



**RESEARCH PAPER**

**Effect of Students' Self-Efficacy on their Cognitive Ability at  
Secondary School Level in Punjab**

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**ABSTRACT**

Self-efficacy is one of the most powerful psychological factors that affects each aspect of students' endeavor and cognitive ability. Self-efficacy is the student's belief in their abilities in this way they like to engage in learning which leads to improved cognitive ability performance across educational domains. Cognitive ability is an individual's mental competency. It refers to such ways as perceiving, meaningful, knowing, conceptualizing, judging, and reasoning. The research was quantitative in nature, and study was used causal-comparative design. The population of the study consisted of 10th- grade secondary school students in Punjab province. The representative sample of the study was selected by using a multistage random sampling method. A total of 3375 students were considered as samples that belonged to three different zones of Punjab namely central, northern and the southern zones. Two instruments Self-efficacy and Cognitive Ability Test (CAT) were used in the research. Cronbach's alpha was used to check the reliability of the questionnaire. The reliability of self-efficacy was 0.89. The data were collected through a survey method. Three expert opinions were include to validate the instrument. The data were analyzed by the descriptive statistical methods; frequency, percentage, mean, standard deviation, multiple linear regressions, and t-test. The findings of the study revealed that self-efficacy, and student's cognitive ability were at medium levels, t-test study (6.10) show that male's self-efficacy is greater than female's self-efficacy, t-test (6.92) show that the urban self-efficacy is also higher than rural self-efficacy, cognitive ability t-test (1.64) show that the score of males is greater than females, t-test (1.75) show that the score of urban people is greater than that of rural people. The linear regression was applied to examine the effect of self-efficacy and learning styles on students cognitive ability, self-efficacy explained 30% of the total variance in student's cognitive ability which a good percentage in total achievement. It can be inferred that if self-efficacy is high, it must be help them to increase cognitive ability of the students. If self-efficacy is higher than cognitive ability will be increased. The study findings show that self-efficacy with sub factors significantly and positively effects on students' cognitive ability. It is concluded that the model of self-efficacy was significant because the overall value is less than 0.05 ( $p < 0.05$ ).

**KEYWORDS** Cognitive Ability, Secondary School Students, Self -Efficacy

**Introduction**

Self-efficacy develops ability to perform activities and specific tasks to achieve the goals (Avsec & Szewczyk , 2018). It determines how students think, feel, and behave that includes cognitive, motivational, and affective processes. (Ritchhart & Perkins, 2008). Self-efficacy is a natural ability that fosters social and learning abilities, including self-belief, self-control, self-assessment, self-monitoring, and behavior regulation to achieve the goals ( Sharma, & Nasa, 2014). The major goal of self-efficacy in determining the students' academic success (Bandura, 2006).

Cognitive ability is the second variable in this study. Cognitive ability pertains to an individual's mental competency and encompasses processes such as perception, knowledge acquisition, recognition, conceptualization, judgment, and reasoning (Padmanabha, 2018). Cognitive ability allows learners to recognize information and convert them into a new knowledge of simple to complex behaviors (Wang et al., 2023). Cognitive ability describes the mental functionality in terms of interactive and independent systems and it refers that the learner is capable of doing (Park, 2004).

The higher level self-efficacy students understand their abilities and effectively plan their activities, leading to successful task implementation. At hand, Students with low self-efficacy, struggle and perform poorly when it comes to completing their assignments (Ashford et al., 2010). The students self-efficacy have greater influence on cognitive ability and have a deep relationship with each other (Maddux & Kleiman, 2018). The high efficacious are more likely to engage on the task that requires efforts, and they successfully to complete the task (van Rooij et al., 2017). Nearby, it was a moderate relationship among self-efficacy and cognitive ability (Bandura, 1997; Fonna & Mursalin, 2018). According to Bloom (1956) cognitive abilities help the learner to find appropriate information and techniques in his previous experience and bring it to new situations. According to Michelson (Kaur et al., 2019) cognitive ability is a brain-based skill and it carries out any task from the simplest to the most complex one. It helps us learn remember, solve the problem and sustain our attention. Cognitive ability includes perception, decision taking and solves the problems (Ariës et al., 2015). Cognitive abilities include: Working memory, verbal Fluency, verbal analogies, figure analogy, number series, word meaning, classification, and problem solving ability. It was a relation among self-efficacy and cognitive ability (Chen et al., 2009).

