

# **Self-Efficacy and Academic Achievement among Undergraduate Female Students: An Exploratory Analysis across Academic Streams**

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## **Abstract**

The present study sought to find out the relationship between self-efficacy and academic achievement among undergraduate female students across science, humanities and commerce academic streams. It also compared students' academic achievement and self-efficacy across these streams. A quantitative descriptive survey with a co-relational design was adopted. The sample comprised 1,248 undergraduate female students. Students were selected through purposive and stratified random sampling. Self-efficacy was measured using the adapted Bengali version of the self-efficacy scale developed by Singh and Narain (2014). Academic achievement was based on students' second-semester examination marks obtained in 2023. Data were analyzed using descriptive statistics, Pearson's correlation and one-way ANOVA through IBM SPSS Version 20. The findings unambiguously exhibited that the self-efficacy had a positive impact on academic achievement. It also manifested a weak but significant positive correlation between self-efficacy and academic achievement determined success of the students. This study recommends that educational institutions should organise orientation programmes guidance sessions and skill development activities to strengthen self-efficacy among female undergraduate students. This in turn can contribute to the overall personal development educational success and empowerment of undergraduate female students.

**Keywords:** Self-efficacy, Academic Achievement, Undergraduate, Female Students, Academic Stream, Science, Humanities, Commerce

## **1. Introduction**

Albert Bandura (1994) has defined self efficacy as "Self-efficacy is the belief in one's ability to influence events that effect one's life and control over the way these events are experienced". A strong sense of self-efficacy is crucial for overall well-being as it boosts feelings of achievement and personal wellness. It also encourages exploring new and creative ideas. Furthermore, when the self-efficacy is elevated, they tend to hold higher expectations for academic performances. Self-efficacy influences emotions, thoughts, motivation levels, behaviours and overall performance. The levels of an individual's self-efficacy can influence their self-perception and self-thought (Alzabidi et al., 2024). The way an individual interprets information from vicarious experiences is shaped by their own experiences. People

with low general self-efficacy tend to be more sensitive. Efficacy activated processes include cognitive, motivational, emotional and selecting processes (Bakdoolot & Dangin, 2024). Cognitive processes take several shapes that are influenced by efficacy beliefs. Human behaviour is purposeful and regulated by cognition, which embodies desired goals. Actions are initially organized in thought. The primary function of mind is to help people gain more control over their lives and foresee events. Self-efficacy has a significant and meditative function in academic achievement (Koseoglu, 2015). It can regulate their feelings and behaviour using a functioning model, and these beliefs predict the people's behaviour (Raqshin & Nirjar, 2012). Students who felt more capable of obtaining higher academic achievement had greater strategic flexibility in seeking a solution (Bandura, 1997). Self-efficacy is regarded to have a substantial impact on a person's psychological adjustment and well-being (Pajares & Urdan, 2006). The self-efficacy theory can be applied to work-related performance to drive various employee aspects and organizational goals (Cherian & Jacob, 2013). Academic achievement is defined as a measure of knowledge, understanding of skill in a specific subject or group of subjects. It refers to achievement in a separate subject or a total score of several subjects combined (Bwenyu, 2023). It is concerned with quality and quantity of learning attained in a subject or a group of subjects after a period of instructions (Schunk, 1995). It includes both cognitive and non-cognitive factors. The studies strongly support the self-efficacy role on improvement of people's activity (Bandra & Locke (2003). A strong relation between self-efficacy and general performance of the individuals was observed. Staikovic and Luthans (1988) through a research which had considered the relationship between the self-efficacy and the performance found out that there was a strong and positive relationship between the self efficacy and the performance. In academic achievements, Multon et al., (1991) through a research study found the positive relationship between the self-efficacy and the academic achievements.(Motlagh et al., 2011). The findings of this study may help teacher's counsellors and policymakers develop effective support services and training programmes (Das & Sarkar, 2025). Strengthening self-efficacy among female students can improve academic performance encourage self-confidence contributing to their overall educational and personal development (Datu et al., 2017). The study advanced discussions on women's education by showing the self-efficacy approaches helped female students enhance their academic achievement.

