EFFECTIVENESS OF COOPERATIVE LEARNING ON ACADEMIC ACHIEVEMENTS OF STUDENTS AT THE ELEMENTARY SCHOOL LEVEL

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ABSTRACT
Cooperative learning is a teaching approach that promotes group collaboration among students. This method aids in structuring classroom activities into meaningful academic learning experiences. The aim of this study is to compare the scores from pre-tests and post-tests between the control group and the experimental group. The study utilized a pre-test-post-test control group design. The sample consist of 30 students of class seventh of an elementary school. Data was collected using achievement test. Test was taken in two phases: Initially, students was randomly assigned to two groups: the control group and the experimental group. Both groups participated in pre-tests and post-tests. Control group employed traditional teaching, while the experimental group received intervention. Results were subsequently compared. The data undergo analysis using measures mean and t-test. The result showed that there is no notable difference in the academic achievement between the pre-test and post-test scores of both the control group and the experimental group. Based on the result of findings, study concluded that no significant difference was observed in the academic achievement of control and Experimental group. Cooperative learning interventions was not found too meaningful in improving the

academic scores of the students.

KEYWORDS
Cooperative Learning, Academic achievement, Classroom activities, Instructional Method, Learning Experiences

INTRODUCTION

A pedagogical approach referred to as cooperative learning promotes student collaboration in small groups to achieve a common objective while also developing their communication, critical thinking, and teamwork abilities. Teachers and academics are putting more and more effort into examining how cooperative learning affects academic achievement as the educational landscape changes. This study attempts to illuminate the potential advantages of this teaching strategy by investigating the effects of cooperative learning tactics on students' learning results. For educators, decision-makers, and other stakeholders, knowing how cooperative learning influences academic accomplishment can be helpful in developing and putting into practice effective pedagogical strategies that improve student learning and success. This research presents a comprehensive analysis of available literature to investigate the relationship between cooperative learning and academic accomplishment, highlighting the possible consequences for educational methods and student outcomes.

The background to investigate this study is that in our educational institutions old methods of teaching were used for a long time, there is a need to introduce some new method in our educational institutions. By introducing new approaches in our classrooms, which can improve the learning potential of weak students. Students work together as a team in cooperative learning with the goal of raising the academic performance of each team member. It is critical to understand that the failure of even one team member might jeopardize the success of the entire group. Therefore, it is crucial to measure both the individual performance of team members and their relationships with one another to better gauge the team's functionality. The effectiveness of the team and overall success can evaluated thoroughly by taking into account both factors (Hsiung et al., 2014).

Many active education methodologies built on the foundation of cooperative learning. It involves the deliberate utilization of small groups during teaching, wherein students collaborate to enhance their individual learning as well as the learning of their fellow students (Johnson & Johnson, 2018). Cooperative learning is widely recognized educational strategy that fosters socializing and speeds up learning among students at all academic levels, from preschool to tertiary, and in a wide range of subject areas. It centres on students collaborating to attain shared objectives or accomplish group tasks

that would be challenging to achieve individually (Gillies, 2016). Cooperative learning can better implemented when groups are formed carefully, instructions are made clear, and the teacher supports healthy group dynamics. The teacher's responsibilities include guiding students, keeping tabs on their development, and promoting introspection and criticism.

Cooperative learning denotes teaching techniques where students collaborate within small groups to assist each other in the learning process. Although cooperative learning techniques are used with students of all ages, they are particularly common in elementary (primary) institutions (Slavin, 2015). Teachers have been employing cooperative learning as a successful teaching approach for more than 40 years. Teachers often assign students to heterogeneous groups, aiming to facilitate learning among lower-achieving students by providing them with the opportunity to benefit from and interact with higher-achieving peers (Wyman & Watson, 2020).

LITERATURE REVIEW

Cooperative Learning

Individual accountability and group reinforcement are key components of cooperative learning practices that are more likely to raise achievement levels for children with impairments. However, design flaws in all of the research make it difficult to draw generalizations about the effectiveness of cooperative learning. Before it can be considered a useful tactic for students with disabilities, more research is required (McMaster & Fuchs, 2002). Cooperative learning, often abbreviated as CL, involves students collaborating in groups to work on a task or project. This approach is effective when specific conditions are met, ensuring that each team member bears individual responsibility for the entire content of the task or project. This chapter discusses the practical applications of cooperative learning, underscores the research supporting its effectiveness, and provides proven strategies for implementing CL successfully while overcoming common challenges (Felder & Brent, 2007).

