Alifbata: Jurnal Pendidikan Dasar
2025, Vol. 5, No. 1, | 29-40
https://doi.org/10.51700/alifbata.v5i1.929
e- ISSN 2774-762X

# Students' Computational Thinking Skills Reviewed from Adversity Quotient and Gender at MTs Negeri 2 Central Lombok

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**Abstract**
Low computational thinking skills in students are often a problem faced by mathematics teachers in schools.. This study aims to find out and describe students' computational thinking based on adversity quotient and gender. This research method uses a quantitative approach with a comparative causal type. The sample used was 136 students of grade VIII MTs Negeri 2 Central Lombok, with details of 62 male students and 74 female students. The instruments in this study used tests and questionnaires. The test instrument was in the form of a computational thinking ability test consisting of 2 questions in the form of descriptions, while a questionnaire was used to measure the adversity quotient consisting of 24 statements. The results showed that 1) there was a significant influence of adversity quotient on students' computational thinking ability; 2) there was no significant influence of gender on students' computational thinking ability; and 3) there was no significant influence of adversity quotient and gender on student computational thinking ability. The contribution of this research provides new insights into how adversity quotient affects students' computational thinking abilities, which can be the basis for developing more effective learning strategies in the future.

**Keywords**: adversity quotient; computational thinking*;* gender

***Abstrak***
*Rendahnya kemampuan computational thinking pada siswa sering menjadi permasalahan yang dihadapi oleh guru matematika di sekolah. Penelitian ini bertujuan untuk mengetahui dan mendiskripsikan* computational thinking *siswa berdasarkan* adversity quotient *dan gender. Metode penelitian ini menggunakan pendekatan kuantitatif dengan jenis kausal komparatif. Sampel yang digunakan sebanyak 136 siswa kelas VIII MTs Negeri 2 Lombok Tengah dengan rincian 62 siswa laki-laki dan 74 siswa perempuan. Instrumen dalam penelitian ini menggunakan tes dan angket. Instrumen tes berupa tes kemampuan* computational thinking *yang terdiri dari 2 soal berbentuk uraian, sedangkan angket digunakan untuk mengukur* adversity quotient *yang terdiri dari 24 pernyataan. Hasil penelitian menunjukkan bahwa: 1) terdapat pengaruh signifikan* adversity quotient *terhadap kemampuan* computational thinking *siswa; 2) tidak terdapat pengaruh signifikan gender terhadap kemampuan* computational thinking *siswa; dan 3) tidak terdapat pengaruh signifikan* adversity quotient *dan gender terhadap kemampuan* computational thinking *siswa. Kontribusi penelitian ini memberikan wawasan baru tentang bagaimana adversity quotient mempengaruhi kemampuan computational thinking siswa yang dapat menjadi dasar untuk mengembangkan strategi pembelajaran yang lebih efektif di masa mendatang.*

**Kata kunci**: *adversity quotient*; *computational thinking;* gender

## Introduction

The computational thinking is a capability that includes the ability to solve problems, understand the core of the problem, and find solutions for the problem (Surmilasari et al.,

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2024). The application of computational thinking in mathematics learning trains students to think abstractly, formulate logical and systematic solutions with structured steps, and solve various complex mathematical problems. (Elinda et al., 2023). It can also improve students' performance in learning mathematics through computational thinking skills, namely generalization and algorithmic thinking; it can help students solve computational problems well. Learning involving computational thinking has the potential to have a positive influence on higher-order thinking skills (logic, algorithmic, and problem-solving views), as well as helping students solve real problems found in everyday life. (Isharyadi & Juandi, 2023)

Research conducted by Rachmat Hidayat et al. states that computational thinking involves the ability to divide large problems into smaller or more manageable parts when solving mathematical problems (2023). Andi Baso Kaswar and Nurjannah stated that computational thinking skills not only improve students' ability to solve problems but also prepare them to face challenges that require critical, creative, and organized thinking (2024). Even in other lessons, for example the application of computational thinking, it can improve students' critical thinking skills in business and energy lessons ( Kunthi Ratna Kawuri*, et al,* 2019). In addition, research proves that computational thinking can improve students' problem-solving abilities (Astuti et al., 2023)

Impressive reality shows that there are still many students who have low computational thinking ability. Research conducted by Nilam D. Jamna et al. showed that out of 20 grade IX students at one of the junior high schools in Ternate City, there were 50% of students who had low computational thinking ability (Jamna et al., 2022). The findings are in line with research conducted by Jose Andreas Gandhi Sinaga, which stated that the level of students' decomposition ability is included in the medium category with an average of 78.93. Furthermore, students' pattern recognition ability was very low with an average score of 53.57. Students' algorithmic thinking skills are classified as very low with an average score of 52.46. In addition, students' abstraction skills were classified as very low with an average score of 49.46 (Sinaga, 2022). In other words, it can be concluded that the ability to computationally think students are classified as very low.

