

Mediating Effect of Self-Efficacy on the Relationship between Placement Exam Results and Career Aspirations of Science Education Students

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Abstract. This research explores the mediating effect of self-efficacy on the relationship between placement exam results and the career aspirations of BSED Science students. This study investigated how self-efficacy influences the connection between placement exam results and the career aspirations of BSED Science students. It aimed to understand if and how self-belief in one's abilities mediates the impact of placement exam performance on career goals. Using a quantitative research design, the study involved 50 freshmen BSED science students at Northwestern Mindanao State College of Science and Technology. A survey questionnaire was administered. Mediation and regression analysis were used to understand the process or mechanism by which one variable influences another variable through an intermediary factor. The results demonstrated no significant relationship between placement exam results and career aspirations for BSED Science students. However, students who aspire to a BSED Science career do not necessarily mean to get high scores during the placement exam. The findings suggest that self-efficacy provides valuable insights into the relationship between placement exam results and career aspirations. To support student growth, placement exam scores should be seen as opportunities for improvement. Encouraging goal-setting, positive thinking, and visualization can build confidence. Parents should foster a growth mindset and work with schools, while teachers connect lessons to real-life use. Strengthening career counseling and promoting collaboration between educators and policymakers can improve guidance and admissions. Further research on self-efficacy can help tailor support for diverse learners.

Keywords: Career aspiration; Placement exam results; Self-efficacy.

1.0 Introduction

Understanding the complex interactions between academic achievement, self-perception, and future professional aspirations is crucial in education and career development. This study delves into the nuanced relationship between placement exam results and the career aspirations of Bachelor of Secondary Education (BSED) Science students, emphasizing self-efficacy's role as a mediating factor. In line with these, placement exams serve as pivotal benchmarks, often shaping academic trajectories and influencing subsequent career paths. The outcomes of such assessments can significantly impact an individual's self-perception, affecting their beliefs about their capabilities and competence. Concurrently, career aspirations, particularly in science-related domains, are molded by a complex interplay of internal factors and external influences. In May each year, the College Entrance Examination Board administers Advanced Placement examinations in different subject areas to high school

students nationwide. In 2015, over 580,000 students participated in Advanced Placement examinations with hopes of obtaining college credit based on successful exam performance (College Board, 2015).

Top institutions in the Philippines demand passing college entrance exams, with PUPCET, ACET, USTET, DCAT, and UPCAT comprising some of the most popular exams. All students graduating from high school must take an entrance exam before entering college. Studies have been conducted to understand whether the results of admission exams would mean success in completing their degree. According to Gomez, Lopez, Rosales et al. (2012), a good admission test can predict a student's academic success in the program of their choice, according to specific research. In the Northwestern Mindanao State College of Science and Technology, one of the requirements before choosing a course is to take the entrance examination. Taking the entrance examination is necessary to ensure that students are prepared for the demands of higher education and reach a minimum standard of academic proficiency. These exams typically cover Mathematics, Science, English, and General Aptitude. Preparing for these exams can aid personal growth by developing time management skills, critical thinking abilities, and problem-solving techniques. It can also improve self-confidence and academic resilience.

One of the most common factors is self-efficacy. Self-efficacy, a psychological construct rooted in Bandura's Social Cognitive Theory (1997), plays a pivotal role in shaping individuals' beliefs about their capabilities to execute courses of action required to attain specific performance levels. In the context of BSED Science students, self-efficacy may significantly mediate the relationship between placement exam outcomes and specific career goals. Accordingly, career aspirations assist students in formulating precise objectives for their future. These objectives motivate them to put in much effort, acquire necessary skills, and take concrete steps toward their desired career outcomes. Many students seek careers that provide financial security; however, this may not always be the case if they cannot handle their finances while in school. Career aspirations serve as guiding principles for students, helping them navigate their educational choices, skill development, and professional endeavors to attain their desired career outcomes and ultimately lead satisfying lives.

