

IMPACT OF GENDER ON THE ACADEMIC PERFORMANCE OF SRI LANKAN UNDERGRADUATES: A SYSTEMATIC REVIEW

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Abstract

Studying and comprehending factors influencing academic performance is crucial for gaining valuable insights into the success of undergraduates. In this systematic review, the correlation between gender and undergraduate academic performance across various fields of studies in Sri Lankan universities was comprehensively studied. The data from multiple studies conducted between 2008 and 2022 in different disciplines, including Science, Management, Medicine, Agriculture, and Information Technology, was analyzed systematically. Quantitative, qualitative, and mixed-method research published in English exploring the impact of gender on academic performance were studied. The review involved 16 research studies comprising 35,608 individuals from several state universities. The data analysis showed a complex picture of gender inequalities in academic performance, with several significant trends and consequences emerging. A consistent pattern emerged, with 75% of the studies demonstrating that female students excel academically across various disciplines, while the rest exhibited no gender differences in performance. These findings underscore the critical need to promote gender equity and eliminate gender-based gaps in Sri Lankan higher education. Conducting in-depth studies across all degree programs and universities in Sri Lanka is recommended to gain a more comprehensive understanding and investigate the relationship between gender and academic performance.

Keywords: Academic Performance, Gender Influence, Higher Education, Sri Lankan universities, Undergraduate Achievement

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Accepted the revised version: 25 November 2023

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Introduction

The impact of numerous factors on university students' academic achievement is a topic of substantial research all around the world. Lecture attendance, English proficiency, income level, learning perspectives, attitudes of both students and lecturers toward education, teaching methods, gender impacts and environmental variables have all been studied for their impact on students' achievement. Several studies conducted in the United Kingdom, Australia, New Zealand, and the United States have indicated a substantial relationship between gender and the academic performance of undergraduates (Weerakkody & Ediriweera, 2012). This observation implies that there are theoretical implications for the impact of gender on university students' academic success. This study systematically investigates the impact of gender on undergraduate academic performance in various subject fields in Sri Lankan universities. Data obtained from multiple studies show significant differences in academic achievement between male and female undergraduates, with females frequently outperforming males across many subject domains. These findings are crucial to uncover the underlying causes of gender differences in academic achievement in certain subject domains and to establish strategies that encourage equitable opportunity for all students, irrespective of gender.

Methodology

Framework

This systematic review was conducted according to 'The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) extension for Systematic Reviews checklist' (Tricco et al., 2018).

Search strategy

The following databases and search engines were explored for eligible publications: SCOPUS, EBSCOhost, Emerald, JSTOR, Taylor and Francis, ERIC, IEEE Xplore and Google Scholar using the keywords 'Gender', 'Academic performance' and 'Sri Lanka'. The search was conducted from September 2022 to October 2022. No date limitations were placed on the search.

Study selection

The study was selected using the Covidence platform. The citations were imported to Covidence for screening. Quantitative, qualitative and mixed-method research conducted on the impact of gender on the academic performance of undergraduates in Sri Lankan universities, which were reported in the English language, were included in this review.

Two independent reviewers conducted the title/abstract screening and full-text screening. The conflicts were resolved by consensus. The eligible articles were retrieved for full-text review. Full texts were assessed in detail against the inclusion criteria, and the studies that did not meet the inclusion criteria were excluded. The reasons for exclusions were noted.

Data extraction and synthesis

Two reviewers independently extracted the data using customized tables. Data items used during the extraction were as follows: author/s, year of publication, title, aim, study design, population, inclusion/exclusion criteria, method of recruitment of participants, population characteristics, field of study, sample size and outcomes of student performance based on gender. After the extraction, the discrepancies were resolved via consensus. A formal assessment of the quality of the methodologies was not performed as this review aimed to provide an overview of existing evidence regardless of quality.

Results

Overview

The flow of the studies through the search and selection process is presented in Fig. 1. The search retrieved 209 records; among those, three (03) were duplicates. After screening the titles and/or abstracts of 206 studies, 43 were selected for full-text review. At the end of the full-text review, 16 studies were included in this review.