Pakistan is facing a great challenge especially, low income families, drop out students from school, social media, less motivation (Hanif, S. et al., 2023). It is essential to know that students lose their motivation level because of having lower self-efficacy. There is a need to motivate students through self-efficacy in Pakistan (Shahid, C et al., 2019). Students perform poorly because of low self-efficacy (Ford et al., 2023). The majority of students in Pakistan have low self-efficacy; because of having the lower cognitive ability (Fatima et al., 2022; Ahmad & Safaria, 2013). The students are less aware of self-efficacy to meet the national and international educational changes. Most of the students have limited awareness of their dormant qualities and are still unaware of their hidden potential (Köseoglu, 2016). If we increase our self-efficacy, it will increase cognitive ability (Masitoh & Fitriyani, 2018).

There is a need to make them aware of self-efficacy that enhances their cognitive ability, and students can practically use them in their classrooms. The Majority of students have less understanding of elf efficacy. The self efficacy of students can improve their learning of students (Hawk & Shah, 2007). Students pay less attention to recognize self-efficacy.

## Literature Review

### Self-Efficacy

Bandura (1997) stated that, self-efficacy as a belief in one's own abilities that organizes the actions required to achieve specific goals (Stevens, 2005). It is the individual' confidence about their competences. It is important in learning processes and motivations. The major role of self-efficacy in determines the students' success (Lyons & Bandura, 2019). The self-efficacy is the formula of success. It is important to attain careful

consideration to self-efficacy when establishing goals, ensuring that it aligns with one's objectives rather than conflicting with them (Masitoh & Fitriyani, 2018).

### **Factors of Self Efficacy**

The Following factors determine the self efficacy

#### **Mastery Experience**

It is the best way to enhance self-efficacy. While, students are more motivated to believe in their own talent to perform a new task if it bears similarities to something they have already accomplished successfully (Schunk & Usher, 2012). Finally the student's self-efficacy is increased through mastery experiences (McMaster, 2009).

#### **Vicarious Experiences**

Vicarious learning is the core of students' instruction. They demonstrate the ability of the students and then copies to others peers (Deci & Ryan, 2010). They watch and observe of their older siblings, then copy what they did. Observing and successfully mastering skills through continuous learning from various experiences and others' actions contributes to the enhancement of self-efficacy (Artino, 2012).

#### **Social Persuasion**

The social persuasion represents the third method of reinforcing students' self-efficacy beliefs. When friends and relatives convincingly confirm that students possess the capabilities to succeed (Lucianetti, 2016) then, this persuasion serves to enhance their self-efficacy. As a result, students are motivated to use greater effort towards achieving success. Consequently, this encouragement fosters skill development and strengthens personal efficacy, ultimately leading to higher performance levels (Hattie & Timperley, 2007).

#### **Psychological and Emotional States**

The psychological and ES are emerging when an individual plans to undertake a task offer indicators of the probable achievement or failure. Stress, anxiety, concern, and fear all have negative effects on individuals, potentially resulting in a self-fulfilling prophecy of failure. The stressful situations generate emotional arousal, influencing a student's self-efficacy in dealing of given circumstances (Gregoire, 2003). The individual emotional states show a major role in the sense of self-efficacy with regard to their performance in performing a specific task. Mood also influences on students' opinion of their personal efficacy (Ooi et al., 2018).

#### **Effect of self efficacy on cognitive ability**

The self-efficacy shows a significant role in impacting student's cognitive ability (Fantilli & McDougall, 2009). It serves to enhance students' cognitive abilities and enables them to manage their cognitive symptoms effectively. It emphasized that improvement in cognitive ability through self-efficacy (Cicerone et al., in 2011).