## 2. Conceptual Framework

Self-efficacy is the belief in one's ability to do a particular task. In 1978, Albert Bandura established the self-efficacy theory that has now gained widespread recognition. Self-efficacy is defined as an individual's confidence and beliefs in his or her ability to successfully carry out a course of action, perform given behaviors, complete given tasks, and achieve desired performance outcomes (Bandura, 1978). Self-efficacy can eventually influence whether a person chooses to perform or refrain from executing a task. It is thus a critical aspect in understanding how people gain confidence and evaluates their talents. Bandura (1994) proposed that self-efficacy beliefs are formed through four key processes and sources. These include (a) previous performance achievements and successful mastering experiences. Success boosts confidence in one's abilities. Failures erode it. (b) The second method for developing and strengthening beliefs in personal efficacy is to observe and mimic the performance of role models. If people see others succeeding via persistent efforts, they will believe that they, too, have the ability to do so. (c) Social persuasion is the third approach to increase a person's efficacy. If people

believe they have what it takes to succeed, they will work harder than if they hold self-doubts and linger on personal shortcomings when issues arise. (d) People also rely on their physical and emotional states to estimate their capabilities. They see their stress, worry and despair as indicators of personal insufficiency. Fatigue and soreness are symptoms of poor physical performance. Hackett and Betz (1981) created a theory of professional self-efficacy by applying the notion of self-efficacy to work-related activities. Efficacy ideas stem from the origins of human agency. People are unlikely to behave unless they believe they can achieve results through their actions. Self-efficacy influences on feelings, thinking and acting process of human being. People with high self-efficacy pick more difficult tasks (Yokoyama, 2019; Usher & Pajares, 2008). They establish greater goals and stick to them. Actions are pre-shaped in thoughts and once taken, highly self-efficacious people exert more effort and continue longer than those with low self-efficacy (Oraon, 2024). When they experience losses, they recover faster and stay devoted to their goals (Bandura, 1997). Self-efficacy is commonly viewed as either task or domain specific. Such an effective approach promotes intrinsic interests and deep engagement in activities. They create tough goals for themselves and remain committed to them. Self efficacy refers believing in one's ability to complete tasks and achieve goals. High level self-efficacy is influenced by motivation, hard work with confidence (Wu, 2024).

### **3. Objectives**

1. To find out the level of self-efficacy of undergraduate female students in relation to their academic streams.
2. To find out the level of academic achievement of undergraduate female students in relation to their academic streams.
3. To ascertain the relationship between self-efficacy and academic achievement of undergraduate female students.
4. To find out the academic achievement among undergraduate female students in relation their academic streams.
5. To find out the self-efficacy among undergraduate female students in relation their academic streams.

### **4. Hypotheses**

1. There is no significant relationship between self-efficacy and academic achievement of undergraduate female students.
2. There is no significant difference in academic achievement of undergraduate female students in relation to streams of education.
3. There is no significant difference in self-efficacy of undergraduate female students in relation to streams of education.

### **5. Methodology**

The present study adopted is a quantitative descriptive survey study with correlation design. Considering the demand and nature, the researcher employed the descriptive survey method to collect data from the

target subjects using standardized tools. The obtained data were quantified and analyzed using appropriate statistical techniques to answer the research objectives research hypotheses.

### 5.1 Population of the Study

The population of the study comprised all enrolled female students in undergraduate courses offered by the colleges under the University of Calcutta. Only female students those who have appeared second semester examination in the year 2023 were considered in this study.

### 5.2 Sample of the Study

The researcher selected eighteen general degree colleges by the purposive sampling process. These colleges are affiliated to the University of Calcutta and located in the districts of Kolkata, South 24 parganas and Howrah. The data were collected through stratified random sampling technique. A total of 1290 female undergraduate students were participated in this study. After screening for complete responses, 1248 female students were included as final sample. Among them, 430 (34.46%) were from science, 571 (45.75%) from humanities and 247 (19.79%) from commerce discipline.

### 5.3 Variables of the Study

The following variables clearly defined and classified into appropriate categories for the present study-

- **Independent Variable**

**Self-Efficacy:** Refers to a person's belief in their ability to perform tasks and manage different situations successfully. In this study it was treated as a dependent variable.