The data was corroborated by the results of preliminary observations conducted by researchers by providing a computational thinking test to one of the Tsanawiyah Madrasah in Central Lombok involving 28 students. The test results showed that the average student was not able to answer the test questions. Students fail to carry out the decomposition process at the beginning, so the final completion becomes inappropriate. The answer of one of the students can be seen in Figure 1 as follows, namely

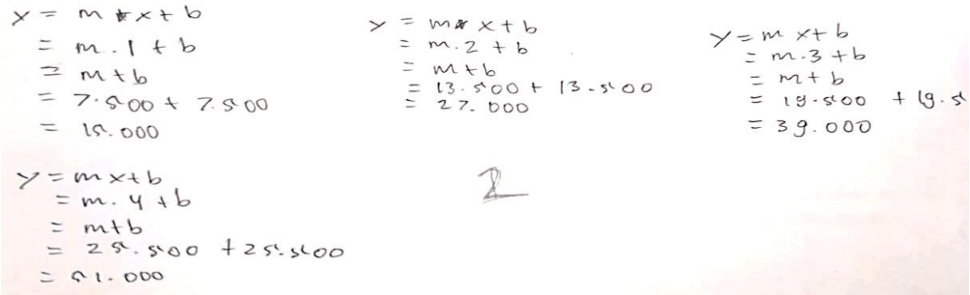


**Figure 1.** One of the students' answers

Further observing the results of the students' test answers in Figure 1, students write their answers, then enter the known scores. So, students only write . Then students look for a combination formula between the value and the one that can meet the corresponding value,

i.e. . Next, CNL students repeat the steps for value pairs and . CNL students are wrong in presenting the order of steps, where CNL students look for a combination formulation between values $y = mx + bx = 1y = mx + bmb\ y\ y = 15.000x = 2y = 27.000m$ and in order to obtain the result $by = 27.000$ . In this decomposition students make an equation by inserting two pairs of values and corresponding ones into the line equation. Thus, two equations are obtained, namely and which can be used to obtain a line that meets the condition of the question. The results show that students have not been able to break down the task into steps to find the gradient and constant of the line equation (decomposition stage), which has an impact on the failure of students in the process of pattern recognition, abstraction and algorithmic thinking to solve the problem. This finding explains that students $'xyy = mx + b15.000 = m(1) + b27.000 = m(2) + b$ computational thinking skills are relatively low.

Factors that are thought to affect the success of the computational thinking Students are adversity quotient (Muhayana et al., 2021). Adversity quotient describes how far a person can go to overcome challenges, obstacles, and difficulties in life. *Adversity quotient* is the intelligence that a person has to face problems or challenges, which can also be interpreted as individual toughness (Wahyuni et al., 2022). Adversity quotient Students in solving mathematical problems greatly affect the quality of the results they want to achieve, including at the ability stage computational thinking. Based on research conducted by Ika Dhian Lestari (Lestari, 2023) which states that students with the category quitters can only decomposition in solving arithmetic series and row problems. Students with a category Campers can meet the aspects of decomposition and abstraction, although the decomposition stage still needs to be improved. Meanwhile, students with the category *climbers* able to master all aspects computational thinking, namely decomposition, pattern recognition, abstraction, and algorithmic thinking.

Students' psychological factors such as gender influence the success of abilities computational thinking student (Nisa', 2022). Gender describes the traits or behaviors of a person who is connected to men and women with different abilities (Samudera, 2020). One of the differences between men and women lies in the way they think. Research conducted by Putu Nanik Siska Sri Agustina and Ni Wayan Suniasih stated that the average female student was higher compared to male students (Siska Sri Agustina & Suniasih, 2021). In line with research conducted by Farah Heniati Santosa et al. who stated that female students are better than male students in terms of accuracy and precision, but not in reasoning (Santosa et al., 2022).