A small group of students engages in cooperative learning, an instructor-facilitated teaching approach that is student-centered. In this method, each student is accountable not just for their personal learning but also for the collective learning of the entire group. These students collaborate within small groups to understand and apply subject concepts, aiming to solve problems, complete assignments, or achieve specific objectives (Li & Lam, 2013). One of the most significant achievements in the history of educational research is the study of cooperative learning. While research on this topic dates back to the early 20th century, the volume and calibre of research in this area experienced substantial growth in the early 1970s and continue to be robust even more than a quarter-century later.

Numerous control methods have been contrasted to cooperative learning in numerous studies over the years. However, the predominant focus of this research has been to establish the impact of cooperative learning on student's class achievement. Researches investigating the advantages of cooperative learning on student achievement have been conducted in various countries, encompassing all academic fields, grade levels, and educational settings (Slavin, 2012).

A learning strategy known as cooperative learning places participants in small groups where they cooperate and assist one another. Cooperation is valued in cooperative learning, in contrast to our current educational system, which encourages competitiveness. Humans have a basic tendency toward cooperation rather than competition. Love and collaboration are two characteristics shared by all people, and these are characteristics that serve as the cornerstone for survival of humanity (Singh & Agrawal, 2011). Cooperative learning techniques can vary greatly in their specifics.

The groups might have two to many members, depending on their size. Members of a group may be given either specific duties or tasks to perform individually, or they may all be given the same duty. Groups may be evaluated or rewarded based on their overall performance or the average of their members' individual performances, or they may just be urged to work together without receiving any official evaluation (Slavin, 2011). While group performance was superior to individual performance during the learning phase, collaboration did not result in better learning outcomes. Cooperative learning also had a beneficial impact on how well performance and competence were perceive. A halo effect may have had a favourable influence on each person's self-efficacy because of the group's overall effectiveness (Krause et al., 2009).

In a cooperative learning environment, students collaborate to achieve a common objective. Cooperation leads to higher levels of performance, according to research. Students are accountable for their own success even if they may participate in a cooperative learning environment. Because you are evaluating both individual and team performance, this makes grading students difficult (Woods & Chen, 2010).

History of Cooperative Learning

Cooperative learning was mostly unknown and disregarded by instructors in middle of the 1960s. Competitive and self-paced learning dominated teaching at the primary, secondary, and collegiate levels. Social Darwinism, which holds that learners are expected to thrive in a "dog-eat-dog" environment, and the notion of "rugged individualism," which underlies practice of self-paced learning, were the foundations of cultural opposition to cooperative learning. Although the foundation of individualistic learning primarily draws from B. F. Skinner's research on programmed instruction and behavioral modification, competition nevertheless dominated

educational ideas.

But educational methods and ideas have evolved. At all levels of education, cooperative learning is now acknowledged and commonly applied instructional method. Currently, Cooperative learning is utilized in educational institutions worldwide, spanning across all subject areas and age groups of students. Cooperative learning is frequently discussed in texts on teaching strategies, teacher journals, and instructional materials. Numerous languages have been used to translate cooperative learning materials. A success story in both the fields of psychology and education is undoubtedly cooperative learning (Johnson & Johnson, 2008).

Previous Researches on Cooperative Learning

Parveen et al. (2011) conducted an experimental study; the experimental group provided with cooperative learning instruction, whereas the control group provided with conventional instruction. Lesson plans, worksheets, and tests used to teach the experimental group were create particularly to apply the cooperative learning technique. Tests used to analyse the data that was gathered. Surprisingly, the study's findings did not corroborate the research theory. When compared to the traditional way of instruction, cooperative learning was not found to be a superior instructional strategy in this study. Majoka (2007) conducted an experimental in the Rawalpindi district was of an experimental nature.

The sample consisted of two sections of the 10th class that divided equally based on pre-test scores made by teacher. Within each group, there were further divisions of high achievers and low achievers that was determined by the pre-test average scores. For data analysis, Factorial Design (2 x 2) utilized. The results indicate that both the groups under experimentation and control possessed similar levels of mathematical knowledge at the beginning of the experiment. There was no discernible change observed between the high achievers in the experimental and control groups during the retention test. However, a notable difference was identified among the underachievers in the control group and the experimental group. These research findings suggest that cooperative learning had a positive influence on the academic performance of low achievers when compared to their high-achieving counterparts.