- **Dependent Variable**

**Academic Achievement:** Refers to the marks achieved by female undergraduate in their 2023 second-semester examinations. In this study it was treated as a dependent variable.

- **Categorical Variable**

**Academic Stream:** Academic stream refers to the specific field or branch of study which are commonly offered by the college i.e., humanities, science and commerce.

### 5.4 Tools of the Study

The selection of appropriate research tools is essential for obtaining valid and reliable data. The following tools were used for the present study-

❑ **Self-Efficacy Scale (SES-SANS) (2014)** by Arun Kumar Singh and Shruti Narain was used to measure the self-efficacy. This tool was adapted with required changes to accommodate the context of female undergraduate students. The English version scale was translated into Bengali and verified by language experts to ensure linguistic accuracy and conceptual equivalence. The adapted scale reflected high reliability (Cronbach's Alpha=0.870) and satisfactory content validity confirming its suitability for assessing the self-efficacy of female undergraduate students (Singh & Narain, 2014).

□ **Academic Achievement:** The academic achievement of the female undergraduate students was calculated on the basis of 2<sup>nd</sup> semester examination of graduation course in the year 2023.

## 5.5 Procedure of Data Collection

The researchers visited the sample colleges and arranged meetings with the principals. After successful meetings, the principals granted permission and set a date for data collection. On the assigned date, the researcher arrived at the college on time with required materials and distributed the tool to the female undergraduate students as planned. After completion of the response by the students, they returned the tool to the researcher. The researcher collected the tools and stored carefully.

## 5.6 Procedure of Data Analysis

The researcher scored the responses of the participants in numerical value as per the scoring procedure and stored in excel sheet. All data were analyzed using IBM SPSS version 20 statistical software. Descriptive statistics like frequency, percentage, mean and standard deviation etc. were calculated. Also, the researcher analysed the data with analysis of variance (ANOVA), Pearson correlation (r) for statistical analysis.

## 6. Analysis and Interpretation

**Table 1**

**Level of self-efficacy Score of undergraduate female students in relation their Academic Stream**

| Academic Stream | Level of Self-Efficacy |              |            |              |            |              |
|-----------------|------------------------|--------------|------------|--------------|------------|--------------|
|                 | High                   |              | Average    |              | Low        |              |
|                 | N                      | %            | N          | %            | N          | %            |
| Humanities      | 212                    | 16.99        | 264        | 21.15        | 95         | 7.61         |
| Science         | 196                    | 15.71        | 174        | 13.94        | 60         | 4.81         |
| Commerce        | 96                     | 7.69         | 110        | 8.81         | 41         | 3.29         |
| <b>Total</b>    | <b>504</b>             | <b>40.39</b> | <b>548</b> | <b>43.91</b> | <b>196</b> | <b>15.71</b> |

The above table represents the level of self-efficacy scores of undergraduate female students belonging to humanities, science and commerce. The findings revealed that undergraduate female students from the humanities stream demonstrated relatively higher levels of self-efficacy compared to science and commerce undergraduate female students. The result also showed that the proportion of self-efficacy was comparatively higher in humanities stream. So, it can be said that the academic stream could have an influence on the level of self-efficacy.

**Table 2**  
**Level of Academic Achievement Score of undergraduate female students in relation their Academic Stream**

| Level of Academic Achievement | Academic Stream |       |         |       |          |       |
|-------------------------------|-----------------|-------|---------|-------|----------|-------|
|                               | Humanities      |       | Science |       | Commerce |       |
|                               | N               | %     | N       | %     | N        | %     |
| <b>High</b>                   | 006             | 00.48 | 041     | 03.29 | 001      | 00.08 |
| <b>Above Average</b>          | 346             | 27.73 | 325     | 26.04 | 152      | 12.18 |
| <b>Average</b>                | 173             | 13.86 | 054     | 04.33 | 080      | 06.41 |
| <b>Low</b>                    | 046             | 03.68 | 010     | 00.80 | 014      | 01.12 |
| <b>Total</b>                  | 571             | 45.75 | 430     | 34.46 | 247      | 19.79 |

The above table presents the level of academic achievement score based on academic stream i.e., humanities, science and commerce. The findings revealed noticeable variations in academic achievement levels across different academic streams. A comparison of academic streams showed that science stream students demonstrated relatively better academic achievement in higher categories such as outstanding, excellent and very good whereas humanities and commerce streams students were more found in the good, above average, average and below average categories.