The results of the description in the previous paragraph show that *adversity quotient* and gender plays an important role in determining a student's ability to *computational thinking*. The research that has been conducted by Farah Heniati Santosa et al only focuses on the gender aspect without paying attention to adversity quotient (Santosa et al., 2022), while the research conducted by Ika Dhian Lestari only focuses on *adversity quotient* regardless of gender (Lestari, 2023). So researchers want to observe both aspects, namely adversity quotient and gender in a research observation of the ability to computational thinking. Based on this background description, the researcher is interested in conducting a research with the title "Ability Computational Thinking Students Reviewed from Adversity Quotient and Gender". The research questions asked are in the form of: (1) whether *adversity quotient* has a significant effect on the ability to *computational thinking* student; (2) whether gender has a significant effect on ability computational thinking students and; (3) whether adversity quotient and gender have a significant effect on ability computational thinking student.

## Method

The research approach used is a quantitative approach (Creswell, J. W., & Creswell, J. D, 2018) with causal-comparative research (Morrell, Patricia D, 2010). Research *causal-comparative design* is a research method used to identify the causal relationship between independent variables and dependent variables. This design is to compare two or more existing groups, without directly manipulating the independent variables. The main goal of this study was to find out if there were significant differences between the groups and what the causes were.

Meanwhile, the population in this study is all students of grade VIII MTs Negeri 2 Central Lombok which totals 264 students with the following details.

**Table 1.** List of Class VIII Students

| No | Class | Number of Students |
|---|---|---|
| 1. | VIII A | 32 |
| 2. | VIII B | 34 |
| 3. | VIII C | 36 |
| 4. | VIII D | 34 |
| 5. | VIII E | 33 |
| 6. | VIII F | 34 |
| 7. | VIII G | 32 |
| 8. | VIII H | 29 |
| TOTAL | | 264 |

The determination of the number of samples in this study was carried out using the cluster random sampling. Cluster random sampling is a sampling technique in which samples are selected based on specific groups within a specific region or area (Fiqri et al., 2022). The sample taken from class VIII A to class VIII D was 136 students with a total of 62 male students and 74 female students.

The data collection techniques used in this study are description tests and questionnaires. Students are given an adversity quotient questionnaire first, then given a description test. The description test is used to measure students' computational thinking skills on linear function materials developed based on four indicators, namely: (1) decomposition, (2) pattern recognition, (3) abstraction, (4) and algorithmic thinking. The description test questions amounted to 2 questions containing computational thinking indicators shown in Table 2 as follows.

**Tabel 2**. Instrumen Tes Computational Thinking

**Test Instruments**

1. An online taxi company sets an initial fare of Rp. 13,000 and a fare per kilometer of Rp. 6,000. Based on these problems, determine:
   a. A linear function that expresses the total cost of a taxi (y) against the distance traveled (x)!
   b. How much does it cost to travel 10 kilometers by taxi?

2. A student has data on the relationship between the number of books purchased (in units) and the total price paid (in rupiah). These relationships are expressed in the following table:

| Number of Books (x) | Total Price (y) |
|---|---|
| 1 | 15.000 |
| 2 | 27.000 |
| 3 | 39.000 |
| 4 | 51.000 |

a. Determine a linear function equation that describes the relationship between the number of books and the total price.$xy$
b. Determine the number of books purchased, if the cost incurred is .Rp. 123.000

The questionnaire aims to generate accurate data about the adversity quotient students by applying the Likert scale. Next indicator adversity quotient shown in Table 3 and the grouping of categories adversity quotient based on research by Wardani and Wahyudi (2019) shown in Table 4 as follows.

**Table 3.** One Form of Statement on the Adversity Quotient Questionnaire Instrument

| Indicator | Sub Indicators | Statement |
|---|---|---|
| *Control* | Ability to Overcome Obstacles Creatively | I try to think calmly even though I am facing difficult problems |
| *Ownership* | Strong Determination to Achieve Goals | I felt challenged to solve the math problems given by the teacher |
| *Reach* | The Desire to Stay in the Comfort Zone | After trying to solve the math problem again, I felt satisfied because I got an easier way |
| *Endurance* | The Tendency to Avoid New Challenges | I am not thorough in solving math problems because I want to collect them immediately |

