

## **A Comparative Study of Public and Private Secondary Schools Students on Academic Achievement, Engagement and Self-Regulation in Mathematics**

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### **Abstract**



*Self-regulation is about getting ready to take challenges regarding education. Self-regulated learning removes disinterest and demotivation regarding academics. Objective of the study was to compare public and private sector secondary school students on academic achievement, mathematics' engagement and self-regulation. The descriptive research design was used to find out difference in public and private sector secondary school students on academic achievement in mathematics, mathematics' engagement and self-regulation in students learning. Three research instruments were used in present survey study. Students' engagement in mathematics classroom, a questionnaire on self-regulated learning, mathematics achievement test were used to investigate the impact of self-regulated learning on students' achievement and engagement in mathematics classroom in public and private sector secondary schools. By using proportionate random sampling technique, eighty schools were selected from the list of schools taken from internet sources.. Both descriptive (Mean Score) and inferential statistics (t-test) were employed. Findings of the study were obtained by comparing self-regulation, engagement and mathematics achievement that in private secondary school students were better than public sector secondary schools. This study might be helpful for school administrators.*

**Keywords:** Public and Private Secondary Schools, Academic Achievement, Engagement, Self-Regulation, Mathematics.

### **Introduction**

There are many benefits of being self-regulated in studies but the autonomy is the main advantage because students organize and utilize their time according to their own timetable. Successful learning has a key point of successful performance in exams and self-regulation strategies is also and other strategies of readings and writings are also their own place in school education. Nobody can refuse the significant role of such strategies used in school education system. Every country is competing to control the global market through education as the globe becomes a small, interconnected village. Education lays the groundwork for generating money and improving the quality of life (Lawal, 2007).

When students try to be self-directed and thoughtful, in fact, they want to be self-regulated, therefore, students get such procedures that are useful in achieving educational goals that is useful in their learning activities for better academic achievement (Yan, 2020). Researchers has also tried to explore difference between public and private sector students self-regulation and found that students of private schools are slightly better in adopting self-regulation strategies in their academic achievement as compare to students of public sector schools. They have explored that self-regulated learning has a significant effect on academic achievement. There is little study on comparison of public and private sector students' self-regulation in case of mathematics. Secondary school educator should take action and do help of students in improving students' self-regulation learning (Asim & Farooq, 2021). According to a study by Xiao, Yao and Wang (2019) has explained that academic activities hold goals, self-monitoring, time adjustment and self-regulation in learning and self-improved way of study to do their best in examinations. There are many definitions of academic achievement but in present study marks obtained in mathematics achievement test are the achievement in mathematics. Furthermore, academic achievement or grades is a useful measurable summary of a forthcoming member's accomplishment in college (Pascarella & Terenzini, 2005).

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This study was intended to compare and contrast the self-regulation, engagement and academic achievement of students in mathematics between public and private schools in order to examine which school environment students possess more self-regulated skills and show more engagement in learning mathematics. This study may help students to control their learning of mathematics by having sufficient control on their self-regulation

### **Literature Review**

In discussion of self-regulation, most important is to consider the parts of self-efficacy in the background of self-regulation and academic achievement. Meanwhile, researchers have confirmed that self-regulation leads self-efficacy. To get a higher self-efficacy level, self-regulation has played a vital role in according to pervious researches (Yang, Zhou, Cao, Xia, & An, 2019). Furthermore, Ajewole (2005) said that education has long been acknowledged as the tool of choice for fostering national development and economic growth, which has led to a worldwide desire for growth. The process of learning mathematics starts at an early age and progresses gradually all the way through the student's schooling. Because there are so many different disciplines of mathematics, learning is typically cumulative, the development of mathematical knowledge is unique. The ability to learn new concepts and skills depends on the ability to master earlier concepts and skills (Montague, 2007).

Challenges arise in school and at career for individuals who lack the necessary math abilities throughout their lives (Fuchs, Fuchs, Powell, Seethaler, Cirino, & Fletcher, 2008). Some children who transfer to high school fail one or more math courses and may have made their decision to drop out even before they started high school. Many of these students are older than their peers since they may have repeated a grade level, and they frequently disrupt classroom behaviour. Students that misbehave, often remain absent, have difficulties paying attention, and have bad attitudes toward mathematics are common in mathematics classes. How to intervene to assist these pupils is an imperative topic of concern for math instructors who see these student behaviours in their classes.