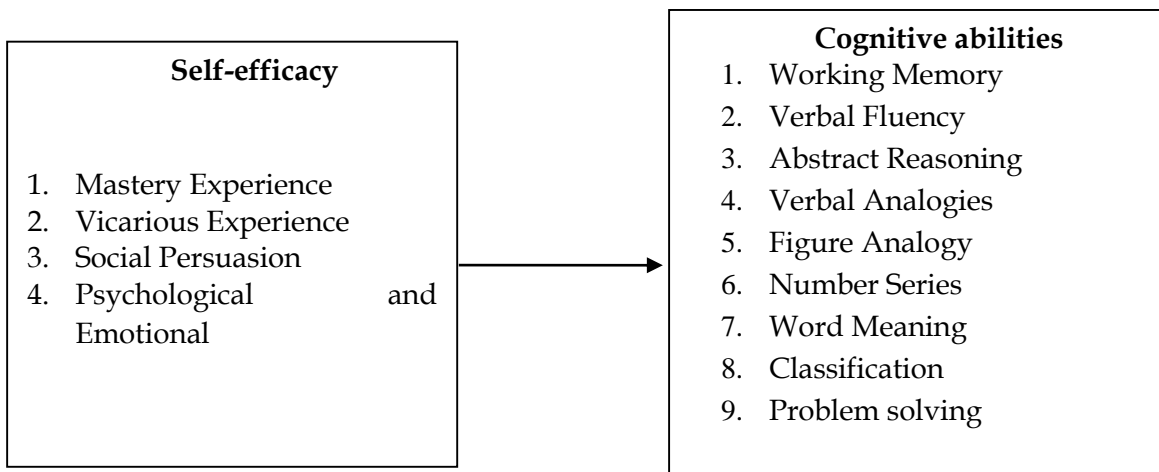
Self-efficacy is characterized by a realistic view of oneself with cognitive ability, which leads to resolve in one's endeavors. Self-efficacy has significant impacts on student's cognitive ability (Cleary et al., 2006). It is a cognitive concept that effects on students' thoughts, expectations, and behaviors. Bandura (1997) proposed that self-efficacy significantly impact on student's cognitive ability. They demonstrated that, it

was a relation of self-efficacy and cognitive ability with task performance (Schunk & Meece, 2006).

### Cognitive Ability

The cognitive ability is viewed as having multiple dimensions, and these different abilities show positive correlations with each other. This consistent positive and significant correlation has led most psychometricians to recognize and accept the reality of a general cognitive ability, which is reflected in the overall score obtained from major cognitive ability tests (Dickens, 2008). The (CA), often referred to as intelligence is defined as the ability to reasoning, planning, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experiment (Gottfredson, 1997). Another definition is that, cognitive ability that refers the ability to receive information which can influence student's decisions and judgments (shanshan.fie, 2017).

### Conceptual Framework



### Material and Methods

The research methodology is a systematic approach for solving problems. It refers to the science of determining the research methodology. It is the process by which researcher describe, discuss, and predict things (Manterola & Otzen, 2013; Hevner et al., 2008).

The study was used a causal-comparative design. A non-experimental research method, specifically an ex-post facto approach, is the causal-comparative design. The research design is consistent with various studies (Jahangir & Akbar, 2023; Hassan et al., 2021; Khalid & Akhter, 2021; Hassan et al., 2019).

#### Population and Sampling

The population was consisted of secondary school students from whom the required data is collected. The research was conducted of the Punjab, it was divided into three zones: Central, Northern, and Southern zone and there were 6674 secondary schools. Total government secondary schools are 6674 (3485=boys' schools & 3189 girls' schools) in Punjab province. There are 4,338,789 students as boys 2242978 and girls 2095811 students in Punjab. The technique was used by a simple random sampling method for the quantitative phase. The researcher was selected schools with the permission of the heads. Furthermore, using a convenient sampling technique, the researcher selected an average of 25 students in each class from the selected school. The sample was consisted of 135 secondary school and 3375 secondary school students.

#### Research Instruments

In order to gather information on the student's self-efficacy and cognitive abilities of the students, a survey questionnaire was used in this research. In this quantitative study, one questionnaire and one achievement test of the student's cognitive ability were employed for data collection. The questionnaires contained; Self-efficacy scale. The second tool was a test aims to assess cognitive ability of students. Self-efficacy consists of 24 items was used to measure the cognitive ability of the students. The researcher developed a cognitive ability test with 68 items to measure student's self-efficacy of students. The reliability test results are displayed in Table 1. The values of Cronbach's Alpha are higher than the recommended value of 0.70, so they are good (Taber, 2018).

## Results and Discussion

**Table 1**  
**Dimensions of self efficacy Questionnaire Reliability Analysis.**

Self-efficacy	Items	No. of Items	A
1. Mastery experiences	1-6	6	.70
2. Vicarious Experiences	8,14,17,19,23	5	.76
3. Social Persuasion	7,9,15,18,21,24	6	.71
4. Psychological and Emotional States	10,11,12,13,16,20,22	7	.68
Total		24	.89

The Reliability questionnaire accomplished by using Cronbach's alpha (Cronbach, 1951) in SPSS while, where the score for every individual of each item was related with the overall score. It specifies that most of the queries were legal and reliable. The cronbach's alpha was used to check the reliability of the questions. Four factors were related to self-efficacy. The reliability of mastery experience is  $\alpha=.70$ , Vicarious Experiences are  $\alpha=.76$ , Social Persuasion  $\alpha=.71$  and Psychological and Emotional States  $\alpha = .68$ . The overall reliability of self-efficacy is .89. It indicates that the questions were very highly reliable.