**Table 4.**Adversity Quotient *Grouping*

| Interval | Score (X) | Category |
|---|---|---|
| $x \geq Mi + 1Sdi$ | $x \geq 92{,}67$ | *Climbers* |
| $Mi - 1Sdi \leq x < Mi + 1Sdi$ | $77{,}33 \leq x < 92{,}67$ | *Campers* |
| $x < Mi - 1Sdi$ | $x < 77{,}33$ | *Quitters* |

Information:

$Mi$ = (minimum score + maximum score)/2 = $\left(\frac{62+108}{2}\right) = 85$

$Sdi$ = (maximum score – minimum score)/6 = $\left(\frac{108-62}{6}\right) = 7{,}66667$

The data analysis technique used consists of 2 main stages to analyze data, namely the pre-prerequisite test and the hypothesis test. The prerequisite test is a test that must be

met in conducting a hypothesis test, which consists of 2 namely: normality test and homogeneity test. If the data is normally distributed, then the hypothesis test is carried out using the Two-Way Anova test.

## Results and Discussion

### Result

The test and questionnaire instruments have been declared valid and reliable so that they can be used to obtain research data. The results of the analysis related to computational thinking ability based on adversity quotient and gender are assisted by the IBM SPSS Statistics application, which provides detailed test results as will be presented in Table 5 below.

**Table 5.** Descriptive Statistics of Students' Computational Thinking Ability Reviewed from Adversity Quotient and Gender

**Descriptive Statistics**

| Dependent Variable: Tes Computational Thinking | | | | |
|---|---|---|---|---|
| Kategori *Adversity Quotient* | Gender | Mean | Std. Deviation | N |
| *Climbers* | Man | 75.0000 | 11.53658 | 7 |
| | Woman | 70.3125 | 12.53423 | 16 |
| | Total | 71.7391 | 12.17702 | 23 |
| *Campers* | Man | 64.6875 | 14.21516 | 40 |
| | Woman | 63.4871 | 12.30857 | 38 |
| | Total | 64.1027 | 13.24807 | 78 |
| *Quitters* | Man | 48.8893 | 13.31195 | 15 |
| | Woman | 53.7500 | 13.84527 | 20 |
| | Total | 51.6669 | 13.63987 | 35 |
| Total | Man | 62.0297 | 15.79086 | 62 |
| | Woman | 62.3312 | 13.92101 | 74 |
| | Total | 62.1938 | 14.74738 | 136 |

The results of the descriptive analysis in Table 5 show that the average computational thinking test score of all respondents is 62.1938 with a standard deviation of 14.74738. This shows a fairly high variation in computational thinking skills among respondents. Climbers had the highest average score of 71.7391, followed by campers at 64.1027 and quitters at 51.6669. This indicates that the group of climbers in general has better computational thinking skills. Furthermore, the average computational thinking test scores of men were 62.0297 and women were 62.3312 and there was no significant difference. This shows that in general there is no significant difference in computational thinking ability between men and women in this study sample. The standard deviation is quite high in each category shows that in each group, there is a considerable variation in computational thinking ability. This means that even though the average score of a group is high, not all individuals in the group have the same abilities. Furthermore, a hypothesis test will be carried out, but prerequisite tests will be carried out first such as normality tests and homogeneity tests.

## Normality Test

The normality test is an important first step in statistical analysis, especially to determine the appropriate type of hypothesis test. In this study, the data normality test was carried out using the Kolmogorov-Smirnov method. The data that has been tested is then displayed in Table 6 below.

**Table 6.** Normality Test Results

| | *Adversity Quotient* | Kolmogorov-Smirnova | | |
|---|---|---|---|---|
| | | Statistic | df | Mr. |
| Computational | *Climbers* | .095 | 23 | .200* |
| Thinking | *Campers* | .090 | 78 | .184 |
| *Ability Test* | *Quitters* | .109 | 35 | .200* |

Based on the results of the analysis shown in Table 6, it is known that the significance value (sig.) of the results of the computational thinking test in each adversity quotient category, namely climbers of 0.200, campers of 0.184 and quitters of 0.200 is greater than the significance value of 0.05. This indicates that the data meets the assumption of normality, which means that it is normally distributed.

## Homogeneity Test

In this study, homogeneity was tested using the Bartlett test, with the criterion that the data were considered homogeneous if the null hypothesis was accepted, i.e. the significance value (sig.) greater than 0.05. The results of the homogeneity test for $(H_0)$ students' computational thinking ability based on the adversity quotient category are presented in detail in Table 7 as follows.