Self-regulating learners, according to strategically experiment with their learning, fine-tuning it over time and across tasks. Students exercise agency by actively choosing what goes into their learning, creating goals, and deciding how to get there (e.g. the intensity in engaging a task and the persistence on that task). Students exercise agency when they metacognitive monitor aspects of their engagement in goal-directed tasks, to be more precise (Winne & Hadwin, 2012). When it comes to a student's ability to self-regulate, cognition and conduct are crucial components (Pintrich & De Groot, 2000). According to Bandura (1991), self-efficacy, which is crucial for one's confidence in one's thoughts, motivations, and behaviours, is connected to self-regulation. Four guiding principles govern beliefs in one's ability to plan and carry out a successful course of action necessary for a certain scenario, according to Bandura's (1991) self-efficacy theory. First, previous performance accomplishment success. Observing a role model through a virtual experience is the second. Third, verbal persuasion to promote a reliable and knowledgeable person. Last but not least, a psychological and affective arousal state that affects one's confidence in acting on one's self-efficacy ideas, which is essential for self-regulation.

Students must be motivated to take action, even though understanding of cognitive and metacognitive methods is frequently necessary for student achievement. As we know that cognition is the main part of human life that contribute a lot in students' achievement in different subjects. Self-efficacy is also part of self-regulation, and working memory capacity is also related in mathematics with student's achievement. Students achievement in mathematics is also considered as the reflection of their attitude, when they like mathematics they do more effectively therefore the got good grades otherwise in case of disliking they can fail or be low achiever in this subject ( Batool, Habiba, & Saeed, 2019; Batool, 2019). From above discussion, self-regulation and engagement are crucial for learning mathematics, because students don't show much interest towards learning mathematics whether they are studying in public or private schools (Fielding, McDonald & Louis 2008; Syam & Salim, 2014). Consequently this study wants to compare the students' academic achievements, engagement and self-regulated learning between public and private schools. Therefore, this study was designed to improve students' achievement, engagement and self-regulation in public and private schools. Schools are agents of change, therefore, parents send their children to school. They are interested in change in their behaviours. There is an attempt to show the better option to parents in case of required achievement in their childrens' achievements in mathematics.

According to Uredi and Uredi (2005) mathematical success may be predicted by one's motivating beliefs and self-regulation techniques. Academic success and self-regulation have a causal relationship (Bembenutty & Zimmerman, 2003). All of these research support the idea that students' academic results are positively impacted if they have high levels of self-regulation and are able to control their learning habits and adjust them in response to various learning contexts. Mathematics is now predominantly seen as a set of understanding and problem-solving actions based on mathematical demonstrating of truth, rather than as a gathering of nonconcrete notions and technical abilities to be learnt (De Corte, Verschaffel, & Op'teynde, 2000). According to this perspective, students' use of a variety of cognitive and metacognitive techniques to control their thinking, acting, and inspiration during self-regulated learning may be suitable for developing an abstract understanding of mathematics and science as well as for gaining insight and understanding the concept. Students can also be engaged by giving them proper feedback, may be feedback can effect on low achiever more effectively but at every level it is source of better achievement (Batool, & Akhter, 2019). Therefore, the present study is designed to conduct on secondary school mathematics students to get insight into the engagement in this subject and the relationship with self-regulation and student achievement in mathematics.

### **Objectives of the Research**

These research objectives were formulated:

1. To find out a comparison between public and private school students' academic achievements in mathematics.
2. To find out a comparison between public and private school students' engagement in mathematics.
3. To explore a comparison between public and private school students on self-regulated learning.

### **Methodology**

It was a descriptive research in nature, a quantitative research approach was used to examine the students' self-regulated learning, their engagement in Mathematics Classroom and Mathematics Achievement by using three different research instruments. A survey research method was used to examine the comparison between three variables.

The research was carried out during 2021-2022 school years with nine grade students studying in public and private sector secondary schools in Lahore district. The target group of students was 14-16 year old students of population.