**Table 3**  
**Correlation between academic achievement and self efficacy of undergraduate female students**

| Variables                   | Statistical Parameters | Academic Achievement | Self Efficacy |
|-----------------------------|------------------------|----------------------|---------------|
| <b>Academic Achievement</b> | Pearson Correlation    | 1                    | 0.121**       |
|                             | Sig. (2-tailed)        | -                    | 0.000         |
|                             | N                      | 1248                 | 1247          |
| <b>Self Efficacy</b>        | Pearson Correlation    | 0.121**              | 1             |
|                             | Sig. (2-tailed)        | 0.000                | -             |
|                             | N                      | 1247                 | 1247          |

\*\*, Correlation is significant at the 0.01 level (2-tailed).

From the above table it has been found that the Pearson correlation between academic achievement and self-efficacy of undergraduate female students is 0.121 which is positive and statistically significant at the 0.01 level ( $p < 0.01$ ). Academic success could be contributed to students' confidence in their abilities but other factors also played a significant role in shaping self-efficacy. This reflected a positive but weak relationship between academic achievement and self-efficacy. This finding suggested that higher academic achievement is associated with higher levels of self-efficacy among undergraduate female students.

**Table 4**

**One-Way ANOVA Showing the Difference in Academic Achievement among undergraduate female students from Different Academic streams**

| Source of Variation | Sum of Square | df   | Mean Square | F      | Sig.  |
|---------------------|---------------|------|-------------|--------|-------|
| Between groups      | 11892.336     | 2    | 5946.168    | 75.444 | 0.000 |
| Within groups       | 98126.014     | 1245 | 78.816      |        |       |
| Total               | 110018.350    | 1247 |             |        |       |

The One-Way ANOVA shows differences in academic achievement among undergraduate female students from different academic streams. The obtained F-value was 75.444 which is significant at  $p < 0.05$ . This indicates that the mean academic achievement scores differed across the academic streams. The result indicates a significant difference in academic achievement based on their academic streams ( $p < 0.05$ ). The formulated hypothesis stated that “there is no significant difference among undergraduate female students of different academic streams with respect to academic achievement” was rejected.

**Table 5**

**Multiple Comparisons of Academic Achievement Scores among undergraduate female students from Different Academic streams**

| Academic stream (I) | Academic stream (J) | Mean Difference (I-J) | Std. Error | Sig.  | 95% Confidential Interval |             |
|---------------------|---------------------|-----------------------|------------|-------|---------------------------|-------------|
|                     |                     |                       |            |       | Lower Bound               | Upper Bound |
| Humanities          | Science             | -6.3993*              | 0.5669     | 0.000 | -7.789                    | -5.010      |
|                     | Commerce            | 0.3048                | 0.6761     | 0.903 | -1.352                    | 1.962       |
| Science             | Humanities          | 6.3993*               | 0.5669     | 0.000 | 5.010                     | 7.789       |
|                     | Commerce            | 6.7041*               | 0.7088     | 0.000 | 4.967                     | 8.441       |
| Commerce            | Humanities          | -.3048                | 0.6761     | 0.903 | -1.962                    | 1.352       |
|                     | Science             | -6.7041*              | 0.7088     | 0.000 | -8.441                    | -4.967      |

\*. The mean difference is significant at the 0.05 level.

The multiple comparison analysis shows significant differences in academic achievement among undergraduate female students from different academic streams. Science students scored significantly higher than humanities students and commerce students ( $p < 0.05$ ). However, the difference in academic achievement between humanities and commerce students was not statistically significant ( $P > 0.05$ ). The findings indicated that academic achievement varies across academic streams. The science stream

demonstrated significantly higher academic achievement compared to those from the humanities and commerce streams. The absence of a significant difference between humanities and commerce students suggested that these two streams showed similar levels of academic performance.