There may be a lack of research exploring the underlying psychological mechanisms through which placement exam results influence the career aspirations of BSED Science students. Researchers observed many students from the freshmen BSED Science who got poor scores in the placement exam results conducted by the college admission in the school year 2023-2024, which led them to shift to other programs. Han (2016) stated that students in national education systems requiring standards-based external examinations have lower expectations for science-related professional careers than those in systems that do not use such examinations. From an educational policy point of view, the results suggest the negative consequences of standards-based external exams in fostering students' interests in pursuing science-related careers. The study could aim to bridge this gap by investigating the mediating role of self-efficacy, shedding light on how individuals' beliefs in their capabilities impact their career aspirations. According to Hayat et al. (2020), while students with low self-efficacy believe that their failures are due to their low abilities, those with high self-efficacy explain their failures to lower attempts. Therefore, self-efficacy might affect the chosen tasks and the persistence with which they are completed. Stated differently, students with poor self-efficacy are more prone to avoid, put off, and eventually abandon their assignments out of fear of not accomplishing them well enough. This study investigated how self-efficacy influences the connection between placement exam results and individual career aspirations of BSED Science students. It aimed to understand if and how self-belief in one's abilities mediates the impact of placement exam performance on career goals.

2.0 Methodology

2.1 Research Design

The study utilized a quantitative research design, specifically a mediation analysis, to collect data. Researchers administered survey questionnaires to assess participants' self-efficacy, placement exam results, and career aspirations in BSED Science. The collected data were utilized to investigate the relationship between placement exam results and career aspirations and the role of self-efficacy as a mediator.

2.2 Research Locale

The study was conducted appropriately at Northwestern Mindanao State College of Science and Technology, specifically with freshmen BSED Science students. It took 8 to 10 minutes to complete.

2.3 Research Participants

The participants consisted of incoming first-year students at the tertiary level who were currently enrolled in the Bachelor of Secondary Education major in Science 1st year, with 50 participants involved in this study. A stratified random sampling technique was used to ensure the representation of educational institutions and the BSEd Science program. The total size of the sample was determined through G*Power software analysis to provide sufficient statistical power. According to Erdfelder et al. (1996), G*Power analysis was designed as a general, standalone power analysis tool for statistical tests frequently employed in social behavioral studies.

2.4 Research Instrument

The researchers used various instruments to measure the relevant constructs to address the presented problems. The survey questionnaire consisted of two sections. The first section will capture the students' career aspirations in BSEd Science. This instrument was adapted from Arellano et al. (2017). The questionnaires' reliability for the quantitative phase underwent a pilot testing using Cronbach's alpha, with a result of 0.78, indicating good internal consistency. The second section measured the students' self-efficacy. This instrument was developed by Schwarzer and Jerusalem in 1995. The survey questions are constructed using a four-point Likert scale (Table 1). Participants must rate their self-efficacy and career aspirations for each statement on a four-point scale.

Table 1. *Likert Scale*

Scale	Range	Interpretation
4- Strongly	3.26-4.00	Very High
3- Agree	2.51-3.25	High
2- Disagree	1.76-2.5	Low
1-Strongly Disagree	1.00-1.75	Very Low

2.5 Data Gathering Procedure

A cross-sectional research design was utilized, consistent with the study's goal. Specifically, a mediation analysis was conducted to assess the mediating effect of self-efficacy on the relationship between placement exam results and career aspiration in BSEd Science. Before data collection, approval was sought from the institution's college president through the Director of Student Affairs and the Institution's Ethical Board. The survey was conducted at the Northwestern Mindanao State College of Science and Technology (NMSCST). It took 8 to 10 minutes to complete.

2.6 Ethical Considerations

This research study followed ethical guidelines. Respondents were informed about the study's purpose and that the survey aimed to gather information about the relationship between placement exam results and career aspiration in BSEd Science and their self-efficacy.

