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### Relationship of Self Efficacy and Academic Achievements in Science at the Secondary Level: A Case Study of Poonch District, Azad Jammu and Kashmir

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#### Abstract

*The purpose of this study is to ascertain the relationship between self-efficacy levels of science teachers and students with academic achievement in science at the secondary level. The research was descriptive in nature and survey method used. One survey was utilized for teachers, and the other was used for students. Simple random sampling was adopted and 200 students, 100 males and 100 girls, made up the sample of the study, which also included 45 male and 45 female teachers. Tools for statistical analysis included correlation coefficient, mean, standard deviation, range, and t-test. Male teachers were shown to have higher personal efficacy and student achievement in chemistry than female teachers, whereas female teachers had higher self efficacy and student achievement in biology than the male teachers. It is suggested that science teachers use words like "you can do this" to show their appreciation for their pupils' academic success. According to this study, a teacher who attended more classes and taught more students was more effective, therefore teacher training is suggested. Training programs can be used to boost teachers' self-efficacy. In-service teacher training programmes in biology and chemistry should be organized for ongoing professional development.*

**Keywords:** Self Efficacy, Academic Achievement, Science, Secondary level, Teachers and Students

#### Introduction

The influence of a teacher on a student's life cannot be overstated. A teacher not only completes the required curriculum but also influences students' thinking and conduct by inspiring them and assisting them in achieving their goals. A good teacher facilitates learning, inspires students, serves as a positive role model, develops resources, disseminates knowledge, conducts assessments, offers counseling, and plans lessons. Only when a teacher possesses the necessary skills can he fulfil all of these responsibilities. A teacher's self-efficacy enables him to carry out his responsibilities with accuracy.

Bandura (1993) defined self efficacy as the confidence in one's competence to plan and carry out the forces of action necessary to control a potential circumstance. These beliefs, according to Bandura, determine how people think, feel, and behave. He defined it as confidence in one's capacity to succeed under specific conditions.

To develop a strong sense of efficacy, dominance confrontations are the best route. Education is provided by teachers, and their effectiveness is demonstrated by how they demonstrate technique and practice. A few analysts have discovered that teachers give a variety of teaching situations by fusing their various theoretical backgrounds with the teaching model. Thus, it follows that, as Schunk (1991) pointed out, students' self-efficacy convictions include their conviction to do specific academic tasks at designated levels. Niemivirta and Tapola (2007) argue that self-efficacy affects both the type and level of goals people decide to attempt in academic environments, referencing Bandura (1997) said that the increased self-efficacy is accompanied by enhanced innate inspiration, the ability to support significant amounts of inspiration and achievement-oriented behaviour, perseverance despite difficulties, and improved critical thinking. According to research by Luthans et al. (2008) self-efficacy, engagement, and adequacy are all closely related. Day & Allen (2004) discovered an unmistakable link between self-adequacy and performance. It is extremely motivating to see that the teaching strategies used in the classroom may and do affect students' self-efficacy in some way.

According to Tai (2006) Al-Eisa et al. (2009) and Kellet et al. (2009) self-efficacy is directly correlated with professional advancement. Self efficacy is also influenced by reactivity, learning, and transfer motivation and Liu et al. (2010) said that performance and satisfaction are mediated by self efficacy, and the self efficacy and devotion to ones' career are associated. Leon-Perez et al. (2011) argued that motivation and self-efficacy help teachers interact with pupils more effectively. Self-efficacy, intrinsic motivation, and job happiness were found to be connected by Olusola (2011). According to research by Qureshi et al. (2011) self-efficacy, creativity, and performance are all related. Chemistry education plays a significant role in improving the quality of teaching and research in order to make sure that students are given solid information, complete commodities, etc. The everyday living facets are covered in biology classes. So it's crucial for everyone to understand their own biology and chemistry.

All of these examples demonstrate the link between self-efficacy and learning, commitment, creativity, and work performance. In order to address the gap in available information and take into account the importance of biology, chemistry, and self-efficacy, this issue was chosen for research. This study will advance knowledge about science teachers' self-efficacy and academic accomplishment of students.

### **Statement of the Problem**

Science-related information explosion calls for new pedagogical approaches and learning paradigms. It is difficult for the teacher to instruct and the student to absorb the new scientific concepts and ideas without the use of valid and appropriate systems. The self-efficacy of the teacher can help students better appreciate new wonders and their own personal knowledge development in the classroom. Hence, the researchers planned this study to judge the relationship of the academic achievements and self efficacy of teachers and students in the fields of biology and chemistry.