**Table 6**  
**Homogeneous Subsets Showing Mean Academic Achievement undergraduate female students across Different Academic Streams**

| Academic Achievement                                                                                                  |                  |     |                         |         |          |
|-----------------------------------------------------------------------------------------------------------------------|------------------|-----|-------------------------|---------|----------|
| Scheffe <sup>a,b</sup>                                                                                                | Academic Streams | N   | Subset for alpha = 0.05 |         |          |
|                                                                                                                       |                  |     | Humanities              | Science | Commerce |
|                                                                                                                       | Humanities       | 571 | 62.053                  |         |          |
|                                                                                                                       | Science          | 430 |                         | 68.452  |          |
|                                                                                                                       | Commerce         | 247 |                         |         | 61.748   |
|                                                                                                                       | Sig.             |     | 0.897                   | 1.00    | 1.000    |
| Means for groups in homogeneous subsets are displayed.                                                                |                  |     |                         |         |          |
| a. Uses Harmonic Mean Sample Size = 369.209.                                                                          |                  |     |                         |         |          |
| b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed. |                  |     |                         |         |          |

The homogeneous subset analysis shows differences in mean academic achievement scores among undergraduate female students from different academic streams. Commerce students had a mean score of 61.748 and humanities students had a similar mean score of 62.053; both appeared in the same subset. Science students formed a separate subset with a much higher mean score of 68.452. This indicated that commerce and humanities students had comparable academic achievement while science students scored higher. The results indicated that academic achievement differs across academic streams. Female students from the science stream demonstrated significantly higher academic achievement than those from the commerce and humanities streams. The commerce and humanities students into the same homogeneous subset confirmed that there was no meaningful difference between these two streams.

**Table 7**  
**One-Way ANOVA Showing the Difference in Self-Efficacy among undergraduate female students from Different Academic streams**

| Source of Variation | Sum of Square | df   | Mean Square | F      | Sig.  |
|---------------------|---------------|------|-------------|--------|-------|
| Between groups      | 417.269       | 2    | 208.635     | 42.832 | 0.000 |
| Within groups       | 91717.691     | 1245 | 73.669      |        |       |
| Total               | 92134.961     | 1247 |             |        |       |

The one-way ANOVA test was conducted to examine whether there was any significant difference in the self-efficacy levels of undergraduate female students across different academic streams i.e.,

humanities, science and commerce. The analysis revealed an F-value of 42.832 which is significant at  $P < 0.05$ . This indicates that there is a statistically significant difference in self-efficacy from different academic streams at  $P < 0.05$ . The result showed a significant difference in self-efficacy based on their academic streams. The result indicated that the null hypothesis which stated that “there is no significant difference among undergraduate female students of different academic streams with respect to self-efficacy” was rejected.

**Table 8**  
**Multiple Comparisons of Self-Efficacy Scores among undergraduate female students from Different Academic streams**

| Academic stream (I) | Academic stream (J) | Mean Diff. (I-J) | Std. Error | Sig.  | 95% Confidential Interval |             |
|---------------------|---------------------|------------------|------------|-------|---------------------------|-------------|
|                     |                     |                  |            |       | Lower Bound               | Upper Bound |
| Humanities          | Science             | -6.2376*         | 0.548      | 0.000 | -7.587                    | -5.113      |
|                     | Commerce            | -0.3073          | 0.654      | 0.994 | -1.670                    | 1.536       |
| Science             | Humanities          | 6.2376*          | 0.548      | 0.000 | 6.113                     | 7.580       |
|                     | Commerce            | 6.1679*          | 0.685      | 0.000 | 5.517                     | 8.852       |
| Commerce            | Humanities          | -0.3073          | 0.654      | 0.994 | -1.531                    | 1.677       |
|                     | Science             | -6.1679*         | 0.685      | 0.000 | -8.854                    | -4.519      |

\*. The mean difference is significant at the 0.05 level.

A post-hoc multiple comparison test (Tukey’s HSD) was conducted to identify which academic streams differed significantly in self-efficacy. The results showed significant differences in self-efficacy scores from different academic streams. Science students had significantly higher self-efficacy than Humanities students and commerce students ( $p < 0.05$ ). However, the difference in self-efficacy between humanities and commerce students was not statistically significant ( $p > 0.05$ ). The findings indicate that self-efficacy varies across academic streams among female students. The science stream exhibited the highest level of self-efficacy while humanities and commerce students show similar levels of self-efficacy.

