



## Motivation of Students toward Learning Science at Secondary School Level in Pakistan

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### ABSTRACT

Motivation and learning are interrelated. Motivation plays a very important role in learning. The present study was conducted to investigate the motivation of secondary-level students toward learning science. The factors i.e. self-efficacy, active learning strategies, science learning values, performance goal, achievement goal and learning environment stimulation were included to study the motivation of students for learning science. The sample for the present study consisted of 100 SSC students (50 males and 50 females). These students were selected randomly from both public and private schools of the district Haripur province Khyber Pakhtunkhwa (KP). The data was collected through a questionnaire from the respondents. The data was collected and analyzed in light of the objective of the study. To analyze the data frequencies, percentage and t test were used. The majority of the students have a good level of motivation for learning science on different selected components except for the performance goal for learning science. But motivation towards learning Science of female students is greater than male students. So it is recommended that efforts should be made to ensure that both male and female students have equal access to resources, opportunities, and support. Gender-sensitive teaching practices can be employed to address potential biases and create an inclusive learning environment where all students can thrive in science education.



## Introduction

A complicated aspect of human psychology and behavior is motivation. Motivation affects how people choose to spend their time, how much effort they put into a task, how they feel and think

about the work, and how long they stick with it. In their self-regulated activities and scientific learning students' motivation plays a significant role in their conceptual change processes (Kingir, Tas, Gok, & Vural, 2013; Kokkinos & Voulgaridou, 2018; Velayutham & Aldridge, 2013), critical thinking, and learning strategies, students' learning goal orientation, task-value, and self-efficacy (Soltani, 2020; Velayutham & Aldridge, 2013).

According to Glyumn, Tasoobshirazi, and Brickman (2007) motivation is the psychological state that "stimulates" and "maintains" student behaviors toward accomplishing specific goals. One important component of learning is motivation (Brewer & Burgess, 2005). However, what exactly is motivation, and how can I tell whether I have it? According to Ryan and Deci (2000), "to be motivated means to be moved to do something." Our overall propensities to be extrinsically or internally motivated vary. However, our motivation, both internal and external, varies with the circumstances and the passage of time (Moneta, 2004). The propensity to participate in activities because one finds them engaging and delightful is known as intrinsic motivation.

More intrinsically motivated students are more likely to stick with challenging assignments and grow from their mistakes (Walker, Greene, & Mansell, 2006). Extrinsic motivation is the propensity to work toward goals unrelated to the activity at hand, such as passing a test or earning a good grade, or the expectation of a reward or punishment (Vansteenkiste, Lens, & Deci, 2006). Kuyper (2000) found that performance motivation was a highly significant predictor of student achievement in his study. Students are more likely to be interested in the material when they perceive the work as having positive value. Pupils put effort into producing better work, are keen to study, and concentrate on comprehending concepts (Brophy, 2010). Students that have a negative attitude about a task will find it annoying to be asked to finish it, according to Brophy (2010).

The definition of learning environment stimulation is when the surroundings of the classroom influence students' desire to learn (Tuan et al, 2005). Student motivation towards science is not homogenous and it varies according to different factors, science subjects or specific science topics, related activities, and gender (Christidou 2006). Patrick, Kpangban and Chibueze (2007) did an experimental study on science students to find out the effect of motivation on students' achievements in Science, and they found that motivation has a strong influence on achievements, because motivated students performed significantly better than unmotivated students. Hence, motivation is as much important as cognition for achieving academically in science. There is also a gender differences in motivation. As Mukharjee and Varma (2004) state, 'girls seems to find science unfriendly because of both the content and the teaching methodology, and end up with being de-motivated to study science in school'. According to Harding & Parker, 1995 girls are given the concept that some subjects are not fit for them for example, Physics is considered to be difficult subject for the girls to understand (Normans and skryabiana 2003). Therefore, this kind of situation can decrease the girls self-confidence in studying these physical sciences, self-confidence is a key factor in developing motivation. Woodward and Woodward (1998) got the result after the survey that, within science, girls' preferences are different. Girls have greater preferences for biological topics and less for physical sciences) girls are more attracted to biology, less to physics, and the attitude towards is less clearly gender-biased, while boys are more attracted to physics, as compared to biology and chemistry.

Murphy (2000) found in a survey that girls are more motivated towards biology and the decline in the uptake of physics and chemistry is a matter of concern. Additionally, the finding of scantlebury et al. (2007) also match with the other researcher that at the high school level, biology is popular among girls, while boys take courses like physics that prepare them for engineering and other

quantitative majors. At the elementary and junior high school level, girls perform well, but the evidence shows that in senior high classes, they select few relevant electives and exhibit a more negative attitude by the end of high school (McDonald, 2005; George, 2006). Motivation to learn is a student's tendency to find academic activities significant and world while and to try to get the intended learning benefits (Brophy 1997). Cousin (2007) studied that participation rate of students and their motivation towards chemistry in secondary classes and he found that despite a similar number of males and females enrolling in chemistry, their motivation for selecting chemistry differed.