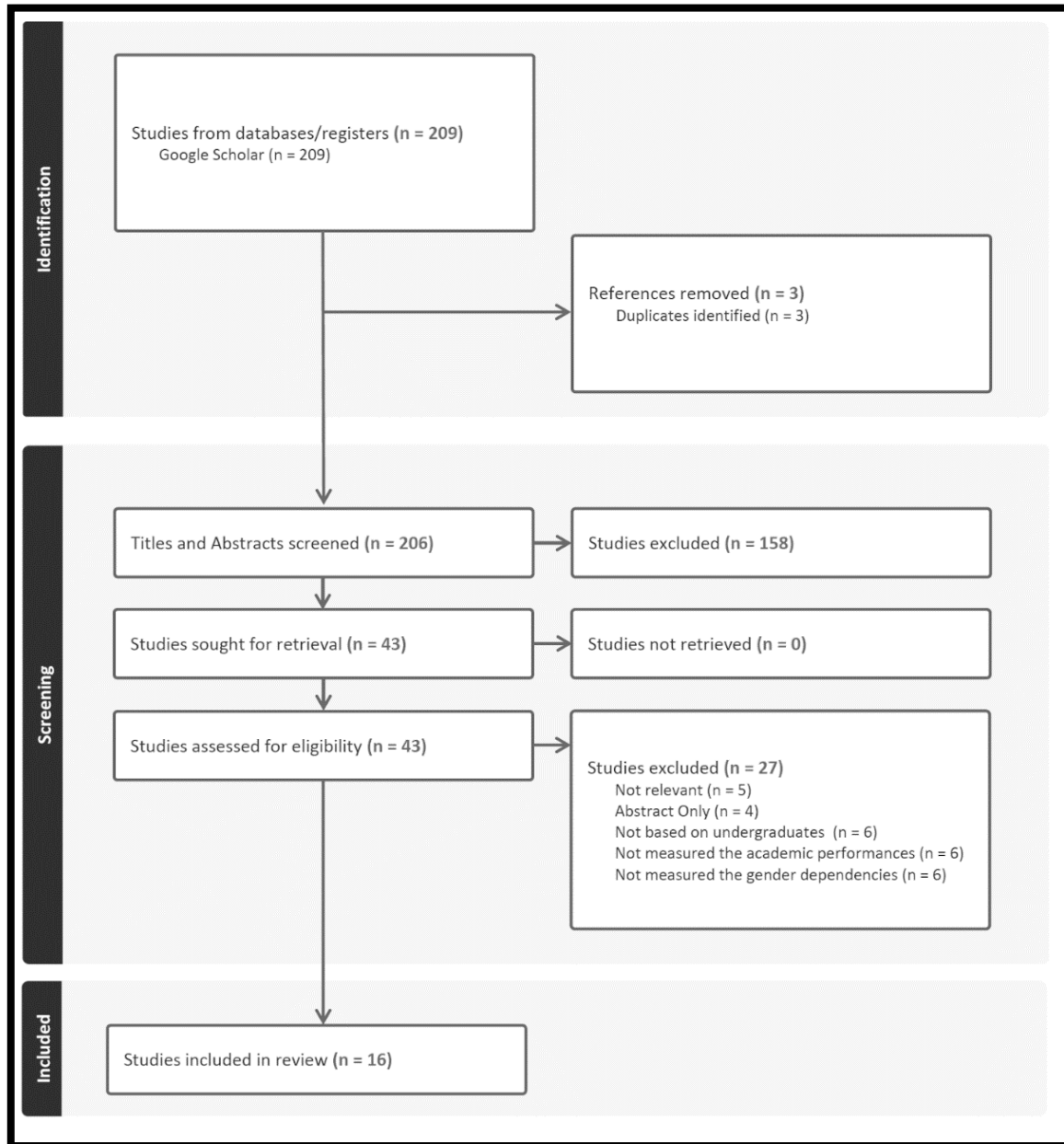


Figure 1: Preferred Reporting Items for Systematic Reviews and Meta-Analyses Flowchart for the Article Search

Study Characteristics

The review consists of 16 studies conducted in Sri Lankan universities on gender dependencies in the academic performance of undergraduates. These data present a complex picture of gender inequalities in academic performance, with several significant trends and consequences emerging from the analysis. The 16 studies consisted the data published from 2008 to 2022 including a total of 36,036 participants from the state universities, including University of Colombo - 88.89% (32,032 participants), Open

University of Sri Lanka – 4.60% (1,657 participants), University of Sri Jayewardenepura - 1.19% (391 participants), University of Kelaniya - 1.06% (382 participants), University of Ruhuna- 0.98% (353 participants), Eastern University of Sri Lanka - 0.86% (309 participants), University of Jaffna - 0.40% (144 participants), University of Peradeniya – 0.88% (316 participants) and one nationwide study included data from undergraduates representing all the state universities in Sri Lanka - 0.41% (148 participants). In another study, the names of the two universities from which the data [0.84% (304 participants)] were collected were not disclosed. In a further analysis, it was identified that the research on gender inequalities in academic performance was conducted in a wide range of fields including management and commerce - 37.5% (6), Science -18.75% (3), Medicine/Dental Sciences - 12.5% (2), IT and computing - 6.25% (1), Agriculture - 12.5% (2), Allied health- 6.25% (1) and not specified- 6.25% (1).