**Table 9**  
**Homogeneous Subsets Showing Mean Self-Efficacy Scores of undergraduate female students across Different Academic streams**

| Self-Efficacy           |                 |     |                         |         |          |
|-------------------------|-----------------|-----|-------------------------|---------|----------|
| Scheffe <sup>a, b</sup> | Academic stream | N   | Subset for alpha = 0.05 |         |          |
|                         |                 |     | Humanities              | Science | Commerce |
|                         | Humanities      | 571 | 85.57                   |         |          |
|                         | Science         | 430 |                         | 82.80   |          |
|                         | Commerce        | 247 |                         |         | 81.64    |
|                         | Sig.            |     | 1.000                   | 1.000   | 1.000    |

|                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------|
| Means for groups in homogeneous subsets are displayed.                                                                |
| a. Uses Harmonic Mean Sample Size = 369.209.                                                                          |
| b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed. |

The table presents the homogeneous subsets of mean self-efficacy among undergraduate female students from different academic streams using the Scheffé post-hoc test. The homogeneous subset analysis showed differences in mean self-efficacy scores from different academic streams. Humanities students have the highest mean self-efficacy score followed by commerce students while science students had the lowest mean score. Each academic stream appeared in a separate subset indicating variation in self-efficacy levels across streams. The results indicated that self-efficacy differs across academic streams. Humanities students show the highest level of self-efficacy followed by commerce students while science students show comparatively lower self-efficacy. The formation of separate homogeneous subsets confirms that the differences in mean self-efficacy scores across academic streams are meaningful.

## 7. Discussion

The present study sought to find out the relationship between self-efficacy and academic achievement among undergraduate female students across academic streams. The findings revealed that undergraduate female students from the science stream demonstrated relatively higher levels of self-efficacy and academic achievement compared to humanities and commerce students. The result also showed that the proportion of students with self-efficacy was comparatively higher in humanities stream. Whereas science stream students demonstrated relatively better academic achievement in higher categories such as outstanding, excellent and very good whereas humanities and commerce streams students were more found in the good, above average, average and below average categories. The study found a positive association between self-efficacy and academic achievement. Students with higher self-confidence generally showed higher academic achievement. This finding is consistent with Bandura's Social Cognitive Theory (1997) and the study by Zimmerman (2002) who explained that self-regulation and effective time management strengthen an individual's belief in their own abilities. Although these relationships were positive, they were relatively weak indicating other factors such as motivation socio-economic background availability of resources family support and parental involvement also play an important role in influencing these outcomes. (Eccles & Wigfield, 2002). The findings also exhibited significant differences in self-efficacy across academic streams. Science students persistently performed better than commerce and humanities students in every aspect. It has been found possibly due to science students having more disciplined, consistent study habits and continuous engagement with the tasks. These types of findings were noticed due to more educational support, good learning environments, educational resources, technology integration and parental involvement (Ghosh, 2014; Lighsey, 2011). The findings confirmed that the self-confidence is a valuable personal resource that promotes to students' academic achievement among the undergraduate female students (Multon et al., 1991). The results also shaped by the academic, personal and environmental contexts stressing the multidimensional nature of student development (Das & Sarkar, 2025; Wu, 2024). The study emphasized the requirements for educational institutions to foster significant time management competency alongside favourable

learning settings which helped to strengthen the self-efficacy (Bwenvu, 2023; Motlagh et al., 2011). These findings are persistently supported by the previous research (Zimmerman, 2002, Eccles & Wigfield, 2002; Lent et al., 1994) and confirmed the importance of implementing an inclusive approach to foster the academic and personal growth among the undergraduate female students.

## 8. Conclusion

The findings unambiguously exhibited that the self-efficacy had a positive impact on academic achievement. It also manifested a significant positive correlation between self-efficacy and academic achievement determined success of the students. Other factors like motivation, family environment, study habits and access to resources also played important roles. The study found that the science stream showed higher levels of self-efficacy than students from the commerce and humanities streams. Based on these findings educational institutions should organise orientation programmes guidance sessions and skill development activities to strengthen self-efficacy. This in turn can contribute to the overall personal development educational success and empowerment of undergraduate female students.

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