### **Objectives**

1. Exploration of association between teachers and students' Self-efficacy with academic achievement in biology at the secondary level
2. To ascertain the correlation between teachers and students' Self-efficacy with academic achievement in chemistry at the secondary level

### **Hypothesis**

- H01: The academic development of biology students and teachers' self-efficacy are unrelated.  
H02: There is no connection between chemistry students' academic achievement and teachers' perceptions of their own efficacy.  
H03: Student self efficacy and academic accomplishment in biology do not significantly correlate.  
H04: Student self efficacy and academic accomplishment in chemistry do not significantly correlate.

### **Review of the Related Literature**

The most crucial factor in a country's development is education. Education is heavily influenced by learning, reading, writing, and environmental awareness. A person could become more and more educated as they learn more. Without education, it would be impossible to explore novel concepts, there would be no room for innovation, and there would be no progress. Education gives people the skills, knowledge, information, and procedures they needed. People can learn about their responsibilities and rights for their families, societies, and nations through this. People who receive an education see the world more broadly as a result.

The capacity to combat violence, injustice, corruption, and other problems grows as a result of education. By offering education, poverty can be eradicated, and everyone in the nation can succeed and be able to contribute to the growth of their nation. Therefore, it may be inferred that education is necessary for a country to develop. Education is widely recognized as being essential to a nation's moral, social, cultural, political, and economic development. Nations act to enact reforms that will completely transform the educational sector. In a study, it is suggested that education systems should produce people who are knowledgeable, skilled, creative, productive, and self-assured, who also have a feeling of personal responsibility and can manage future challenges in an effective manner (Aly, 2007).

### **Science Education**

Science education is receiving increased attention worldwide. It is essential to employ instructional tactics and methods that will aid in the comprehension of scientific phenomena and encourage the

study of scientific topics (Ainsworth, 2006). Teachers should provide knowledge to their charges while fostering the growth of critical thinking. Science instruction should help students develop a scientific mindset as well as scientific concepts, facts, and principles. It means that in order to teach science, students must understand scientific principles, ideas, concepts, and facts, but this can only be done if they have self-efficacy.

Numerous studies have shown a correlation between male and female students as well as a relationship between self-efficacy, academic success, and gender. These results had a statistical significance level of 0.05 and 0.01 with a 2-tailed degree of freedom of 45 and 55, respectively (Tenaw, 2013). For the English and Mathematics language proficiency of secondary school pupils in the Nyamira District, Moturi (2012) performed study on the relationship between academic performance and self-efficacy.

### **Self-Efficacy**

Bandura defined self-efficacy as one's capability, aptitude, and confidence to perform a task in specific circumstances. Techniques, methodologies, goals, tasks, and difficulties related to self-efficacy may play a significant part in evaluating one's aptitude. It emphasizes how social experience and perceptual learning play a role in personality formation. The underlying concept and methods used in social subjective hypothesis, such as social practices and intellectual procedures, have a significant impact on an individual's actions relative to those of other people. According to the social cognitive theory, a person's display and reaction are influenced by his perceptions. What he observed in others has an impact on how he portrays social behaviour and relationship-related activities.

A key component of a social cognitive paradigm is self-efficacy. It determines the impact of many events and is a person's perception of external social factors. As a result of outside experience and self-discernment, self-efficacy plays a significant role in determining outcome. Self-efficacy, which is often referred to as perceived capability, refers to a person's confidence in their ability to complete a task. Even if they are knowledgeable about methodologies that, if used, could be advantageous to these students, instructors who don't expect to be successful with particular students may put forth less effort in preparation and delivery of instruction and may give up easily at the first sign of difficulty, according to social-cognitive theory. Accept the idea of both the capacity and inadequacy; self-efficacy beliefs may subsequently become visibly self-fulfilling prophecies (Tschannen-Moran and Woolfolk-Hoy, 2007). Self-efficacy is the belief of one's ability carry out tasks achieving goals.

For concrete assessment requires work, certainty, planning, and their implementation required self-efficacy (Heslin and Klehe, 2006). Bandura (2006) proposed a system to provide the guidelines for the development of self-efficacy scales. He also described self-efficacy as a "configuration of self-convictions" rather than a "universal trait" that applies to all situations. The self-efficacy was also considered to be a unique and significant feature in comparative development, including certainty, confidence, and outcome hopes. Self-esteem truly refers to a person's ability to control oneself, whereas self-confidence is a general measure of how well a person performs most of the time. Additionally, it typically develops more effectively than self-efficacy or fearlessness (Heslin and Klehe, 2006).