3.0 Results and Discussion

Table 2 shows the placement exam results of the students conducted by the college admissions office. The mean performance of students who took the college admission examination was an average ($mp=46.36$) out of 50 participants involved. Regarding the students' performance, the study dealt with how well students performed in the placement examination. This broadens the context to encompass various aspects of student performance, which could include understanding strengths and weaknesses, identifying areas that require development, and assessing the overall proficiency of the student cohort.

Table 2. *Placement Exam Results of the Students*

Performance Level	Score Range	Frequency	Percentage	Description / Interpretation
Above Average	100- 73	-	-	No students scored within this high-performance bracket.
Average	72 - 26	50	100%	All students fell within the average performance range.
Below Average	25 - 0	-	-	No students scored within the low-performance bracket.
Mean Performance	-	46.36	-	Interpreted as Average Performance

In a study by Shaw, Marini, and Mattern (2013), results showed that the advanced placement average predictor that most enhanced model fit the advanced placement exam score. These findings are especially pertinent and topical for those who work in college admissions and assessment because data on advanced placement coursework, as opposed to exam outcomes, is typically considered when making admission decisions. Admission decisions are made when advanced placement information is considered at all.

Table 3 above shows the students' career aspirations in BSEd Science. Researchers surveyed the freshmen students to investigate these aspirations. The results revealed that the overall mean of students' career aspirations was high ($m = 2.71$). The findings show that students are highly motivated to follow a specific professional goal, and the phrase "overall mean of agree" displays a positive outlook and a strong will to be successful in a selected professional path. Some students choose "strongly agree" because of several variables, including a sincere interest in science, opportunity for growth that they perceive, positive educational experiences, the influence of role models, a desire to have an impact on society, and supportive environments that encourage them to pursue these fields. Some students choose "strongly disagree" because they seek independence and want to pursue their interests outside of the family's professional arena. They might put their preferences first.

Table 3. *Students' Career Aspirations in BSEd Science*

Indicator	Mean	Interpretation
1. I consider my choice to be an in-demand course	3.36	Strongly Agree
2. I consider the financial status of my family in choosing my course.	3.52	Strongly Agree
3. I consider the place of my future work in choosing my course.	3.20	Strongly Agree
4. I consider the work I will do after finishing my degree in choosing a course.	3.38	Strongly Agree
5. My choice of school affects my choice of course.	2.96	Agree
6. The availability of a job in the future affects my choice of course.	3.00	Agree
7. My preferred course is my "childhood dream" work.	2.90	Agree
8. My preferred course is connected to my favorite subject.	2.94	Agree
9. My preference of course is my personal choice.	3.18	Agree
10. My preference of course is a reflection of my talent.	2.64	Agree
11. My friend's preference of course affects my decision in choosing a course.	1.98	Disagree
12. My friend's choice of school affects my decision to choose a course.	2.00	Disagree
13. My parents are the ones who are choosing my course.	2.10	Disagree
14. Our family business is a factor in my choice of course in college.	1.74	Strongly Disagree
15. The dominant profession in my family is also my preferred course.	2.08	Disagree
16. Siblings' position can affect career preference.	2.16	Disagree
17. Poverty can affect career choice.	3.16	Agree
18. The educational attainment of my parent can affect my career choice.	2.44	Agree
Overall Mean	2.71	Agree

Notes: 1-1.75 – Strongly Disagree; 1.76-2.50 – Disagree; 2.51-3.25 – Agree; 3.26-4.00 – Strongly Agree

In a study by Itani and Srouf (2016), students were surveyed on career goals to see if this impacted their perceptions. The findings demonstrated that while the students understood the value of soft skills, some of these judgments were unavoidable, partly because of their career goals. This research suggests that higher education institutions should do more to help students develop their non-technical abilities in particular domains, like oral communication. Thus, career goal expresses the desire to advance professionally (Strauss et al., 2012). Enhancing students' career aspirations in BSEd Science can improve and serve as a leader for career progress, assisting the person to reach job-related objectives. Hartman and Barber (2020) stated that the desire to pursue possibilities in leadership, mentoring and supervising others, and educational advancement is also reflected in career aspirations.

