

The Influence of Peer Groups on Academic Performance in University-Level Mathematics Courses in: A Case Study of Morogoro Municipality

Fadhili Mustafa Mrope^{1✉}, Ernest
Simon Kira¹, Emmanuel
Deogratias¹

¹Mathematics and Statistics,
Sokoine University of Agriculture,
Tanzania

✉ Corresponding email:
fadhili.mrope@sua.ac.tz

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Abstract: This study investigates the influence of peer groups on students' academic performance in university-level mathematics courses, with a specific focus on Morogoro Municipality. The research aims to examine the dynamics of peer interactions and their impact on students' learning outcomes in mathematics. A mixed-methods approach was employed, combining quantitative analysis of academic performance data with qualitative exploration of peer group dynamics through interviews and surveys. The study population included students from higher education institutions in Morogoro Municipality, with a sample of 200 students randomly selected from four universities. Data were collected using questionnaires and interviews to gather information on peer interaction patterns, academic performance, and demographic characteristics. The quantitative data were coded and analyzed using the Statistical Package for the Social Sciences (SPSS) version 20, with Chi-square tests applied to determine correlations between peer group dynamics and academic achievement. The findings indicate that peer groups significantly influence students' attitudes, study habits, and academic performance in mathematics. Positive peer interactions encourage collaboration, motivation, and deeper understanding of mathematical concepts contribute to improved academic performance. Meanwhile, negative peer influences such as social distractions and peer pressure can hinder academic progress. The results highlight the importance of understanding how peer groups shape students' academic behaviors and outcomes. These insights can inform the development of educational interventions and support systems to foster positive peer interactions and enhance learning outcomes in mathematics at the university level.

Keywords: peer groups; university students; mathematics courses; academic performance

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A. Introduction

The achievement of academic excellence at university level is influenced by various interdisciplinary factors (Alhosani et al., 2023). Among these, the dynamics of peer interaction within academic settings play a pivotal role. Peer groups exert significant social influence on adolescents, impacting decisions ranging from everyday choices to long-term educational plans (Ragelienė & Grønhøj, 2020). While primary socialization with parents may not always mediate peer influence, secondary socialization with peers often correlates with risky behaviours (Tomé et al., 2012). Peer groups, defined as close-knit, similar-aged friends engaging in shared activities, wield considerable influence due to the extensive time

adolescents spend with them compared to adults (Filade et al., 2019). Behavioural decisions, acting as mediators between peer influence and academic achievement, are crucial in shaping student outcomes (Gebresilase & Zhao, 2023). The collective behaviour and attributes of peer groups can profoundly impact individuals' actions, especially in education.

Academic performance, defined as the attainment of educational goals and the ability to retain and communicate knowledge, is vital for both individual success and national development (Ozcan, 2021). The impact of peer groups on academic performance is evident in education policy discussions, with studies showing that peer group study approaches enhance understanding and problem-solving skills in mathematics (Filade et al., 2019).

Additionally, research suggests that stronger students within peer groups can positively influence overall academic performance (Yu et al., 2023). However, concerns arise regarding the negative influence of peer groups on academic performance, as evidenced by studies highlighting a decline in performance among university students influenced by peers.

The university environment presents a unique amalgamation of academic, social, and personal challenges that can significantly affect students' overall performance (Wang et al., 2024). Beyond peer interactions, factors such as faculty support, curriculum design, and personal motivation also contribute to academic success (Anderson et al., 2018). Effective faculty guidance and support systems are essential for providing students with the necessary resources and mentorship to excel academically (Fountain & Newcomer, 2016).

Moreover, the structure and content of mathematics courses themselves can impact students' academic performance (Cabuquin & Abocejo, 2023). Courses that are well-designed, engaging, and tailored to students' diverse learning styles can foster a deeper understanding of mathematical concepts and facilitate better academic outcomes (Arthur et al., 2017). Innovative teaching methods, such as interactive lectures, collaborative learning activities, and real-world applications, can enhance students' comprehension and retention of mathematical principles (Ordu, 2021).

Furthermore, individual characteristics and experiences, such as prior academic background, self-efficacy beliefs, and socio-economic status, also influence academic performance (Hayat et al., 2020). Students who possess a strong sense of self-efficacy and resilience are better equipped to overcome academic challenges and persist in their studies. Additionally, socio-economic factors can impact students' access to resources, such as textbooks, technology, and academic support services, which can further influence their academic performance.