A summary of the 16 studies considered in this review is shown in Table 1.

Table 1: Summary of the Studies on the Impact of Gender on Academic Performance of Undergraduates in Universities in Sri Lanka

Reference (Title, Author, Year)	Title	Aim of the study	Total number of participants	Field of study and the university	Key findings
(Karunaratna, 2021-09-15)	Effects of Course-Related Factors on Academic Performances of Undergraduates- A Study with Science Courses	Investigate whether the academic performances of undergraduates in the Faculty of Science, EUSL, depend on course-related factors, especially the subject of courses, type of courses, level of courses and volume of courses and demographic factors like gender.	109	Faculty of Science Eastern University	Female students' academic performance (final GPA) is higher than male students.
(Jayani & Sooriyarachchi, 2019)	Joint Model for Study Programme Completion and Performance of Students in Distance Education in Sri Lanka.	Investigate the impact of individual-level factors (gender, age, employment state) of the students on the completion status of a study program and their performance through a joint/bivariate model of time and count.	1657	Management studies Open University of Sri Lanka	The performance of female students is 1.41 times higher than male students.
(Thayamathy et al., 2018)	Factors Affecting Academic Performances of Undergraduates: A Case Study with Third-Year Science Undergraduate of Eastern University, Sri Lanka	Explore critical factors that affect the academic performances of undergraduates of the Faculty of Science, Eastern University, Sri Lanka.	68	Faculty of Science Eastern University	The GPA of female students is 0.7 times higher than the GPA of male students. Academic performances (GPA) of third-year undergraduates depend on gender, performances in their mother language, English language, and stream of study at the university.
(Paranthama, 2014)	Factors Influencing the Academic Performance of Students in Business Education	Analyze the factors of students' commitment and teaching context that influence students' academic performance.	56	Faculty of Commerce and Management	There is no significant impact of gender on students' commitment where commitment and performance are positively

				Eastern University	related. Hence, there is no significant impact of gender on academic performance.
(A.L. Sandika, 2012)	Factors Affecting the Academic Performance of Agriculture Under-graduates: A Case in Faculty of Agriculture, University of Ruhuna	Understand the factors affecting the academic performance of the undergraduate students of the Faculty of Agriculture, University of Ruhuna, Sri Lanka.	114	Faculty of Agriculture University of Ruhuna	Females outperform males, where the percentage of females attaining a higher class is significantly higher than males.
(Sathees et al., 2018)	Factors Affecting the Learning of Allied Health Sciences Students, University of Jaffna, Sri Lanka.	Assess the influencing factors on student's learning in Allied Health Sciences	144	Unit of Allied Health Sciences (UAHS), Faculty of Medicine University of Jaffna	Students' academic performance is not significantly associated with gender, nationality, native place, living arrangement, and study programme.
(K. A. Weerakkody, 2015)	The Impact of Background Variables on Students' Performance: Case of Online External Degree Program in Sri Lanka	Identify background variables influencing student dropouts and completion in an external degree program in Sri Lanka.	31561	UCSC University of Colombo	The gender of students does not effectively impact external degree completion/performance.
(Hathella, 2022)	Determinants of Attainment of High Class of the Degree of University Students in the Sri Lankan Context	Understand factors related to high performance (class of the degree) in Sri Lankan universities	148	All universities in SL	Attaining a high class is significantly higher with Females (9% higher) than the odds of male undergraduates. The study has recognized that gender, attempt at university entrance, lecture attendance, time management skills,