Table 4 above shows the students' self-efficacy in BSEd Science. Researchers surveyed first-year students to investigate their self-efficacy in BSEd Science. The results revealed that the overall mean of students' self-efficacy was the highest ($m = 3.32$). This states that first-year students can pursue BSEd Science. In addition, no matter what circumstances may come, they are ready to face and surpass those circumstances, as they can pursue BSEd Science. This finding aligns with Bandura's social cognitive theory, which emphasizes the role of self-efficacy in determining individuals' engagement and performance (Bandura, 1997). Additional research by Bandura (2006), referenced by Gumonan et al. (2024), demonstrates that students' self-efficacy can identify minute changes in their academic performance and can also serve as an excellent predictor of their learning efficiency and motivation, coordinating their learning process. Bandura also found that students' self-efficacy regarding academic ability is vital to their motivation. Yusuf (2011) also found that self-efficacy can directly affect student achievement. However, it should not entirely be based on a study of Embang and Saluta (2021); the necessity to strengthen the alignment of curriculum, pedagogy, and assessment should also be considered. This study introduced self-efficacy as a mediating role. It recognized whether it served as a partial mediator in the path of students' placement exam results and career aspirations in BSEd Science.

Table 4. *Self-efficacy of BSEd Science Students*

Indicator	Mean	Interpretation
1. I can always manage to solve difficult problems if I try hard enough.	3.28	Strongly Agree
2. If someone opposes me, I can find the means and ways to get what I want.	3.36	Strongly Agree
3. It is easy for me to stick to my aims and accomplish my goals.	3.30	Strongly Agree
4. I am confident that I can deal efficiently with unexpected events.	3.30	Strongly Agree
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.	3.28	Strongly Agree
6. I can solve most problems if I invest the necessary effort.	3.48	Strongly Agree
7. I can remain calm when facing difficulties because I can rely on my coping abilities.	3.36	Strongly Agree
8. When I am confronted with a problem, I can usually find several solutions.	3.28	Strongly Agree
9. If I am in trouble, I can usually think of a solution.	3.20	Agree
10. I can usually handle whatever comes my way.	3.34	Strongly Agree
Overall Mean	3.32	Strongly Agree

Notes: 1-1.75 – Strongly Disagree; 1.76-2.50 – Disagree; 2.51-3.25 – Agree; 3.26-4.00 – Strongly Agree

Table 5 shows the computed r-value of -0.051, which signifies a negligible negative correlation between placement exam results and career aspirations. This suggests that as placement exam results change, there is a faint tendency for career aspirations in BSEd Science to exhibit a weak opposite trend. The associated p-value, standing at 0.725, surpasses the conventional significance level of 0.05. This elevated p-value underscores the lack of statistical significance in the observed correlation. In practical terms, the weak link between placement exam results and career aspirations could result from random chance, indicating a dearth of substantial evidence to assert a meaningful connection.

Table 5. *Significant Relationship between Students' Placement Exam Results and their Career Aspirations in BSEd Science*

Variables	r-value		p-value	Remarks
Placement Exam and Career Aspirations	-0.051	Negligible	0.725	Not Significant

Notes: If p-value > 0.05 – Not Significant; if p-value ≤ 0.05 – Significant; and if p-value ≤ 0.01 – Highly Significant
Correlation Size: .00 – .30 – Negligible; .31 – .50 – Low; .51 – .70 – Moderate; .71 – .90 – High; and .91 – 1.0 – Very High

Considering the non-significant p-value, the remarks aptly categorize the relationship as "Not Significant." This classification reinforces the idea that the observed correlation between placement exam results and career aspirations lacks statistical significance and, consequently, should not be considered to have meaningful predictive power. The provided notes are an itinerary for interpreting p-values, establishing that a p-value exceeding 0.05 indicates a "Not Significant" relationship. The correlation size classification further reinforces the notion of insignificance, as the calculated r-value falls within the 0.00 to 0.30 range, emphasizing the negligible nature of the observed correlation.