Within the realm of peer interactions, it's crucial to acknowledge the diverse nature of peer groups and their influence on academic performance. Peer groups can vary widely in terms of their academic attitudes, study habits, and goals. Some peer groups may foster a culture of academic excellence, where members support and motivate each other to strive for high achievement (Kindermann, 2016). In contrast, other peer groups may prioritize social activities over academic pursuits, potentially leading to distractions and detracting from students' focus on their studies.

Furthermore, the quality of peer relationships within these groups can have a significant impact on academic performance. Positive and supportive peer relationships can provide students with encouragement, constructive feedback, and collaborative learning opportunities, all of which can enhance their academic outcomes (Wentzel & Watkins, 2002). Conversely, negative peer relationships characterized by competition, envy, or peer pressure to engage in risky behaviours may undermine students' academic progress and well-being (Moldes et al., 2019).

In addition to peer influence, the broader socio-cultural context in which students are immersed can shape their academic experiences and outcomes. Factors such as cultural norms, societal expectations, and institutional policies can influence students' perceptions of academic success, their motivation to excel, and their access to educational opportunities (Alam & Mohanty, 2023). It is essential for universities to consider these contextual factors and strive to create an inclusive and supportive academic environment that values diversity and promotes equitable access to education.

Moreover, the role of technology in peer interactions and academic performance cannot be overlooked. With the widespread availability of digital platforms and social media, students have new avenues for connecting with peers, sharing academic resources, and collaborating on academic projects (Aleksandrova & Parusheva, 2019). However, excessive screen time and online distractions can also pose challenges to students' academic focus and productivity (George et al., 2023). Universities must navigate the opportunities and challenges presented by technology to foster positive peer interactions and support students' academic success in the digital age.

B. Statement of the Problem

Understanding the influence of peer groups on academic performance in mathematics courses at the university level is paramount for optimizing educational processes and improving school system organization. Despite the extensive research on peer effects in education, particularly regarding older students, there remains a notable gap in understanding the specific impact of peer dynamics on academic achievement in mathematics courses at the university level. While numerous studies have explored the correlation between peer relationships and overall academic performance, there is a scarcity of longitudinal examinations of these links, particularly within the context of mathematics education.

Furthermore, within the Tanzanian academic landscape, research on the influence of peer groups on academic performance has predominantly focused on secondary school levels, leaving a significant void in understanding how peer interactions specifically affect students' performance in mathematics courses at the university level. This gap in research becomes particularly pertinent given the transition to university, where students often experience greater autonomy and reduced parental supervision, potentially intensifying the influence of peer groups on academic outcomes.

Therefore, this study seeks to bridge this gap by investigating the influence of peer groups on students' academic performance in mathematics courses at the university level in Tanzania. By examining the dynamics of peer interactions and their impact on academic achievement

within the context of mathematics education, the study aims to provide valuable insights into the factors that contribute to success or challenges in this academic domain. Understanding the role of peer groups in shaping students' performance in mathematics courses is crucial for designing targeted interventions and support systems that can enhance academic outcomes and promote student success in this critical subject area.

C. Purpose of the study

This research paper aimed to explore the influence of peer groups on students' academic performance, particularly focusing on mathematics courses at the university level. Specifically, the study sought to attain three objectives, which included:

1. Investigate whether patterns of socialization among peers impact students' academic performance in mathematics courses.
2. Determine if there is a variation in the influence of peer groups on academic performance in mathematics courses between male and female students.
3. Explore whether the influence of peers on students' academic performance in mathematics courses varies with the students' age.

D. Research Questions

The study aimed to address the following research questions

1. How do peer socialization patterns impact the academic performance of university-level mathematics students?
2. To what extent does the influence of peer groups on academic performance differ between male and female students in mathematics courses at the university level?
3. How does the influence of peers on academic performance vary with the age of university-level mathematics students?

E. Significance of the study

These findings are anticipated to hold significant relevance for researchers and educational professionals, contributing to the advancement of literature concerning the influence of peer groups on academic performance among university students in Mathematics courses. Moreover, policymakers stand to benefit from these findings, as they can utilize the study's recommendations to formulate strategies aimed at mitigating the adverse effects of peer pressure on students.

F. Limitation of the study

A minor limitation of this study was the inability to encompass all university students within respective universities, as some students in other institutions were on holiday sessions.

G. Literature review

The concept of peers and peer groups, as described by Castro Giovanni (2002), involves a group of individuals of similar age, abilities, and backgrounds, who often exhibit resemblances in individual traits. Given adolescents' extensive interaction with peers compared

to other adults, understanding the influences and pressures within peer dynamics becomes crucial.