### **Teacher Efficacy**

The ability and confidence of a teacher to perform a task are referred to as their teacher self-efficacy. It provides educators faith in their ability to effectively communicate their knowledge to students. The academic success of kids is greatly influenced by teacher effectiveness. Self-efficacy is the belief that one is capable of functioning in a suitable and efficient manner in order to achieve particular goals (Ormrod, 2006). It can be found in a variety of human endeavours, including both personal and professional conduct. Teacher self-efficacy, specifically in a learning environment, is only the teacher's confidence in his or her ability to set rules and accomplish educational goals.

Teachers who are more effective are likely to adopt new teaching methods, implement management strategies that respect student autonomy, establish attainable goals and maintain them despite student disappointment, provide low-achieving students with prompt and exceptional help, and develop policies that enhance students' perceptions of their academic abilities. Additionally, Woolfolk Hoy and Davis (2005) discussed how teachers who are confident in their ability to guide, manage, and form relationships with students may have more intellectual and passionate resources available to push students toward completing more difficult tasks and developing deeper

understandings. This is due to the possibility that teachers who have a high sense of effectiveness may be less concerned about student conflict and more inclined to pursue more serious relational and intellectual risks in the classroom.

Research has shown that good teachers exhibit effort and perseverance in the face of difficulties (Podell and Soodak, 1993) and that implementing novel teaching strategies is associated with students' academic success and achievement (Evers, Brouwers, and Tomic, 2002).

### **Academic Achievements**

For schools, one of the main issues is academic accomplishment. It is the outcome of the educational level at which a pupil, instructor, or organization has succeeded in imparting knowledge. Exams and routine evaluations are typically used to assess academic performance, although there is no agreement on the best methods or crucial viewpoints. Individual differences of achievements were linked with individual differences of intellect, traits. Self-efficacy beliefs are one method that motivation analyzers have used to obtain students' abstract convictions about their abilities to perform their academic obligations. Recent studies on human behaviour have revealed self-efficacy to be a significant motivator. It has been demonstrated that increased ability levels for performance on specific scholastic subjects (Javanmard et al., 2012).

### **Methodology**

This descriptive study employed co-relational research techniques. Utilizing the survey methodology, it was finished. Two tools—the Bandura self-efficacy scale questionnaire and achievement—were used to analyze the performance outcomes of the Board of Secondary Education Mirpur.

### **Population**

The research population consisted of 56 male and 65 female biology teachers who taught biology and chemistry to all high school students in the 9th and 10th grades in District Poonch Azad Kashmir.

### **Sample of Study**

The sample was chosen using a simple random sampling procedure. 90 instructors, 45 male and 45 female, were chosen at random from District Poonch Azad Kashmir. A sample of hundred each male and females from Govt high schools are chosen to test the effectiveness of the teachers.

### **Research Instruments**

#### **1. Questionnaire for Teacher's Self-Efficacy**

Albert Bandura granted the researcher permission to use his self-efficacy assessment scale (BSES) from 2006. Likert scale on 5 points was used.

The BSES for teachers included 27 elements and four sub factors, which are as follows:

1. Ability to have an impact on decision-making
2. Academic self-efficacy
3. Parental involvement effectiveness
4. The success of fostering a supportive school climate

Tests on the teacher self-efficacy scale were conducted. The Cronbach's alpha value for this was 0.81.

#### **2. Questionnaire for Students' Self Efficacy:**

With the assistance of professionals, the BSES scale for students' was modified with the help of study guide of (Bandura, 2006). It was translated into Urdu after undergoing pilot testing. The final survey included 60 items on it, each item were given Likert scale type on 5-points.

The following elements were to be investigated:

1. Self-efficacy in mobilizing social resources
2. The capacity for intellectual success.
3. Self-efficacy for learning that is self-regulated
4. Self-efficacy for extracurricular activities and leisure skills
5. Self-regulation effectiveness
6. The ability to live up to others' expectations
7. Self-assertive effectiveness
8. Confidence in one's ability to participate in parental and local sports
9. Effectiveness in influencing judgment.

The students scale for self-efficacy was given to twenty students for pilot testing. It has a reliability coefficient value of 0.89.

Both questionnaires utilized were validated by Experts.