**Table 2**  
**Level of Self-Efficacy of 10<sup>th</sup> Grade?**

Scale	Low n(%)	Medium n(%)	High n(%)
Self-efficacy Overall	2(.1)	2291(93.7)	153(6.3)
Mastery experiences	237(9.7)	81.6)	214(8.7)
Vicarious Experiences	127(5.2)	1646(67.3)	673(27.5)
Social Persuasion	73(3)	1983(81.1)	390(15.9)
Psychological and Emotional States	100(4.1)	2040(83.4)	306(12.5)

The Table 2 shows that base on the data majority students have medium level in self-efficacy (N=2291, 93.7).and high level (N=153, 6.3) and low (N=2, .1).The majority students have low level (N=237, 9.7) in mastery experience (N=214, 8.7%) perceive high and (N=81, 6%) have medium. The next factor shows that the majority of students have medium level (N=1646, 67.3) in vicarious experience. (N=673, 27.5) have high in vicarious experience (N=127, 5.2%) students have low in vicarious experience. It is noted that the majority of students (N=1983, 81.1) have medium level in social persuasion (N=390, 15.9%) students were higher in social persuasion they were convinced by their peers and they had the ability to succeed. (N=73, 3%) respondents were low level in social persuasion. In Psychological and Emotional state (N=306, 12.5%) of the students have high in Psychological and Emotional States because stress and anxiety negatively affected by their ability and their plan according to the situation. (N=2040, 83.4%) of the students think about psychological and emotional states in somehow and agree.(N=100, 4.1%) of the think low.

**Table 3**  
**Level of Cognitive Ability of 10<sup>th</sup> graders**

Cognitive Ability test scores	Low n(%)	Medium n(%)	High n(%)
Working Memory	74(3.0)	957(39.1)	1415(57.8)
Verbal Fluency	118(4.8)	1122(45.9)	1206(49.3)
Abstract Reasoning	1361(55.6)	510(20.9)	575(23.5)
Verbal Analogies	475(19.4)	740(30.3)	814(33.3)
Figure Analogy	583(23.8)	685(28.0)	1178(48.2)
Number Series	1003(41.0)	825(33.7)	618(25.3)
Word Meaning	616(25.2)	960(38.2)	870(35.6)
Classification	480(19.6)	989(40.4)	452(39.9)
Problem Solving	1026(41.9)	968(39.6)	452(18.5)
Over all	269(11)	1593(65.1)	584(23.0)

The table 3 shows that (N=1415, 57.8%) students have high level in working memory because they have good performance in working memory. (N=74, 3.0%) of the students have low level in working memory. (N=957, 39.1%) of the students have medium level in working memory.

(N=1206, 49.3%) of the students have a high level of verbal fluency. The verbal fluency shows that (N=118, 4.8%) of the students have low levels. Whereas, (N=1122, 45.9%) students have a medium level in verbal fluency. (N=575, 23.5%) of the students have higher levels in abstract reasoning because they have the ability to understand the complex concepts. (N=519, 20.9%) of the students have medium level in abstract reasoning. The abstract reasoning shows that (N=1361, 55.6%) of the students have low levels. (N=814, 33.3%) of the students have a high level in verbal analogies. Whereas, (N=740, 30.3%) students have medium level in verbal analogies. (N=475, 19.4%) of the students has low level in verbal analogies.

(N=1178, 48.2%) of the students have higher levels in figure analogy. whereas, (N=685, 28.0%) of the students have medium level in figure analogy. (N=583, 23.8%) of the students have low level in figure analogy. (N=618, 25.3%) of the students have higher in number series. Medium level has (N=825, 33.7%) of students in number series. Regarding number series (N=1003, 41%) of the students have low levels. (N=870, 35.65%) of the students have higher levels in word meaning, whereas, (N=960, 38.2%) of the students were medium in word meaning. Majority of the students (N=616, 25.2%) have low level in word meaning. (N=452, 39.9%) of the students have higher levels in classification ability. While majority students (N=989, 40.4%) have medium level in classification ability. (N=480, 19.6%) of the students has a low level of classification. (N=452, 18.5%) of the students have high in problem solving ability while, (N=968, 39.6%) of the students were medium level. The majority students in problem solving ability (N=1026, 41.9%) have low levels. The overall cognitive ability medium (N=1593, 65.1%) low (N=269, 11) perceive high (N=584, 23.0%).