Academic performance, as defined by Al-Abyadh and Abdel Azeem(2022), encompasses the knowledge, skills, and achievements acquired through formal education. Kathryn (2010) extends this definition to include excellence across various academic disciplines and extracurricular activities, underscoring the multidimensional nature of academic achievement. Steinberg (2005) emphasizes the interconnectedness of academic performance with cognitive, emotional, and social development, highlighting the significant influence of parental involvement and home environments on students' academic success.

Parental involvement emerges as a critical factor in students' academic success, as highlighted by Utami (2022) and Shumox & Lomax (2001). Parenting styles, as elucidated by Yao(2023), shape children's social competence, while higher levels of parental engagement positively impact children's self-esteem, peer relationships, and overall academic performance, as noted by Akomolafe (2016). Seth (2010) further emphasizes the role of parental surveillance of homework and responses to grades in shaping students' motivation and achievement, with authoritative parenting associated with higher academic success, as supported by Hoang et al.,'s (2022) findings.

Family dynamics play a crucial role in shaping individuals' lives, particularly when both parents provide care. Nan Li's (2015) research underscores diverse effects of peer and teacher support on educational aspirations across ethnicities, stressing parental communication. Yu et al's., (2023) study suggests that peer support alone might not independently impact academic achievement, especially among Asian students with strong cultural values.

Research demonstrates that peer interactions and cultural contexts significantly impact academic performance. Studies Aldhafri et al., (2020) and Rivers (2008) emphasize the importance of peer relationships, particularly among students with authoritative parents, which may extend to university-level Mathematics courses. Furthermore, Butler-Barnes et al., (2015) highlight a positive correlation between peer support and academic achievement among diverse student populations, including African American, Latino, and European American students. Additionally, Felix's (2014) study in Kenya underscores the role of school environment and peer influence in shaping academic performance, suggesting implications for university-level Mathematics students.

Gender dynamics also play a role in academic pursuits, as evidenced by research showing disparities in STEM fields and gender stereotypes in secondary schools (Makarova et al., 2019). Friendship groups and peer pressure can significantly influence students' academic interests and motivation, especially among adolescents (Nelson & DeBacker, 2008). Furthermore, studies on peer teaching and network interactions highlight the potential of peer strategies to enhance academic achievement (Garrote,2020)

As individuals transition into adulthood, peer networks become more integrated and continue to influence academic outcomes. However, the influence of peer groups may not always correlate positively with academic performance, as seen in studies examining peer effects on secondary school students (Olalekan, 2016). Despite this, institutions such as

colleges and universities can play a pivotal role in shaping peer dynamics and fostering positive academic outcomes (Fidale et al., 2019). Understanding the complex interplay between peer relationships, cultural contexts, and academic performance is essential for educators and policymakers to support student success.

H. Research Methodology

This was a quantitative study that aimed to investigate the influence of peer groups on university students' academic performance in Mathematics courses within selected universities in Morogoro Municipality. Utilizing the Chi-square statistical analysis tool, the research examined whether significant differences existed in peer group influence at specific times. The study encompassed all students in higher education institutions in Morogoro Municipal, with a sample of 200 students randomly selected from four universities. Data collection methods included questionnaires and interviews, while analysis employed Statistical Package for the Social Sciences (SPSS) version 20. The collected quantitative data were coded and subjected to Chi-square computation to align with the research objectives.

I. Results and Discussion

The findings of the study suggest that peer influence among university students encompasses various factors, including age, gender, and interaction patterns. Despite a majority of students falling within the 20-25 age range and a higher representation of males(60.5%) than females (39.5%) within the sample, no significant gender-based differences were observed in peer dependence for academic decisions. Furthermore, while engagement in group discussions was common across genders and universities, it did not significantly correlate with academic performance. The tables below substantiate the results.

Table 1: Distribution of respondents by age

Age	Frequency	Percent
16-20	10	5.0
20-25	137	68.5
26 and above	53	26.5

Source: *Field data (2023)*

The table indicates that only 5.0% of respondents were aged 16 to 20, while the majority (68%) were fresh-from-school university entrants.

Table 2: Distribution of respondents by sex

Sex	Frequency	Percent
Males	121	60.5
Females	79	39.5

Source: *Field data(2023)*

The results indicate that 60.5% of respondents were males (121) and 39.5% were females (79).
Table 3:Extent to which students depend on their friends in decision making

Sex	Level of dependent on friends			
	P/School	Ordinary level	A-level	College and above
Males	18(14.9)	41(33.9)	24(19.8)	38(31.4)
Females	11(13.9)	34(43.0)	15(18.9)	19(24.2)

Note: Numbers in the brackets represent percentages

The chi-square analysis found no significant difference between males and females in depending on their peers for academic decision-making (Chi-square = 2.022, df = 3, $p = 0.568 > 0.05$).