Subsequent research by Hayes (2009) further contributed to this paradigm shift by emphasizing the distinction between the direct and overall effects in mediation analysis. Hayes advocated for a focus on the total effect, suggesting that the absence of statistical significance in the independent variable-dependent variable relationship does not rule out the potential of a meaningful mediation process. This perspective aligns with the growing recognition that mediation can occur even when the independent variable-dependent variable relationship is statistically insignificant (Hayes, 2013). Moreover, recent meta-analytic studies, such as those conducted by Williams and MacKinnon (2008), have reinforced the idea that requiring a significant independent variable-dependent variable relationship may unnecessarily constrain mediation analyses. They demonstrated that there may be mediation effects even when there is no significant independent variable-dependent variable relationship, challenging the conventional wisdom established by Barron and Kenny (1986).

Table 6, the results indicate a positive mediating effect of self-efficacy on the relationship between students' placement exam results and their career aspirations in BSEd Science. The self-efficacy (SE) regression model shows a significant coefficient of 0.0147 ($p = 0.0167$) between self-efficacy and placement exam scores. The statement suggests that self-efficacy and placement exam scores are important factors that may impact predicting academic success or career choices. Another study of de Fátima Goulão (2014) examines the relationship between the academic self-efficacy of an adult learners' group and their actual performance. The results of the data analysis showed that academic accomplishment and students' levels of self-efficacy are significantly correlated. Therefore, students' levels of self-efficacy are high.

Table 6. Mediating Effect of Self-Efficacy on Placement Exam Results - Outcome Variable: SE (Self-efficacy)

Model Summary	R	R-sq	MSE	F	df1	df2	p
	.3370	.1136	.0357	6.1498	1.0000	48.0000	.0167
Model1	coeff	SE	t	p	LLCI	ULCI	
Constant	2.1549	.4698	.0357	.0000	1.2104	3.0995	
overall	.0147	.0059	2.4799	.0167	.0028	.0266	

Thus, the importance of placement exam results and self-efficacy stems from their ability to grasp the variables affecting academic performance thoroughly. Teachers and researchers can better understand students' readiness and potential for success by considering subjective factors, such as students' self-efficacy – their conviction in their abilities – and objective measurements, such as placement exam results.

In Table 7, the regression model for Career Aspiration (CA) shows an insignificant relationship between career aspirations and placement exam scores with a coefficient of -0.180 ($p = .1289$). This suggests that students could have diverse career aspirations that are not uniformly influenced by academic performance. While some students may prioritize different factors while forming their job aspirations, others may be motivated by academic achievement. Thus, this can contribute to an overall lack of significant correlation.

Table 7. Mediating Effect of Self-Efficacy on Placement Exam Results - Outcome Variable: CA (Career Aspiration)

Model Summary	R	R-sq	MSE	F	df1	df2	p
	.3390	.1149	.1229	3.0509	2.0000	47.0000	.0568
Model1	coeff	SE	t	p	LLCI	ULCI	
Constant	2.0609	1.0453	1.9715	.0546	-.0421	4.1639	
Overall	-.0180	.0117	-1.5456	.1289	-.0415	.0054	
SE	.6253	.2678	2.3350	.0239	.0866	1.1641	

Holland's theory (1959), cited by Stoltz (2017), proposes that individuals find each other attractive, to careers that align with their personality types. The relationship with exam results may not be pronounced if career aspirations are driven more by personal interests, values, and personality traits than academic success. Conversely, the regression model for Career Aspiration (CA) shows a significant relationship between career aspirations and self-efficacy with a coefficient of 0.6253 ($p = .0239$). This suggests that as self-efficacy increases, so does the possibility of students aspiring to careers in BSEd Science. This relationship suggests that students may be more likely to think about a career in education, particularly in science education, if they have confidence in their academic ability and feel competent in science-related courses.