An experimental study by Gull & Shehzad (2015) revealed a statistically significant difference between the post-test scores of the experimental and control groups. A paired sample t-test was used to evaluate how the intervention affected the test group's academic performance. The results showed that the experimental group's ratings before and after the intervention differed statistically significantly ($p = .000$). These results imply that students' academic performance in the field of education was positively impacted by cooperative learning experiences. Parveen et al. (2017)

conducted an experiment in which traditional methods were used to signify the control group, and cooperative learning was used to train the trial social event. In the study's framework, a form of Pre-test and post-test control groups—a true experimental design—were used. The dependent variable was pupils' academic success in mathematics, and the independent variables were teaching strategies. All of the seventh-graders enrolled in the Government Girls High School in Rawalpindi, Pakistan, were included in the study's population. 30 students in the seventh grade who were randomly chosen from the Rawalpindi government school made up the sample.

The selected sample of students was divided into a control group and an experimental group based on their pre-test results. Subsequent analysis of the post-test revealed that students who had received cooperative learning instruction demonstrated superior academic performance compared to students who had received traditional instruction. According to the experimental results, it found the pupils who participated in cooperative learning had noticeably higher grades on both homework assignments and unit tests compared to their counterparts in the individualistic learning setting when given enough time to form cooperative learning teams. As shown by the higher academic outcomes of students who participate in cooperative learning, the careful monitoring of time spent on activities supports the idea that cooperative learning outperforms individualistic learning (Hsiung, 2012).

The results showed that even though the instructor used a cooperative learning strategy based on research, he adapted the model to work in his particular classroom. The outcomes also showed that the teacher's prior training and learning environment influenced how he used cooperative learning instruction (Siegel, 2005).

RESEARCH OBJECTIVE

1. To determine whether there is statistically significant difference in academic achievement between students who exposed to cooperative learning and those exposed to traditional teaching method.

RESEARCH HYPOTHESES

1. There is statistically no significant difference in the mean score of pre-tests of controlled and experimental group.
2. There is statistically no significant difference in the mean score of post-tests of controlled and experimental group.

RESEARCH METHODOLOGY

This study used an experimental design of research, more precisely a pre-test-post-test control group design. Participants in this kind of trial are assigned at random to either receive the intervention (referred to as the treatment group) or not (referred to as the

control group). All seventh-grade kids from private schools in Rawalpindi city made up the study's population. There is total 1216 private schools that have elementary level education in Rawalpindi city. The study's sample consist of seventh grade students at British Academy School (Girls campus) Rawalpindi. There is total 30 students in class seventh who the part of study were. Researcher used purposive sampling technique. These 30 students were further divided into the two groups: an experimental group and a control group. There were fifteen pupils in every group. Research instrument that used in the study was achievement test taken from the 30 students of the class seventh. This achievement test was from the subject of science, which include both objective and subjective type test items.

The following protocol was used to carry out the research:

1. The researcher purposively selected one private elementary level school for doing experimental study on the students of class 7^{th} on the subject of science. There are 30 students in class 7^{th} of British Academy School (Girls Campus) Rawalpindi.
2. When researcher started experimental study, then previous marks of the students were taken from the science teacher. Then these two groups of fifteen pupils each were randomly chosen from the thirty students. By allocating their grades in descending order, the students were divided into two groups: the experimental group and the control group.
3. The duration of study were three weeks. The duration of each science class was 40 minutes.
4. The researcher carefully constructed achievement test for pre-test to check current level of understanding of students. Then Pre-test taken from both experimental and control group to check their previous knowledge. The controlled group taught by their science teacher and experimental group were taught by the researcher.
5. After Pre-test interventions given to experimental group only and the control group received instruction in a typical classroom setting. To compare the two groups' academic success differences. Interventions include first teacher taught the lesson and then placed the experimental group students in small groups, three students in each group. Students taught each other by group discussion, peer teaching, and think Pair Share and Jigsaw activities. Students were also given worksheet activities to solve them in a group at the end of each lesson to check their current learning. At the end of each student discussion in group, oral quizzes were also taken from the student, to check their recent level of learning.
6. Upon administering the interventions, at the conclusion of the study, post-tests were given to the experimental group as well as the control group. By contrasting the post-test results with the pre-test results, data analysis was carried out. The researcher compared the scores of the experimental and control groups.

