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EXAMINING HOW GROUPING BY TEMPERAMENT AFFECTS MATHEMATICS PERFORMANCE AMONG STUDENTS IN GRADES 6 AND 7

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Nowadays, it is crucial to consider students’ different behavioral patterns and action styles in education to achieve high academic results, especially when grouping students and assigning team-based tasks. This study examines the effectiveness of organizing group work based on students’ temperament types. Mathematics requires students to think logically and perform analytical reasoning during lessons. Therefore, taking into account students' specific temperament types can significantly increase their interest in the subject [1]. In this study, a quasi-experimental design was conducted with 6th–7th grade students to compare pre-test and post-test results.

As an example of the importance of temperament in mathematics, it has been shown that students with different psychological characteristics participate differently in classroom activities [7]. Passive students tend to show lower engagement, while more active students participate more during group work. Research also indicates that students who are aware of their temperament types better understand which tasks suit them [2]. This highlights the connection between temperament-related factors and mathematical anxiety.

In this study, two sixth-grade and two seventh-grade classes were selected to conduct the experiment, where two classes belonged to the experimental group and two to the control group. At the beginning of the study, temperament tests were conducted to identify which type of temperament each student belonged to (melancholic, sanguine, choleric, phlegmatic) [2]. The experiment lasted for 7 academic weeks. The experimental classes were divided into “ideal” groups, where each group included at least one of each temperament type. This approach is supported by cooperative learning theory, which emphasizes balanced group interaction [3], [4]. For example, one melancholic, one choleric, one phlegmatic, and two sanguine students were placed in one group. However, the control classes were divided into random groups.

After two lessons on a new topic in each class, a pre-test was conducted to measure students’ mathematics performance levels. Then, for the next five weeks, students worked in groups. At the end of the experiment, students took a post-test to evaluate their progress compared to the pre-test. To analyze students' progress, a paired t-test was conducted using each group’s pre-test and post-test results to determine whether there was any improvement. Overall, both 6th and 7th grade students showed higher post-test scores compared to their pre-test results in both the experimental and control groups. To further examine the effectiveness of temperament-based group work, an independent t-test was conducted to compare the differences between the experimental and control groups.

t-Test for Two Independent Samples Assuming Unequal Variances		
	Pre-test	Post-test
Mean	4.727273	1.826087
Variance	0.207792	0.150198
Observations	22	23
Hypothesized Mean Difference	0	
Degrees of Freedom (df)	41	
t-Statistic	22.95352	
P(T ≤ t) one-tail	2.56E-25	
t Critical one-tail	1.682878	
P(T ≤ t) two-tail	5.11E-25	
t Critical two-tail	2.019541	

Table 1. t-Test Calculated for the Growth Indicators of Sixth Grade Students in the Experimental and Control Groups

The results of sixth grade students showed that the p-value was significantly less than 0.05(5.11E-25), which indicates that the null hypothesis should be rejected. In this study, the hypothesis was: "Temperament-based group work significantly increases students' mathematics performance compared to randomly formed groups."

As observed, during temperament-based group work, students tried to motivate each other and divide tasks among themselves. For instance, one student was responsible for task distribution, another prepared explanations, and another searched for solutions in textbooks. This type of collaboration improves both academic performance and social interaction skills [3].

On the other hand, the classroom environment was sometimes noisy. Students in each group had different personalities, which occasionally made communication difficult. In the control groups, some students were passive, while others were overly active. This imbalance can negatively affect group learning outcomes [4].

In conclusion, group work based on temperament is an effective method for improving students' achievement in mathematics. The results of the study show that this approach contributes not only to academic success but also to the development of personal and social skills. This aligns with modern educational standards that emphasize student-centered learning [5] and innovative teaching methods [6]. In the future, it is recommended to apply this method to other subjects and to students of different age groups. In addition, organizing specialized methodological guidelines and training sessions for teachers can help enhance the quality of education.

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