There are 332 Government high schools and 400 private schools at Lahore (both boys and girls). A list of schools was found. By using proportionate sampling technique 80 schools (both public and private) selected from the list of schools and the sections were sub-groups of population and tried to form a sample. So, participants in total were 1000 students that were sampled by using sampling techniques. All students were nine graders to form a sample for study in hand.

### **Research Instruments**

In this study researcher has used three research instruments. Students' engagement in mathematics classroom was measured by a adapting a questionnaire of five points. This research instrument was settled by Kong, Wong and Lam (2003), where they found dimensions of engagement (three types). The student engagement in mathematics classroom scale has included three constructs named as, cognitive engagement, affective engagement and students' engagement regarding their behavioural engagement. The resulting research instrument consisted of 55 items with 5-point on it. The second research instrument was also a five-point Likert scale on Self-regulated learning and it was adapted from different sources. Pintrich and De-Groot (1990) developed a questionnaire on motivational beliefs and Self-Regulated Learning and Barnard, Lan, To, Paton, & Lai, 2009 have also developed a questionnaire on online Self-Regulated Learning. The questions of self-regulation from these questionnaires was adopted for this study. Mathematics achievement test was planned by the researcher to gain mathematics achievement. Mathematics achievement test was constructed for grade nine students that was according to the curricula in Punjab. All three research instruments were pilot tested and reliability and validity was ensured by the researcher.

### **Results**

Data were collected and analysed with the help of SPSS Version 20 and following results were obtained.

**Table 1 Comparison between public and private school students on Academic achievements in mathematics**

Academic Achievements	Public <i>M(SD)</i>	Private <i>M(SD)</i>	Independent samples t-test		
			T	df	p-value
Objective items score	50.47(24.17)	47.56(24.9)	1.34	998	0.180
Subjective Item scores	54.95(22.49)	57.71(17.1)	-1.41	998	0.159
Overall	52.74(21.89)	52.63(19.83)	0.06	998	0.954

Independent samples t-test was conducted to find difference in public school students and private school students on academic achievements. There was no statistically significant difference in objective items score, subjective item scores and overall academic achievement in mathematics.

**Table 2 Comparison Between Public and Private School Students on Students Mathematics Engagements**

Scales	Public <i>M(SD)</i>	Private <i>M(SD)</i>	Independent samples t-test		
			<i>t</i>	<i>df</i>	<i>p-value</i>
Cognitive Engagement (Surface strategy)	3.59(0.77)	3.92(0.61)	0.56	998	0.576
Deep strategy	3.43(0.77)	3.78(0.64)	-5.78	998	<.001
Reliance	3.4(0.9)	3.39(0.92)	-3.69	998	<.001
Affective Engagement (Interest)	3.87(0.78)	3.82(0.62)	0.49	998	0.627
Achievement Orientation	3.72(0.69)	3.94(0.66)	3.79	998	<.001
Anxiety	3.43(0.86)	3.69(0.69)	5.83	998	<.001
Frustration	3.48(0.67)	3.58(0.78)	-7.87	998	<.001
Behavioral Engagement (Attentiveness)	3.37(0.72)	3.73(0.66)	0.28	998	0.783
Diligence	3.49(0.61)	3.7(0.53)	-0.71	998	0.475
Overall	3.59(0.77)	3.92(0.61)	-2.29	998	0.022