**Procedure**

Data collection procedures were carried out in two phases. At first stage, the researchers gave ninety questionnaires to the selected teachers of biology from Districts Poonch, forty five male and forty five females. Each sentence was carefully read by the respondents, who then indicated how much they agreed or disagreed with it. In the second stage, the researcher spoke with 100 male and 100 female ninth- and tenth-graders. After reading each statement, secondary school students rated according to their own will whether they agree or not agree with it. Teachers returned questionnaires with a response rate of 38 males (84%) and 41 females (91%) while students questionnaires were returned with the response rate of 78% males and 80% females.

**Results**

*Table-1 Self-efficacy of Teachers*

	N	Min	Max	M	SD
overall Self-efficacy of teachers	79	3	5	4.06	.35

The M value is 4.06 and the SD is 0.35, according to Table 1. The range of self-efficacy is 3 to 5, with 5 being the highest. The average of 4.06 indicates that instructors generally have good self-efficacy.

*Table-2 Male Self Efficacy*

Gender	N	R	M	SD
Male	38	1.41	4.04	.31

Male teachers' self-efficacy is displayed in Table 2. 4.04 is the mean, and 0.31 is the standard deviation. Male teachers' self-efficacy is of high level, according to the mean value.

*Table-3 Female Teachers' Self Efficacy*

Gender	N	Range	Mean	Std. Deviation
Female	41	1.48	4.08	.39

Female instructors' self efficacy is displayed in Table 3. The standard deviation is.39 while the mean is 4.08. The mean figure shows that female instructors' self-efficacy have a high value.

*Table-4 Male and Female Teachers' Self Efficacy t-test result*

Gender	N	M	SD	t	p
Male	38	4.04	.31	.57	.57
Female	41	4.08	.39		

$\alpha = 0.05$

The self-efficacy of male and female instructors is contrasted in Table 4. The average of male teachers is lower and the average of female teacher is slightly higher. The standard deviation for male instructors is 0.31 and the standard deviation for female teachers is 0.39 ( $p=0.57 > 0.05$ ). Null hypothesis is therefore accepted. As a result, there is no discernible difference between male and female teachers' levels of self-efficacy.

*Table- 5 Correlation result in biology of male teacher's*

Male Teachers' Self-Efficacy	Biology Academic Achievement	Pearson Correlation
80.70	88.53	.116

According to Table 5, male teachers' self-efficacy and academic accomplishment in the field of biology are only weakly correlated. Male teachers' self-efficacy is 80.70, while academic achievement is 88.53 and  $r=0.116$

*Table-6 Correlation results in chemistry of male teachers*

Male Teachers' Self Efficacy	Academic Achievement in Chemistry	Pearson Correlation
80.70	84.05	.055

According to Table 6, male teachers' self-efficacy and academic accomplishment in the subject of chemistry are only weakly correlated. Male teachers' self-efficacy is 80.70, while male students' academic achievement is 84.05. At the 0.01 threshold of significance, the correlation value is not significant.

*Table-7 Correlation results in biology*

Self-Efficacy of female Teachers	Academic Achievement in Biology	Pearson Correlation
81.59	90.61	.159

According to Table 7, a very weak relation found between female teachers' academic and accomplishment self-efficacy in biology, female instructors with the self-efficacy of 81.59 and academic achievement being 90.61. At the 0.01 threshold of significance, the correlation value is significant.

*Table-8 Correlation results in chemistry*

Female Teachers' Self-Efficacy	Academic Achievement in Chemistry	Pearson Correlation
81.59	89.76	.041

According to Table 8, there is a weak link between female teachers' self-efficacy and student accomplishment in the subject of chemistry ( $r=0.041$ ), with the females' self-efficacy of being 81.59 and academic attainment being 89.76. At the 0.05 threshold of significance, the correlation value is significant.

*Table-9 students' self-efficacy*

N	M	SD
158	3.60	.396

The overall self-efficacy of all pupils is displayed in Table 9. The standard deviation is .396 and value of the mean is 3.60. Self-efficacy is moderate since the estimated mean (3.60) is higher than 3.

*Table-10 Overall male students' self-efficacy*

Gender	N	Range	Mean	Std. Deviation
Male	78	2.05	3.63	.37

The overall self-efficacy of male students is displayed in Table 10. 3.63 is the calculated mean, and .37 is the standard deviation. Since the estimated mean is more than 3, male students as a whole have a moderate level of self-efficacy.