Metrics like the mean, standard deviation, and T-test are used to analyse the data.

DATA ANALYSIS

The study's objectives are aligned with the presentation of the findings. Our goal was to determine if students who participated in comparative learning and those who participated in standard classroom instruction had significantly different academic results. Both groups completed a pre-test, and the results showed that there was no discernible difference between the two groups' academic results. The experimental group received all interventions after the pre-test, whereas the control group received none. Worksheets, team teaching, group projects, and other cooperative learning activities are examples of interventions. The investigation lasted for three weeks. Following the interventions, both groups' post-test results were obtained, but there was still no discernible difference between them. Data analysis was done using the social sciences statistical software.

Table 1: ***Group statistics of Pre-test scores of Controls and Experimental Group***

	Pre-test Group	N	Mean	Std. Deviation	Std. Error Mean
Pre Test Score	Control Group	15	33.1333	9.66486	2.49546
	Experimental Group	15	33.3333	9.53690	2.46242

The pre-test findings for the control and experimental groups are displayed in Table 1. The average score of the 15 individuals in the control group was 33.13, with a standard error mean of 2.5 and a standard deviation of 9.66. There were 15 participants in the experimental group, and their mean score was 33.33 with a standard deviation of 9.54 and a standard error mean of 2.46. This suggests that both groups had baseline scores that were similar before any intervention was implemented.

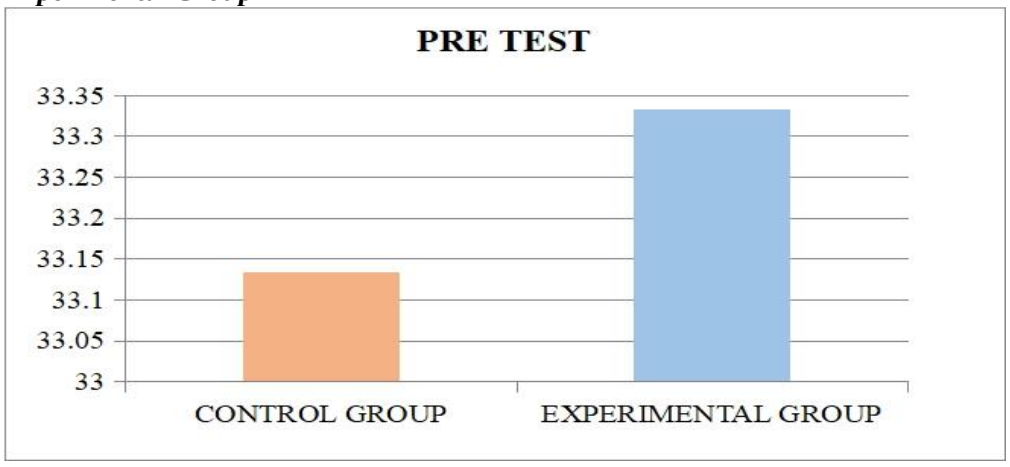
Table 2: ***Analysis of Pre-test Scores of Controls and Experimental Group***

		Pre-Test Score	
		Equal Variance Assumed	Equal Variance not Assumed
Levene's Test for Equality of Variances	F	0.374	
	Sig.	0.546	
	T	-0.057	-0.057
	Df	28	27.995
	Sig. (2-tailed)	0.955	0.955
	Mean	-0.20000	-0.20000

T-Test for Equality of Means	Difference Std. error mean		3.50582	3.50582
	95% confidence interval of difference	Lower	-7.38135	-7.38141
		Upper	6.98135	6.98141

The comparison of pre-test outcomes between the experimental and control groups is displayed in Table 2. With a p-value of 0.546, Levene's Test for Equality of Variances revealed identical variances. Based on the T-Test for Equality of Means, the standard error mean was 3.51 and the mean difference was -0.20 points. The t-value of -0.057 with 28 degrees of freedom was not statistically significant ($p = 0.955$, $p > 0.05$). This indicates that there was little variation in the pre-test scores of the two groups, indicating that they were comparable before the intervention.