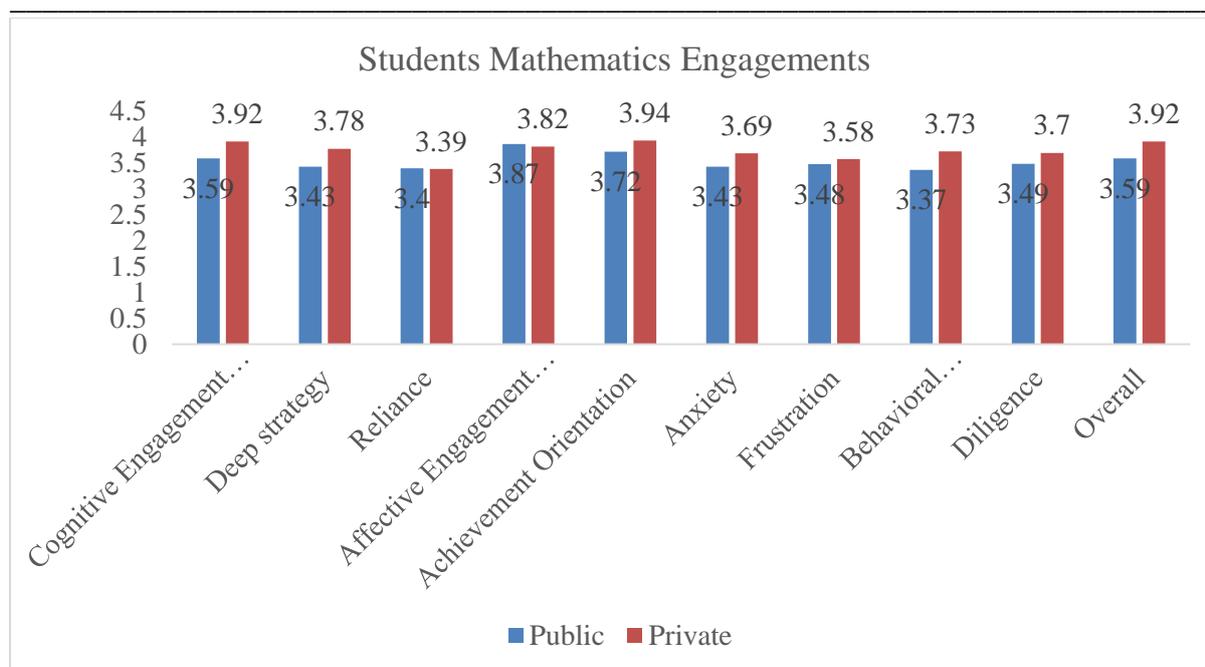
A comparison between public and private school students on Students Mathematics engagements was calculated. Independent samples t-test was conducted to find the statistically significant difference in public and private school students on Students Mathematics Engagements scale and subscales. The students of privates schools had high statistically significant ( $p < .05$ ) scores as compare to public school students scores on cognitive engagement, deep strategy, reliance, affective engagement, achievement orientation, anxiety, behavioural engagement and diligence. There was no statistically significant difference ( $p > .05$ ) in mean scores of public school and private school students scores on surface strategies, interest, attentiveness and diligence. So behavioural engagement of students in public and private schools is almost the same.

There was statistically significant difference ( $p < .05$ ) in mean scores of public school and private school students scores on deep strategy, reliance, achievement orientation, anxiety, frustration and overall scale scores.

**Table 3 Comparison between Public and Private School Students on Self-Regulated Learning**

Scales	Public <i>M(SD)</i>	Private <i>M(SD)</i>	Independent samples t-test		
			T	Df	p-value
Goal Setting	3.59(0.77)	3.92(0.61)	-4.917	998	<.001
Environment Structuring	3.43(0.77)	3.78(0.64)	-5.147	998	<.001
Task Strategies	3.4(0.9)	3.39(0.92)	0.214	998	0.831
Time Management	3.87(0.78)	3.82(0.62)	0.654	986	0.513
Help Seeking	3.72(0.69)	3.94(0.66)	-3.588	998	<.001
Self-Evaluation	3.43(0.86)	3.69(0.69)	-3.459	998	0.001
Cognitive Strategy use	3.48(0.67)	3.58(0.78)	-1.690	998	0.091
Self-Regulation	3.37(0.72)	3.73(0.66)	-5.507	998	<.001
Overall	3.49(0.61)	3.7(0.53)	-3.919	998	<.001

Table 3 shows comparison between public and private school students on self-regulated learning. Independent samples t-test was conducted to find the statistically significant difference in public and private school students on self-regulated learning scale and subscales. The students of privates schools had high statistically significant ( $p < .05$ ) scores as compare to public schools students' scores on goal setting, environment structuring, help seeking, self-evaluation and self-regulation. There was no statistically significant difference ( $p > .05$ ) in mean scores of public teacher schools scores on task strategies, time management and cognitive strategy use.