*Table- 11 Overall female students' self-efficacy*

Gender	N	Range	Mean	Std. Deviation
Female	80	1.87	3.56	.42

The overall female students' self-efficacy is shown in Table 11. 3.56 is the mean value, and .42 is the standard deviation. The average value is greater than 3, indicating that female students have a moderate level of self-efficacy.

*Table-12 Students' self-efficacy*

Gender	N	M	SD	t	P
Male	78	3.63	.37	1.117	.266
Female	80	3.56	.42		

Table 12 compares the self-efficacy of male and female pupils. The mean score for female students is 3.56 with a standard deviation of .42, while the mean score for male students is 3.63 with a standard deviation of .37. As a result, there is no significant difference between them ( $p=0.266 > 0.05$ ). Therefore, the null hypothesis is accepted.

*Table-13 Correlation results in Biology*

Male Students Self-Efficacy	Academic Achievement in Biology	Pearson Correlation
72.62	55.96	.065

According to Table 13, there is only a slight association between male students' self-efficacy, which is 72.62, and their academic accomplishment in biology, which is 55.96, as indicated by the Pearson correlation value of 0.065.

*Table-14 Correlation results in Chemistry*

Self-Efficacy of Male Students	Academic Achievement in Chemistry	Pearson Correlation
72.62	50.47	.087

In Table 14, a male student's self efficacy is shown to be 72.62, and his academic performance in chemistry is shown to be 50.47, with a Pearson correlation of 0.087, indicating that there is little association between the two.

*Table- 15 Correlation results in Biology*

Self-Efficacy of female Students	Academic Achievement in Biology	Pearson Correlation
71.22	53.34	.081

According to Table 15, there is a weak association between a female student's self-efficacy score of 71.22 and her academic performance in biology, which is shown to be 53.34 with a Pearson correlation of 0.081.

*Table-16 Correlation results in Chemistry*

Self-Efficacy of female Students	Academic Achievement in Chemistry	Pearson Correlation
71.22	53.34	.081

According to Table 16, there is a weak association between a female student's self-efficacy score of 71.22 and her academic performance in biology, which is shown to be 53.34 with a Pearson correlation of 0.081.

### **Conclusions**

Teachers are quite confident in their abilities. Biology academic success is negatively connected with sense of self-efficacy of male teachers. In the subject of chemistry, men teachers' academic success is inversely connected with their sense of self-efficacy.

The degree of self-efficacy among female teachers is inversely connected with the academic success in the biology discipline. Inversely correlated with self-efficacy of female teachers' academic success in the subject of chemistry was given.

Self-efficacy among students is moderate. A slight correlation exists between academic achievement and male students' self-efficacy level in biology. A slight correlation exists between male students' chemistry academic success and their level of self-efficacy. There is little correlation between female students' self-efficacy and their academic success in biology. There is little correlation between female students' academic success in chemistry and their sense of self-efficacy.

### **Discussion**

Teachers' self-efficacy and pupils' academic achievement are related. According to Dellinger, Bobbett, Ellett, and Olivier (2008) and the same connection was demonstrated by (Brady & Fuertes, 2011). Academic accomplishment and teachers' sense of their own efficacy are related based on studies (Ross 1992, Caprara et al., 2006). According to Moturi (2012) academic achievement is related to both teachers and students in secondary schools. Because they are more interested in doing practical work than theory, male biology teachers perform less academically in biology than in chemistry (Finn, & Frone, 2004; Britner, 2008).

### **Recommendations**

1. It is advised that training and refresher courses are crucial to improving both teachers' and students' sense of self-efficacy.
2. The education department regularly suggests continuing education programs, seminars, and teacher training courses.
3. Both male and female teachers should concentrate on teaching biology and chemistry, and inadequacies must be eliminated using all available tools.
4. The results indicate that, whereas there is a strong correlation between male teachers' self-efficacy and academic accomplishment in chemistry, there is a weak one in biology. It's possible that men are more exposed to chemistry than women are to biology. It is suggested that biology-related seminars for male teachers be held.
5. Female academic attainment overall is higher in biology than chemistry. It is advised that chemistry-related seminars for female teachers be held.
6. In teacher preparation programs, there is a critical need to concentrate on enhancing self-efficacy and academic accomplishment.
7. It is advised to motivate and appreciate students to increase self-efficacy.
8. To ensure that they fully comprehend a subject, students should be permitted to ask questions and do practical tasks.

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