					internet usage, and self-motivation are significant and influential factors in attaining high class in Sri Lankan university students.
(Mudalige SKK,2018)	Academic Performance of Undergraduates of Three New Bsc Degree Programs as Affected by Gender and A/L Study Stream and Subject Performance	Determine the academic performance of undergraduates of three new BSc degree programs as affected by gender and G.C.E Advanced Level stream and subject performance. Semester grade point averages (SGPA) over eight semesters and overall grade point averages (OGPA)	239	Faculty of Agriculture University of Ruhuna	Female undergraduates achieved higher GPA values than male students. Among students who secured first- or second-class uppers, 87 and 65 % were females.
(Nirmal & Padmasiri, 2022)	Health Behavior and Academic Performance of Sri Lankan Undergraduates	Identify the impact of health behavior on the academic performance of university undergraduates. To address this primary purpose, the following objectives have been developed: (a) to identify the relationship between health behavior and academic performance, (b) to investigate the level of academic performance among undergraduate students. (c) to identify the level of academic performance in accordance with the gender.	304	Two state universities	Male undergraduates' academic performance is lower than that of female undergraduates.
(Sriyalatha, 2016)	Factors Contributing to Students' Academic Performance: A Case of Uni-	Examine the factors (Gender, Employment status, district of residence) that affect the academ-	200	Faculty of Management	The mean GPA for female students (3.2071) was higher than for male students.

	iversity of Sri Jayeward- enepura, Sri Lanka	ic performance of undergraduate students at the Faculty of Management Studies and Commerce, USJP		Studies and Commerce University of Sri Jayeward- enepura	
(Thayamathy et al., 2018)	Identification of the Factors Affecting the Academic Performance of the Science Undergraduates of the Eastern University, Sri Lanka: A Case Study	Identify and address the factors affecting the academic performance of undergraduates in Sri Lankan universities.	76	Faculty of Science Eastern Uni- versity, Sri Lanka.	The study revealed that gender, mother language, academic grades obtained for English language and general English at the GCE examinations, the stream of study of the degree programme in the university, and the number of attempts at the GCE examination to enter the university were the most influencing factors.
(Mudalige SKK, 2018)	Predictors of Academic Performance of First-Year Dental Undergraduates in Sri Lanka	Predictors of academic performance of first-year dental undergraduates in Sri Lanka: a re-evaluation following curriculum changes	316	Faculty of Dental Sciences University of Peradeniya	Female students perform better ($p < 0.001$, Beta -0.35)
(Priyadarshana & Kumari, 2020)	Determinants of Undergraduate Students' Academic Performance: The Case of University of Sri Jayewardenepura, Sri Lanka	Examine the factors affecting students' academic performance at the undergraduate level.	191	Faculty of Management Studies and Commerce University of Sri Jayewardenep ura	A negative insignificant rela- tionship between gender and GPA

(Ranasinghe et al., 2017)	Emotional Intelligence (EI), Perceived Stress and Academic Performance of Sri Lankan Medical Undergraduates.	Explore the relationship between EI, perceived stress and academic performance and associated factors among medical undergraduates.	471	Faculty of Medicine University of Colombo	The mean EI score in females (123.5 $\hat{\pm}$ 10.1) was higher than the mean EI score in males (120.7 $\hat{\pm}$ 14.0). There was no significant difference in the mean Perceived Stress Score PSS scores between the genders. Higher EI is associated with better academic performance among final-year medical students.
(Weerakkody & Ediriweera, 2018)	Influence of Gender on Academic Performance: An Empirical Study of Human Resource Management Students (Undergraduates) in The University of Kelaniya, Sri Lanka.	Examine the influence of gender on university students' academic performance.	382	Department of Human Resource Management. University of Kelaniya	The academic performance of females is significantly different from the academic performance of males.

Analysis conducted according to the fields of study

As depicted in Fig.2, Management-related subject areas have the highest published data, up to approximately 37.50% of the total studies considered in this review. Science-related areas comprise 8.75%, while Agriculture and Dental/Medicine contribute 12.50%. Allied Health and Information Technology-related areas comprise 6.25% of studies, while unspecified subject categories also comprised 6.25% of studies. This figure visually represents the number of studies conducted across a broad spectrum of subject areas, highlighting that certain fields have limited information on the selected topic of study.