Figure 1: ***Figure shows the difference in mean of pre-test scores of Control and Experimental Group***



The mean pre-test scores for the control and experimental groups are displayed in Figure 1. With a mean score of 33.3, the experimental group outperformed the control group, which had a score of 33.1. The consistency of these mean scores suggests that prior to the application of any intervention, the baseline performance of both groups was similar.

Table 3: ***Analysis of Mean Scores of Post-test Scores of Controls and Experimental Group***

Post Test Group	N	Mean	Std. Deviation	Std. Error Mean

Post Test Score	Control Group	15	36.7333	8.87586	2.29174
	Experimental Group	15	37.2000	7.36982	1.90288

The post-test results for the experimental and control groups are displayed in Table 3. With a standard deviation of 7.37 and a mean score of 37.20, the experimental group (N = 15) outperformed the control group (N = 15) in terms of standard deviation and mean score, respectively. These similar mean scores suggest that both groups performed comparably after the intervention.

Table 4: Analysis of T-test of Post-test scores of Controls and Experimental Group

			Post Test Score	
			Equal Variance Assumed	**Equal Variance not Assumed**
Levene's Test for Equality of Variances	F		0.043	
	Sig.		0.838	
T-Test for Equality of Means	t		-0.157	-0.157
	df		28	27.085
	Sig. (2-tailed)		0.877	0.877
	Mean Difference		-0.46667	-0.46667
	Std. error mean		2.97876	2.97876
	95% confidence interval of difference	Lower	-6.56838	5.63505
		Upper	5.63505	5.64435

The results of statistical tests Table 4 displays a comparison of the experimental and control groups' post-test results. According to Levene's test, group variances are equal (p = 0.838). Whether equal variances are assumed or not (p = 0.877), the T-test shows no discernible difference in means (p = 0.877). Given that the two groups fared equally following the intervention, it is possible to draw the conclusion that the intervention had no discernible impact on the post-test outcomes.

Figure 2: ***Figure shows the difference in mean of Post-test scores of Controls and Experimental Group***

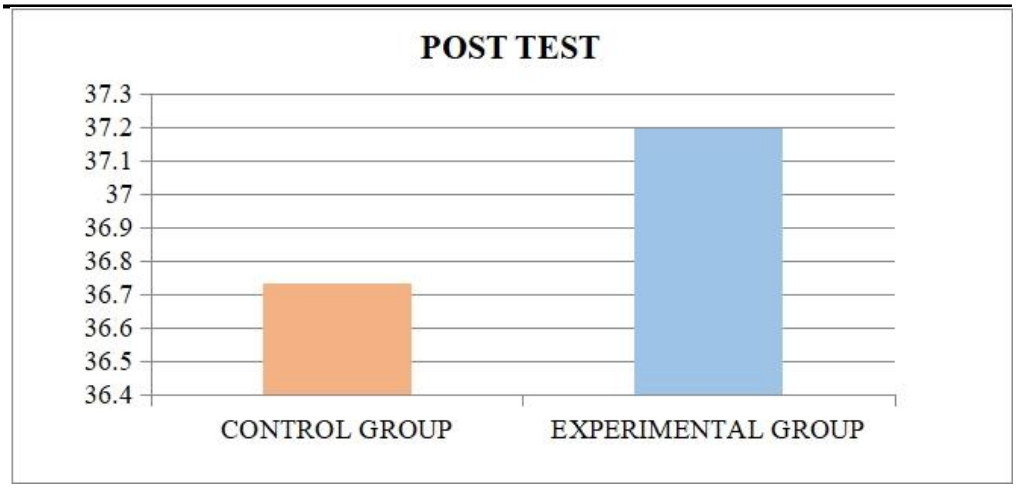


Figure 2 displays contrasting experimental and control groups' mean post-test results. The experimental group scored somewhat greater at 37.2 than the control group, which had a mean score of 36.73. This slight variation in mean scores implies that both groups' post-intervention performance was quite similar, suggesting that the intervention had no discernible effect on the differences between the experimental and control groups.