**Figure 1 Mean scores of public and private school students of students Mathematics**

The above figure shows that students overall engagement in mathematics classroom at private schools is better than students overall engagement in mathematics classroom at public sector schools. Only reliance of students at public sector schools and private sector schools is almost same. Otherwise, all dimensions of students’ engagement are better in private sector then public sector schools.

**Discussion**

As the aim of the study is to compare academic achievement, mathematical engagement and self-regulation between students of public and private schools. Thus, from the above mentioned results it is revealed that there is no noteworthy modification in overall academic achievement between public and private school students. It is might be due to same sight in both sectors. On the other hand, private school students demonstrated high engagement in mathematics and are more self-regulated as compare to public school students. For examining students engagement in mathematics eight indicators were used that were cognitive engagement, deep strategy, reliance, affective engagement, achievement orientation, anxiety, behavioural engagement and diligence. The change in public school students and private school students’ academic achievement regarding the subject of mathematics was not reported in present study. In case of academic achievements in objective items score, subjective item scores and overall academic achievement in mathematics. Researchers also support these findings, Frenette and Chan (2015) has found that students in public sector students are low achiever as compare to the students in private sector schools. Students engagement is a positive factor in students’ mathematics studies, students like mathematics if they find it more useful in professional life (Batool, 2020b). Students’ self-regulation also matter in students’ betterment in mathematical concepts. Self-study and to regulate there self-students can do well in mathematics and in other subjects as well (Batool, Noureen, & Ayuob, 2019).

A comparison between scores of students from private schools and public schools has shown that students at students at private schools has gain high scores as compare to the students’ score at public schools on cognitive engagement, deep strategy, reliance, effective engagement, achievement orientation, anxiety, behavioural engagement and diligence. On the other hand, there was not an important difference in mean scores of students at public schools and private schools on surface strategies, interest, attentiveness and diligence. So behavioural engagement of students in public and private schools is almost the same (Maamin, Maat & Iksan, 2021) Researchers has also investigated engagement of secondary school students and they have found positively correlated all factors of students’ academic engagement (Rotgans, & Schmidt, 2011). A comparison between public and private school students on self-regulated learning has shown difference in public and private school students on goal setting, environment structuring, help seeking, self-evaluation and self-regulation (Asim, & Farooq, 2021).

On the other hand, there was not important difference in mean scores of public teacher schools scores on task strategies, time management and cognitive strategy use. These results are comparable with the judgments of some researchers (Schloemer and Brenan, 2006), that reported that students who avail self-regulated learning strategies are more self-regulated and are high achievers comparatively to other students in mathematics. They also showed that students are active agents of their behaviour and they can be changed by training as self-regulated learners to be affective learners. This study encourage students to change their style towards studies and they are the only one who can do this. The advantage of being self-regulated is found in both educations and also in students' achievement in all subjects (Batool, & Akhter, 2018).

### Conclusions and Recommendations

The conclusions from current study is that some indicators did not depict any statistical difference, while some indicators has shown statistical difference. The results are interesting in the sight of previous studies. Both types of schools need too much improvement regarding their students' betterment. Although private school students has shown more engagement toward learning mathematics and are more self-regulated learner in mathematical classroom as compare to public school students, but, still there is need for further improvement. Though, private schools are better than public schools in terms of academic achievement in mathematics learning, but, there is still a great need to improve methods of teaching strategies specially in learning mathematics in both sector schools so that students can be able to show more interest and engagement towards learning mathematics. In case of self-regulations student needs more trainings in both sectors. Teachers also need some training and useful books on training students for self-regulation habits in their studies. Results of this study gives specific recommendations for policy and practice. Findings can also help parents to engage and self-regulate their children in homework and other studies.

The major recommendation of this is that it can be mixed method research where interviews of secondary school teachers regarding students' learning of mathematics can also be included. The study also recommend to explore and develop training of students to self-regulate them. Such type of research can be useful for other selves like self-efficacy, self-esteem, self-control, there is need to explore some information about self-efficacy and self-regulation to improve mathematics achievement in secondary level mathematics students (Batool, 2020a).

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