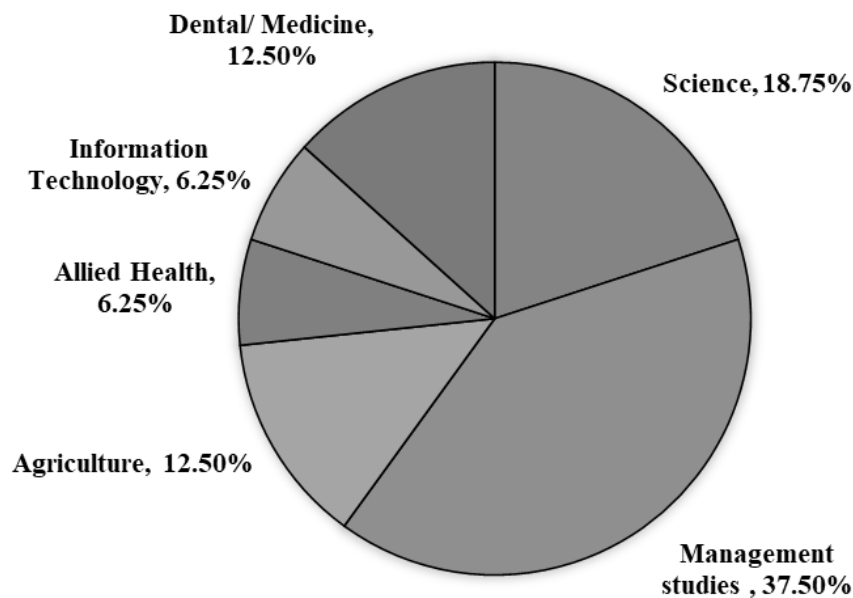


Figure 2: Representation of studies on the impact of gender on academic performance according to the fields

Analysis conducted according to the Universities in Sri Lanka

Studies conducted on the impact of gender on academic performance in the context of Sri Lankan universities discover a noteworthy trend. Table 02 shows that only a few studies have been published on this subject, demonstrating an apparent research shortage. Compared to each university's degree programs, the quantity of published studies is deficient. Eastern University is notably the most research-active university in this field, with four published papers. The data mentioned above underscores the necessity of conducting more extensive research on the impact of gender on academic achievement in Sri Lankan universities.

Table 02: Gender Impact Studies and Degree Programs in Sri Lankan Universities

Name of the University	A number of studies were published based on the 'Impacts of gender on academic performance'.	Number of degree programs offered by the University (According to the annual report/ web site of respective university)
University of Kelaniya	01	90 (University of Kelaniya, 2020)
University of Colombo	02	80 (University of Colombo, 2020)
University of Sri Jayewardenepura	02	78 (University of Sri Jayewardenepura, 2020)
University of Peradeniya	01	23 (University of Peradeniya, 2021)
University of Ruhuna	02	40 (University of Ruhuna, 2020)
Eastern University	04	45 (Eastern University, 2021)
University of Jaffna	01	29 (University of Jaffna, n.d.)
Open University	01	46 (Open University, 2018)
All Sri Lankan Universities	01	-
Not specified	01	-
University of Moratuwa	-	15 (University of Moratuwa, n.d.)
Wayamba University	-	19 (University of Wayamba, 2021)
Rajarata University	-	17 (University of Rajarata, 2017)
South Eastern University		37 (South Eastern University, 2020)
Sabaragamuwa University	-	41 (Sabaragamuwa University, 2018)
Uwa Wellassa University	-	13 (Uwa Wellassa University, 2020)
University of Vavuniya	-	12 (Sunday Times, 2022)
Gampaha Wickramarachchi University of Indigenous Medicine	-	8 (Gampaha Wickrama-rachchi University of Indigenous Medicine, n.d.)
University of the Visual & Performing Arts		23 (University of the Visual & Performing Arts, n.d.)

Discussion

Based on the data analysis, 75 % of the studies showed that female students outperformed their male peers in various academic fields. Specifically, female students outperformed male students in the biological and physical streams of the Faculty of Science, Eastern University. Similarly, female performances at the Open University of Sri Lanka exceeded male performances by 1.41 times across diverse subject areas. When using the degree class as a performance metric, female students at the University of Ruhuna, Faculty of Agriculture, performed significantly better than their male counterparts. Furthermore, female students at the University of Peradeniya, Faculty of Dental Sciences, had exhibited higher GPA performances compared to males. Moreover, female students in the Faculty of Medicine, University of Colombo, had performed better in their final exams, which was attributed to their higher level of Emotional Intelligence (EI). These findings highlight the consistent trend of female students outperforming their male counterparts across various academic disciplines.