**Table 7.** Homogeneity Test Results

| Box's M | | .348 |
|---|---|---|
| F | Approx. | .171 |
| | df1 | 2 |
| | df2 | 22313.003 |
| | Mr. | .842 |

Based on the results shown in Table 7, it is known that students' computational thinking ability towards the adversity quotient with a significance value of 0.842 is greater than the significance value of α = 0.05, which indicates that the data has a homogeneous variance.

## Hypothesis Testing

After ensuring that the data is normally distributed and has a homogeneous variance, the next step is to conduct a hypothesis test to evaluate whether there is an influence of adversity quotient and gender on students' computational thinking skills. The analysis used the two-way ANOVA analysis method with a significance level of α = 0.05. The analysis process is assisted by the IBM SPSS Statistics application, which provides detailed test results as shown in Table 8 below.

**Table 8.** Results of the Analysis of the Anova Two Way Test

**Tests of Between-Subjects Effects**

| Dependent Variable: Tes Computational Thinking | | | | | |
|---|---|---|---|---|---|
| Source | Type III Sum of Squares | df | Mean Square | F | Mr. |
| Corrected Model | 6595.993a | 5 | 1319.199 | 7.533 | .000 |
| Intercept | 378934.081 | 1 | 378934.081 | 2163.958 | .000 |
| Advessity Quotient | 6462.305 | 2 | 3231.152 | 18.452 | .000 |
| Gender | 2.826 | 1 | 2.826 | .016 | .899 |
| Advessity Quotient * Gender | 336.956 | 2 | 168.478 | .962 | .385 |
| Error | 22764.502 | 130 | 175.112 | | |
| Total | 555417.001 | 136 | | | |
| Corrected Total | 29360.496 | 135 | | | |

**a. The effect of adversity quotient on students' computational thinking ability**

Based on the data in Table 8, in the Adversity Quotient row, a significance value of 0.000 was obtained which is smaller than the significance level of α = 0.05 which means $H_1$ accepted. This shows that the first hypothesis, which states that adversity quotient has a significant influence on students′ computational thinking ability , is accepted. Furthermore, to look at the adversity quotient category that has better computational thinking, it is necessary to conduct a post-hoc test or a post-anava follow-up test. The post-hoc test or post-anava follow-up test is shown in the following table.

**Table 9.**Tukey-Kramer Test Results

| Dependent Variable: Tes Computational Thinking | | | | | | |
|---|---|---|---|---|---|---|
| Tukey HSD | | | | | | |
| (I) AQ | (J) QA | Mean Difference (I-J) | Std. Error | Mr. | 95% Confidence Interval | |
| | | | | | Lower Bound | Upper Bound |
| Climbers | Campers | 7.6364* | 3.13984 | .043 | .1923 | 15.0806 |
| | Quitters | 20.0723* | 3.55200 | .000 | 11.6510 | 28.4936 |
| Campers | Quitters | 12.4358* | 2.69225 | .000 | 6.0529 | 18.8188 |

Based on the results of Table 9, it was found that there was a difference in computational thinking ability between students with adversity quotient (AQ) climbers compared to campers and quitters, where this difference was significant (p <.05). This can also be seen from the average computational thinking ability of AQ climbers of 71.7391 (see Table 5), which is higher than that of campers who have an average of 64.1027, and quitters of 51.6669.

**b. The influence of gender on students' computational thinking ability**

Based on the data in Table 8, in the Gender row, the significance value of 0.899 is also greater than α = 0.05 which means $H_0$ it is accepted. So the second hypothesis

that states that gender has a significant influence on students′ computational thinking ability is rejected.

**c. The effect of adversity quotient and gender on students' computational thinking ability**

Based on the data in Table 8, in the combination of Adversity Quotient and Gender, a significance value of 0.385 was obtained which is still greater than α = 0.05 which means $H_0$ it is accepted. Therefore, the third hypothesis that the interaction between adversity quotient and gender has a significant influence on students' computational thinking ability is also rejected.

