000	,000
	Hotelling's Trace	185,984	5300,552b	2,000	57,000	,000
	Roy's Largest Root	185,984	5300,552b	2,000	57,000	,000
Learning model	Pillai's Trace	,299	12,166b	2,000	57,000	,000
	Wilks ' Lambda	,701	12,166b	2,000	57,000	,000
	Hotelling's Trace	,427	12,166b	2,000	57,000	,000
	Roy's Largest Root	,427	12,166b	2,000	57,000	,000

a. Design: Intercept + Learning Model
b. Exact statistics

Table 4 can be described that the F value on Wilk's Lambda obtained a value of 0.000 at a significance level of α = 0.05, meaning p-value (sig) <0.05. So it can be concluded that there is an influence of the CIRC learning model on increasing the adversity quotient and mathematical literacy of students.

The results of the MANOVA test using SPSS and looking at the test results on Wilk's lambda produced the first hypothesis which stated that there was an influence of the Circ learning model to improve the adversity quotient and mathematical literacy of students. Multivariate test with a sig value. Smaller than 0.05, which is 0.000, so that H_0 is rejected and H_1 is accepted. This shows that the CIRC learning model has an effect on increasing the adversity quotient and mathematical literacy of students.

Interpretation of the learning model on the adversity quotient of students obtained a sig. value of 0.000 with a significance level of 0.05. This shows that the sig. value is smaller than 0.05 so that H_0 is rejected and H_1 is accepted. So it is concluded that there is an influence of the CIRC learning model on increasing the adversity quotient of students.

In the third hypothesis the results in the SPSS program for the third hypothesis of the learning model on mathematical literacy skills obtained a sig. value of 0.004 with a significance level of 0.05. This shows that the sig. value is smaller than 0.05 so that H_0 is rejected and H_1 is accepted. So it is concluded that there is an influence of the CIRC learning model on students' mathematical literacy.

CONCLUSION

Based on the results of data processing and the discussion above, it can be concluded that there is an influence of adversity quotient and mathematical literacy abilities using the CIRC learning model that the results of the questionnaire work with very good criteria and the learning outcomes are also increasing. to see other mathematical abilities that students have and to be able to prepare learning materials very well and interestingly. Further researchers who want to use the CIRC learning model are expected to look at the other mathematical abilities possessed by students and be able to prepare learning materials very well and interestingly because it is possible that not all learning materials can use the CIRC learning model.

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