Motivation depends on many factors such as goal, value, self-efficacy understanding motivational beliefs about themselves as learner and their role in their classroom (Tsai and Kuo 2008). Students are taught the sciences in abstract terms, and they are not able to relate the scientific knowledge they have acquired to their surroundings to help them understand it better or apply it to situations they face on a daily basis. As a result, many students do not recognize the significance of studying science. Therefore, research on scientific education should focus on both the affective aspect of cognition and student cognition. Researchers have just lately begun to emphasize the significance of affective components within affective components.

### **Objectives of the Study**

The present research has been undertaken

- a) To explore the motivation of secondary-level students toward learning science.
- b) To measure gender differences in motivation of learning science.

### **Research Methodology**

#### **Population and Sample of the study**

The education setup in Pakistan comprises Public and private schools. The population of the present study consisted of all the students of Public and private schools. The 20 schools comprising 10 male and 10 female secondary schools were randomly selected. From each school 5 students were randomly selected in this way, the present study consisted of 100. The motivation of secondary school students was measured by using a questionnaire. The student's motivation towards learning science was measured through their agreement/ disagreement to 30 short statements, which were directly related to motivation. Data was collected by using five Likert scale of "Strongly Agree" to Strongly Disagree. The questionnaire consisted of six factors' of motivation towards learning science. The questionnaire was completed by students in half an hour of class time allocated for science (an average class period is of 40 minutes), hence this mode of administration was also cost-effective in terms of time.

#### **Data Collection and Analysis**

The data for this research study was collected by survey method. The questionnaires were personally distributed among the students to collect data. The collected data was analyzed by using frequencies, percentages, mean, and t. test.

## Results

**Table 1: Level of motivation among all secondary students towards learning science**

Variable	Gender		High	Medium	Low
Level of motivation towards learning science	Male	f	28	17	5
		%	56	34	10
	Female	f	35	15	0
		%	70	30	0

Table 1 showed that 56% male and 70% female students have high level of motivation in science subject in all secondary students, and only 10 % male students fall in low category of motivation for science. The motivational level of male is less than that of female students among all secondary students.

**Table 2: Comparison of Male & Female Students about Motivation towards learning Science**

S. No.	Gender	N	Mean	SD	Variance	T
1	Male	50	113.36	10.092	101.867	2.27
2	Female	50	117.36	7.286	53.092	

Table demonstrate that mean score of male students is (113.36), whereas for female students is (117.36) which shows that Motivation towards learning Science of female students is greater than male students. the calculated value of  $t'$  is 2.27, which is slightly more than tabulated value 1.96 at 0.05, level of significance. It means that there is significant difference between the mean scores of motivation level among male and female towards learning science.

## Findings

Analysis of the data reveals that a majority of secondary students exhibit high levels of motivation in science, with a notable gender disparity. Specifically, 70% of female students demonstrate high motivation levels, compared to 56% of their male counterparts. It is worth noting that only a small fraction of male students, approximately 10%, fall into the low motivation category for science. Overall, the data suggests that female students generally possess higher motivational levels in science compared to male students across the secondary education spectrum.

While examining the differences between public and private educational sectors, the findings indicate similar motivation levels. In public institutions, 58% of students exhibit high motivation in science, while in private institutions, this figure stands at 56%. Interestingly, there is a marked difference between the proportions of students with low motivation: only 2% in public schools compared to 10% in private schools fall into this category. Despite these minor variations, the overall motivational levels among students in public and private sectors appear to be roughly equivalent. Within public sector institutions, gender-based analysis reveals that 68% of female students and 60% of male students demonstrate high levels of motivation in science. Notably, only 4% of male students in this sector exhibit low motivation levels. The data suggests that while there is a slight difference favoring female students, the motivational levels between genders in public institutions are broadly comparable. In the private sector, a similar pattern emerges, albeit with a wider gap. Here, 64% of female students show high motivation levels in science, compared to 56% of male students. It is noteworthy that 16% of male students in private institutions fall into the low

motivation category, a higher proportion than observed in the public sector. Despite these differences, the overall motivational levels between genders in private institutions are deemed to be roughly equivalent.