## Discussion

**a. The effect of *adversity quotient* on *students'* computational thinking ability**

Based on the data in Table 8, in the adversity quotient row, a significance value of 0.000 was obtained, which is smaller than the significance level of α = 0.05 which means $H_1$ accepted. This shows that the first hypothesis, which states that adversity quotient has a significant influence on the ability of computational thinking students to be accepted. Based on the results of Table 9, it was found that there was a difference in the ability of computational thinking between students with the type of adversity quotient (AQ) climbers. Compared campers and quitters, where this difference is significant ($p < .05$). This can also be seen from the average ability of computational thinking on AQ climbers, which is 71.7391 (see Table 5), which is higher than Campers, who have an average of 64.1027, and quitters, amounting to 51.6669. This finding is consistent with the research of Abdul Ma'arif et al. (2020), which states that students with AQ type Climber have better mathematical problem-solving skills compared to students of the Camper and Quitter. Research by Yustiana et al (2021) also indicates that students of the Climber able to solve all indicators of problem-solving ability. The unyielding attitude that is the hallmark of the type Climber making them always make maximum efforts to find the best solution in solving problems (Saadah et al., 2022).

In facing mathematical problems, each student showed a variety of responses. Some students see the problem as a challenge that needs to be overcome and solved, while others see it as an obstacle that is too difficult, so they feel unable to solve it (Nurliyan Hidayati et al., 2023). In the process of thinking, students with adversity quotient climbers tend to use a conceptual approach when solving mathematical problems. Meanwhile, students with adversity quotient campers and quitters shows a tendency to think that is semi-conceptual (W. Hidayat & Sari, 2019).

**b. The influence of gender on students' computational thinking ability**

Based on the data in Table 8, in the Gender row, the significance value of 0.899 is also greater than α = 0.05, which means $H_0$ accepted. So the second hypothesis that states that gender has a significant influence on the ability of computational thinking students is rejected. This finding is in line with the results of research conducted by Suprapto et al. (2018). It was found that gender did not have a significant influence on students' thinking ability. This finding is also supported by the results of research by Mira Esti Kusumaningrum et al. (2020), which shows that there is no significant difference in thinking ability between male and female students.

Men and women have strengths and weaknesses that complement each other. However, these differences are not a barrier in the learning process, especially in the context of computational thinking. In solving problems through computational thinking, there is no one approach that is considered correct for all individuals. Instead, solutions can be diverse, depending on each individual's way of thinking, creativity, and analytical abilities (Astra et al., 2022). Therefore, the difference in ability between men and women is no longer rooted in gender factors, but rather in individual abilities, interests, and talents.

**c. The effect of adversity quotient and gender on students' computational thinking ability**

Based on the data in Table 8, in the combination row of adversity quotient and gender, a significance value of 0.385 was obtained, which is still greater than $\alpha = 0.05$, $H_0$ cccepted. Therefore, the third hypothesis that states that the interaction between adversity quotient and gender has a significant influence on the ability of computational thinking students is also rejected. The findings are in line with research conducted by Rachma Amindayani and Sigit Muryono (2024), which shows that there is no significant difference between the adversity quotient of male and female students in their ability to think in one of the junior high schools in Jakarta. In other words, an individual's resilience to challenges or difficulties is not affected by gender differences. Instead, adversity quotient tends to be influenced by various other aspects such as natural talent, determination, intelligence, health conditions, personality traits, genetic factors, education received, as well as beliefs held by the individual. These factors are more relevant in influencing a person's ability to survive adversity than gender differences.

## Limitations

This study has proven that adversity quotient has a significant effect on computational thinking skills, where toughness and unyielding become capital in solving a problem, especially in mathematics. However, the researcher acknowledged that there are limitations that can be recommended for further research, namely that the research sample may be limited to certain populations, such as students from one school or a certain region. This can limit the generalization of research results to a wider population with different characteristics*;* causal-comparative research has limitations in establishing strong causal relationships. Without full randomization and control, it is difficult to be sure that adversity quotient is the only factor affecting computational thinking ability; the presence of uncontrolled related variables may affect students' computational thinking ability, such as parental education level, teaching quality, and learning environment; and gender variables, although research shows that gender has no significant effect, these results may be influenced by insufficient sample size or uneven distribution between males and females.

## Conclusion

Adversity quotient has a significant effect on computational thinking skills, where toughness and never giving up become capital in solving a problem, especially in mathematics. Then gender does not have a significant effect on students' computational thinking skills, which means that men and women have their own advantages and weaknesses, especially in computational thinking skills. The interaction between adversity quotient and gender did not have a significant effect on students' computational thinking

skills. In other words, the combination of male and female students' resilience did not affect students' computational thinking skills.

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