DISCUSSION

The purpose of this research was to examine the impact of cooperative learning on the academic performance of elementary school students. To assess this impact, a Pre-test – Post-test control group Design was employed. The researcher administered pre-tests to both groups, with interventions only provided to the experimental group, followed by post-tests. The study involved 30 seventh-grade students from a single elementary school in Rawalpindi. Findings indicated no significant disparity in the pre-test scores between the control and experimental groups. Furthermore, there was no notable difference observed in the post-test scores between the two groups. Consequently, the study suggests that cooperative learning may not be an effective instructional approach for enhancing students' academic achievement. This result was found consistent with the findings of Parveen et al. (2011) where it was revealed that cooperative learning was not a superior strategy to improve the academic achievements of students. Siegel (2005) showed that the teacher's prior training and learning environment influenced how he used cooperative learning instruction. Mobark (2014) study results are also consistent with study's findings, The data showed that there is no discernible difference between the effectiveness of cooperative and competitive learning approaches when teaching graduate students research methods and educational statistics courses.

Sengal and Katranci (2014) also researched one of the strategies of cooperative learning which is Jicksaw and the results are consistent with the present study findings. They found that there were no appreciable differences between the students' pre- and post-test scores. This result suggests that the Jigsaw method has no positive effect on students' attitudes toward mathematics. Stanczak et al. (2012) also conducted research on Jicksaw that is the strategy of cooperative learning, results were also consistent with the present study and findings show that the jigsaw intervention was compared to a "teaching as usual" strategy or an "individualistic" approach on the same pedagogical topic in five experiments. However, none of these trials produced any empirical support for this theory. Internal meta-analytic calculations suggest that overall, the jigsaw intervention did not have the anticipated favorable impacts on learning.

Tan et al. (2007) conducted research on group work and their result is also consistent with present study's findings. According to Tan et al. (2007), high achievers did not encourage group work because they performed significantly better than poor achievers. The effects of the group investigation strategy on the academic performance of high and low achievers were not significantly different. However, it only affected the high achievers' motivation to study in relation to the Criteria subscale. Majority of the researchers have conducted research and there result was significant because the present study's duration is three weeks and in many researches which have significant result duration is more than three weeks. Keramati and Gillies (2022) conducted research on cooperative learning and their study's research was significant as there study's duration was 16 weeks. Tran (2014) also have significant results in their study and its study duration was also eight weeks, which is more than present study. Hosseini et al. (2017) also found significant impact of cooperative learning on students' academic performance and related research duration was also ten weeks.

In majority of research in which results are found significant the sample size was larger than present study. The study conducted by Gull and Shehzad (2015) there sample size was 63 female students but the current study sample size was just 30 female students. It can say that sample size can also be helpful to achieve significant results. Keramati (2010) also conducted research on cooperative learning and its results were found significant as the sample size of study was 220 Iranian high school students. Parveen and Batool (2012) also support cooperative learning strategy as they discovered a substantial difference between the experimental and control post-tests. And their sample size was 36 students which is also a little larger than the present study. To conclude, our study found limited evidence supporting the effectiveness of cooperative learning compared to research with larger sample sizes and longer study durations. This underscores the need for future investigations to extend study durations and involve larger participant groups. Additionally, utilizing a variety of assessment

methods could provide a more comprehensive understanding of cooperative learning's impact on student achievement. Such efforts will contribute to refining educational practices and maximizing the benefits of cooperative learning in diverse classroom settings.

In conclusion, this study did not discover a statistically notable disparity in elementary academic achievement among students who participated in cooperative learning activities and those who did not. In contrast to some studies with larger sample sizes and longer durations, our study did not identify any significant benefits of cooperative learning. These variations imply that greater time and larger groups may be necessary for the effects of cooperative learning to become apparent. Our study's shorter duration and smaller sample size may have made it more difficult for us to identify meaningful impacts, underscoring the significance of study design in educational research.

RECOMMENDATIONS

Larger sample sizes should be used in future research to guarantee stronger statistical power and more trustworthy outcomes. Bigger sample sizes make it easier to uncover important impacts and produce results that are more applicable to a variety of educational contexts.

Extended study periods are advised to give cooperative learning enough time to potentially show results. Longer time frames can aid in capturing long-term advantages and improvements in student performance that may be missed by studies conducted too quickly.

A range of evaluation techniques ought to be employed to fully capture the complex effects of cooperative learning on student performance. A thorough assessment of student outcomes can be obtained by utilizing a variety of instruments, including performance evaluations, standardized examinations, and observational measures.

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