Statistical analysis reveals a significant difference in motivation levels between genders across all secondary students. The mean motivation score for female students (117.36) is higher than that of male students (113.36). This difference is statistically significant, as evidenced by a calculated t-value of 2.27, which exceeds the critical value of 1.96 at the 0.05 significance level. Comparing public and private sectors, the mean motivation scores (116.54 for public and 114.18 for private) show no statistically significant difference. The calculated t-value of 1.51 is below the critical value of 1.96 at the 0.05 significance level, indicating that the sector type does not significantly influence overall student motivation in science. Within the public sector, the difference in mean motivation scores between male (115.76) and female (117.32) students is not statistically significant. The calculated t-value of -0.66 is below the critical threshold, suggesting comparable motivation levels between genders in public institutions. In contrast, the private sector exhibits a statistically significant gender difference in motivation levels. Female students show a higher mean score (117.4) compared to male students (110.96). The calculated t-value of 2.50 exceeds the critical value, indicating a meaningful difference in motivation levels between genders in private institutions.

The mean score differential between the private (mean score 110.96) and public (mean score 115.76) sectors for male students is not statistically significant. The computed t-value of 1.71 is below the critical value, indicating that male students' motivation for science is not substantially influenced by the educational sector.

Comparably, for female students, the mean motivation score in the public (mean score 117.32) and private (mean score 117.4) sectors does not differ statistically significantly. The estimated t-value of 0.05 is much below the crucial limit, suggesting that female students' desire for science is not significantly impacted by the educational sector.

## **Conclusion and Discussion**

A complicated psychological idea known as motivation explains behavior, effort, and participation in a range of activities (Cavas, 2011; Broussard & Garrison, 2004). It is a theoretical framework covering goal-oriented behavior's direction, initiation, intensity, and persistence (Pintrich, 2003; Brophy, 2004). The desire to participate in science education is the definition of motivation towards science learning (Bolat, 2007). This idea has a significant impact on critical thinking, conceptual modification, and scientific method abilities (Deci & Ryan, 2000). According to Cavas (2011), motivation fosters students' active production of scientific knowledge, and learning environments and science education quality are directly impacted by motivational elements (Schunk, Pintrich, & Meece, 2008).

Gardner and Lambert (1972) asserted that a learner's orientation toward and attitudes regarding learning tasks influence their motivation to learn. Motivation and attitude inclinations have a big impact on how involved students are in their education (Ryan & Deci, 2000). Because science demands patience, effort, persistence, and taking risks, learning the subject requires motivation that is very important (Charles, Lester, & Daffer, 1987; Wigfield & Eccles, 2000).

In this study, secondary students' motivation for learning science was examined. It was discovered that 10% of male students had poor motivation, compared to 70% of female students and 56% of male students who had high motivation. These findings are consistent with those of Cavas (2011),

who found that students' mean scores in scientific learning improved (mean score of 4.40) as their motivation grew. Motivation positively influences students' attitudes toward science, and Patrick et al. (2007) indicated that it strongly impacts their academic achievement in science. Studies by Brady (2008), Yilmaz & Cavas (2007), and Brady (2008) show that gender plays a significant influence in motivation, with female students often having higher levels of motivation than male students. According to this survey, female students outperformed male students in terms of motivation, with a mean score of 117.36, while female students scored higher overall at 117.36. At the 0.05 significance level, the computed t-value (2.27) was greater than the tabular value, indicating a statistically significant difference in motivation between male and female students. Similar findings were made by Sevinc, Ozmen, and Yigit (2011), who discovered that female students were more motivated than male students (mean of 244.61), with a mean of 272.86.

These gender differences may stem from various social and environmental factors, including perceptions of gender roles within families and broader societal expectations. Female students may receive more encouragement and opportunities, fostering higher motivation levels in academic areas, particularly in science (Meece, Glienke, & Burg, 2006). The majority of students in this study exhibited a good level of motivation across different components, with slight gender variations. No significant differences were observed between public and private school students regarding overall motivation for science learning.

Teachers need to be proactive in piqueing students' interest and putting successful learning practices into practice if they want to see an improvement in students' motivation, especially in science classes. Students must take an active role in their education rather than just be passive consumers of knowledge (Pintrich, 2003). To increase female students' motivation and sense of value, teachers should pay particular attention to including them in conversations (Wigfield & Cambria, 2010). Teachers can promote scientific literacy, conceptual comprehension, and favorable attitudes toward science by implementing inquiry-based teaching approaches (Hmelo-Silver, Duncan, & Chinn, 2007). In order to foster kids' enthusiasm in science education, teachers should also seek to increase students' confidence through suitable evaluation techniques and work in tandem with parents.

Students' interest in science should be maintained through a variety of inquiry-based activities both within and outside of the classroom, as well as through a variety of instructional strategies that create curiosity. Teachers can have a key role in the academic success and development of their pupils in science education by fostering their motivation.

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