**Table 5**  
**Effect of self-efficacy on cognitive ability of the students**

Variables	B	SE	$\beta$	t	p.
(Constant)	75.20	3.672		20.479	<.001
Mastery experiences	-.447	.728	-.011	-.614	.539
Vicarious Experiences	4.103	.778	.111	5.277	<.001
Social Persuasion	-6.097	.873	-.143	-6.984	<.001
Psychological, Emotional States	-6.384	.878	-.158	-7.270	<.001

$R^2=0.31$ ,  $F=109.14$ ,  $p<.001$

Table 5 shows the effect of all independent sub factors on cognitive ability of students. Mastery experience has no effect ( $\beta=-.011$ ,  $t=-.614$ ,  $p=.539$ ) on the cognitive ability of students. Significant value is greater than 0.05 ( $p>.05$ ). Vicarious experiences have an effect ( $\beta=.110$ ,  $t=5.277$ ,  $p=.001$ ) on the cognitive ability of students. Social Persuasion has an effect ( $\beta=-.143$ ,  $t=-6.984$ ,  $p=.001$ ) on the cognitive ability of students. The psychological, emotional state has an effect ( $\beta=-.158$ ,  $t=-7.270$ ,  $p=.001$ ) on the cognitive ability of students.

### Data Collection

All this was done through getting permission from the concerned teacher and head teachers. Some questionnaires were sent to the students with the permission of head through email. In this procedure, they were filled the questionnaire and answers were entered in the Google forms. For analysis, the data sheet was entered into a Microsoft Excel file. The researcher has permission to move their classes with the help of their respective teachers to distribute the instruments. The response rate was 78.125%. The information was gathered over a period of 90 days.

### Discussion

The current study base on the data majority students have medium level in self-efficacy .so there was a moderate level of self-efficacy. According to previous study (Rahmati, 2015; Gharetepeh, et al., 2015) the results of the current study shows that overall levels of levels of self-efficacy was moderate with cognitive performance. Specifically, students who scored one standard deviation higher than the mean tended to have high self-efficacy, while those who scored one standard deviation lower than the mean tended to have low self-efficacy.

The overall cognitive ability was medium levels . According to previous study (Rahayu, A, 2018; Shi & Qu, 2021) there was a different levels of cognitive ability but most significant level is moderate. The results of the current study show that the significant level of cognitive ability was moderate. Self-efficacy has a positive effect on cognitive ability of 10<sup>th</sup> grade students. Furthermore, mastery experience has no effect on cognitive ability. Social persuasion also has a positive effect on cognitive ability of students. This is a statistically significant effect because alpha value is less than .05 ( $p<.05$ ). Another two factors of self-efficacy: vicarious experience and emotional state have a statistically significant effect on cognitive ability of 10<sup>th</sup> grade students in this model. Previous studies (Ashford & LeCroy, 2010; Frith & Singer, 2008) have found that, those different sources can differently affect the levels of self-efficacy in some realms of functioning of cognitive ability. It is concluded that when self-efficacy higher than cognitive ability, leads to higher performance. This is influenced by various factors including vicarious experience, social persuasion, and psychological/emotional state. Additionally, it suggests that cognitive ability can be enhanced through these factors, ultimately contributing to increased self-efficacy and performance.

**Conclusion**

The current study was causal comparative in nature and purpose to examine the effect of self-efficacy of students on their cognitive ability. Respondents of this study were secondary school 10<sup>th</sup> grader students of province Punjab. The conclusion is that students with lower mastery experience tend to have lower cognitive abilities. Contrary to expectations, mastery experience does not serve as a predictor of cognitive ability. Instead, vicarious experience, social persuasion, and psychological/emotional state emerge as the most powerful predictors. These factors significantly contribute to higher self-efficacy in students have greater influence of cognitive ability.

**Recommendations**

The findings of the study show certain facts, yet there are unexplored areas in Pakistani students that need to be investigated. Researchers must be establish a link to head teachers, students, and student engagement across provinces in Pakistan to improve the existing body of knowledge. The specific conceptual framework should be applied across educational levels to produce novel and unexpected results. There are some recommendations are made for further study;

1. The research must be carried out in different provinces and the results must be compared for a better analysis to improve cognitive ability.
2. The mix method and experimental studies should be implemented at different levels of public and private in Punjab.
3. This study represents a model on self-efficacy, learning styles and cognitive ability, so all the stakeholders like government, curriculum developers, policy makers, administrators, have to work together, for full implementation of learning styles in public schools.
4. Additionally, the future research is needed to determine the effectiveness of (CAT) test in improving students' writing, reading and general knowledge abilities in secondary schools at different levels such as secondary and higher secondary.
5. The study ensured longitudinal that applied on students for further study.



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