Female students excel over male students in academic settings for various reasons. Many factors contribute to this, including differences in learning styles, study habits, and motivation, with female students often displaying greater dedication to their studies than male students. It has been shown that language proficiency, both in the mother tongue and in English, positively affects academic performance, and female students may have an advantage in this regard. Specific academic streams may have courses and evaluation standards biased against female students.

Furthermore, females tend to have greater emotional intelligence (Ranasinghe et al., 2017), which could affect their academic performance. While involvement in extracurricular activities can be positive, it additionally takes up time that could be spent on studying, which may have a more significant effect on male students' performance. These explanations also may differ depending on the situation and educational settings.

Upon analyzing the data, it was further observed that specific fields of studies revealed no apparent gender disparities in academic achievements. Notably, gender does not seem to influence performance in Eastern University's Faculty of Commerce and Management, where male and female students achieve similar academic accomplishments. Similarly, there are no gender-based performance discrepancies in the field of Allied Health Sciences at the University of Jaffna, which asserts that academic achievement is not significantly correlated with gender. Furthermore, the University of Colombo's School of Computing (UCSC) reveals that gender does not affect the distribution or the completion by both genders within an external degree program at the university, indicating comparable performance outcomes for both genders in the field of Information Communication Technology. The cumulative results demonstrate the absence of substantial gender-based performance disparities in academic performance between male and female students in the above specific subject areas.

It is important to note that there is a significant gap in the existing research, particularly in studies specific to STEM (Science, Technology, Engineering and Mathematics)-related degree programs, mainly in the field of Technology. This is particularly important considering that both Technology and Engineering are predominantly male-dominated areas of study.

Additionally, these kinds of studies give students who passed the GCE Advanced Level Examination the chance to learn about how gender affects the success of the degree program they are interested in. As a result, this will offer an opportunity for them to acquire extensive knowledge of their intended career.

Limitations and future directions

This review focuses mainly on studies conducted in English at Sri Lankan universities. It is limited to a few specific fields due to the limited number of studies conducted in Sri Lankan universities on the topic of study. To gain more insights, it is recommended that a comprehensive study on the correlation between gender and academic performance, covering all the degree programs and state and non-state universities in Sri Lanka, be conducted. Overall, it is recommended that the studies be expanded to gain a more comprehensive understanding and investigate the relationship between gender and academic performance.

Furthermore, given that there have been only a few studies conducted in this area in the STEM related fields, we are unable to determine the impact of gender on academic achievements in STEM-related degree programs, which are recognized as male-dominated. Hence, future studies should incorporate data on STEM-related fields.

Conclusions

This systematic review on gender impact on undergraduate academic performance across Sri Lankan universities highlights the significant and recurring trend of female students consistently outperforming their male counterparts in various academic disciplines.

The data obtained from the studies conducted in several universities and faculties in Sri Lanka represents a complex picture of gender impact on academic performance, revealing several significant trends and consequences that emerge from the analysis as follows:

1. **Gender-Based Performance discrepancies:** There is a noticeable performance gap between genders, with female students consistently outperforming their male counterparts. This trend is evident across various academic disciplines.
2. **Statistical Significance:** Statistical analyses, such as p-values, are frequently used to determine the significance of gender-related performance disparities. This indicates that differences in academic achievement are not random occurrences but relatively consistent patterns.
3. **Variability Across Disciplines:** While some fields of studies and universities consistently exhibit better performance by female students, others indicate that gender does not influence academic outcomes. These disparities could be attributed to each institution or academic field's uniqueness.
4. **Implications for Gender Equity:** The data emphasizes addressing gender equity in education. It is crucial to uncover the underlying causes of gender differences in academic achievement in certain subject domains and to establish strategies that encourage equitable opportunity for all students, irrespective of gender.

It is essential to note a significant gap in the existing research, particularly in studies specific to STEM-related degree programs. This is particularly important, considering these fields are predominantly male-dominated areas of study. Examining whether there is a connection between students' performances and gender in these domains would be a valuable and intriguing study.

We recognize the need for future research to enhance our understanding of the intricate relationship between gender and academic performance, encompassing all degree programs and universities in Sri Lanka. This systematic review is a foundation for promoting gender equity and bridging performance gaps in higher education, emphasizing the importance of fostering equal opportunities for every student.

Acknowledgement

We express our gratitude to the universities and faculties in Sri Lanka that performed these studies leading to this research and for providing valuable data, enabling a comprehensive analysis of gender

disparities in academic performance. Our gratitude extends to everyone who contributed to this endeavor, directly or indirectly.

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