This aligns with Bandura's social cognitive theory, emphasizing the crucial role of self-efficacy in influencing individuals' engagement and performance. The study's findings underscore the importance of educators focusing on enhancing students' capabilities, as this can potentially boost self-efficacy and, consequently, stimulate students' interest in pursuing careers in science.

Table 8. Total Effect of PE on CA

Effect	SE	t	p	LLCI	ULCI	c' _cs
-.0089	.0115	-.7709	.4445	-.0320	.0142	-.1106

In Table 8, the regression results show a total effect with a coefficient of -0.1106 for self-efficacy (SE) and a non-significant coefficient of -0.0089 ($p=0.4445$). This suggests that self-efficacy can mediate both career aspiration and placement exam results of BSEd Science students. However, the results demonstrated no significant relationship between placement exam results and career aspirations in BSEd Science. The point estimate of the overall effect is -0.0089. It implies a negative link between the independent and dependent variables because it is negative. A hypothesis test on the overall effect yielded a p-value of 0.4445. A p-value higher than the selected significance level (usually 0.05) in mediation analysis indicates insufficient proof to reject the null hypothesis. In this case, the null hypothesis typically states that the overall effect is insignificant. This states that self-efficacy must be enhanced to excel in placement exam results and career aspirations. Students who desire a BSEd Science do not necessarily mean to get high scores on the placement exam. Recent meta-analytic studies, such as that conducted

by Williams and MacKinnon (2008), have reinforced the idea that requiring a significant independent variable-dependent variable relationship may unnecessarily constrain mediation analyses. They demonstrated that mediation effects can exist even when there is no significant independent variable-dependent variable relationship, challenging the conventional wisdom established by Barron and Kenny.

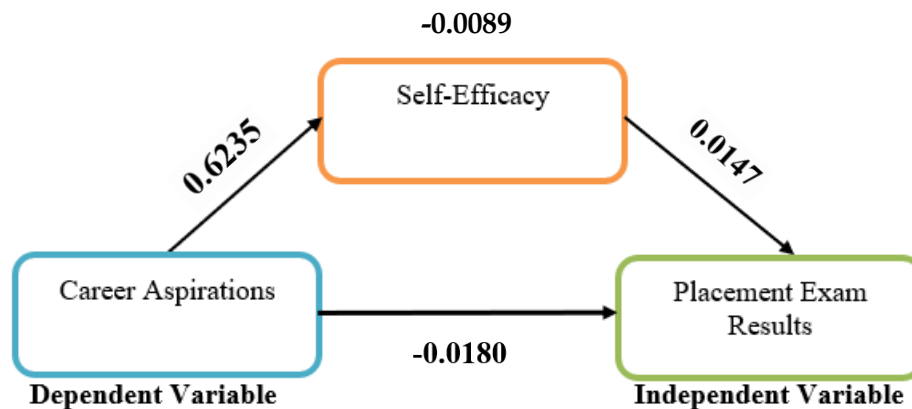


Figure 1. Mediating Effect and the Interplay of Variables

4.0 Conclusion

This study concludes that self-efficacy can mediate career aspiration and placement exam results in BSEd Science. However, the results demonstrated no significant relationship between placement exam results and career aspirations in BSEd Science. This states that self-efficacy must be enhanced to excel in placement exam results and career aspirations. Students who aspire to a BSEd Science program do not necessarily mean to get high scores during the placement exam.

5.0 Contributions of Authors

The author conceptualized and designed the study, collected and analyzed the data, and wrote the manuscript. Authors B and C contributed to data analysis, interpretation, and manuscript revisions. Author D provided critical feedback on the study design, supervised the research process, and approved the final manuscript. All authors read and approved the final version of the manuscript and agree to be accountable for its contents.

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7.0 Conflict of Interests

The authors declare no conflict of interest related to this study.

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