Table 4: Students responses on the degree of belonging to a peer group

Sex	Belongingness to a peer group			
	S-disagree	Disagree	Agree	Strongly agree
Males	6(5.0)	13(10.7)	81(66.9)	21(17.4)
Females	4(5.0)	10(12.7)	46(58.2)	19(24.1)

Source: Field data (2023)

The chi-square test revealed that the difference in peer group belongingness between males and females was not statistically significant (Chi-square = 1.796, df = 3, $p = 0.616 > 0.05$).

Table 5: Students responses about places of interaction with their peers university wise

Name of University	Place of interaction with peers					
	Hostel	Class	Cafeteria	Off-campus	Out campus	In-campus
SUA	9(18.0)	17(34.0)	0(0.0)	4(8.0)	6(12.0)	14(28.0)
MUM	6(12.0)	10(20.0)	4(8.0)	7(14.0)	14(28.0)	9(18.0)
MZUMBE	11(22.0)	14(28.0)	2(4.0)	11(22.0)	6(12.0)	6(12.0)
JUCO	10(20.0)	15(30.0)	0(0.0)	4(8.0)	9(18.0)	12(24.0)

Source: Field data (2023)

The Chi-square test indicated that the variation between public and private universities was not statistically significant (Chi-square = 24.294, df = 15, $p = 0.060 > 0.05$).

Table 6: Views of respondents about their engagement in group discussion.

Engagement in group discussion with friends

University	S-Disagree	Disagree	Agree	Strongly Agree
SUA	7(14.0)	8(16.0)	17(34.0)	18(36.0)
MUM	3(6.0)	3(6.0)	18(36.0)	26(52.0)
MZUMBE	3(6.0)	3(6.0)	23(46.0)	21(42.0)
JUCO	2(4.0)	2(4.0)	22(44.0)	24(48.0)

Source: *Field data (2023)*

The Chi-square analysis indicated that engagement in group discussion among students of various study years within their respective universities was not statistically significant (Chi-square = 12.385, df = 9, $p = 0.192 > 0.05$).

Additionally, the study noted variations in the influence of peer spending on clothing and pocket money expenditure, although these factors did not emerge as significant predictors of academic performance. Female students tended to seek more peer counselling on lifestyle issues, but this did not translate into significant differences in academic performance compared to males. Tables below indicate the results

Table 7: Respondents' views on the influence of peers' pocket money spending on clothing style.

Sex	Various ranges of pocket money spending influenced students' clothing styles.				
	2000-3000	3000-4000	4000-5000	5000>	I don't know
Males	49(40.5)	30(24.8)	21(17.4)	14(11.6)	7(5.8)
Females	28(35.4)	30(38.0)	15(19.0)	5(6.3)	1(1.3)

Note: *Numbers in the brackets represent percentage*

The influence of socialization on clothing style, considering gender and pocket money spent, was not statistically significant according to Chi-square analysis (Chi-square = 6.978, df=4, $p=0.137>0.05$).

Table 8: Respondents' views on their peers' spending per day against performance.

Sex	Amount in (Tshs)	Academic performance(High, Low, Moderate)		
Males	2000-3000	11(9.1)	15(12.4)	1(0.8)
	3000-4000	9(7.4)	21(17.4)	2(1.7)
	4000-5000	4(3.3)	10(8.3)	1(0.8)
	5000 and above	3(2.5)	8(6.6)	1(0.8)
	I don't know	15(12.4)	17(14.0)	2(1.7)
Females	2000-3000	7(8.9)	11(13.9)	0(0.0)

3000-4000	8(10.1)	14(17.7)	1(1.3)
4000-5000	5(6.3)	6(7.6)	0(0.0)
5000 and above	3(3.8)	2(2.5)	0(0.0)
I don't know	10(12.7)	12(15.2)	0(0.0)

Source: *Field data (2023)*

Chi-square analysis indicated that the difference in pocket money spent by peers between males and females was not statistically significant for both males (Chi-square = 4.226, df = 10, $p=0.937>0.05$) and females (Chi-square = 3.647, df = 8, $p=0.887>0.05$).

Table 9: Respondents' views on spending of pocket money by peers sex wise.

Sex	Spending of pocket money by peers(Tshs)				
	2000-3000	3000-4000	4000-5000	5000 and above	I don't know
Males	27(22.3)	32(26.4)	16(13.2)	12(9.9)	34(28.1)
Females	18(22.8)	23(29.1)	11(13.9)	5(6.3)	22(27.8)

Source: *Field data (2023)*

The chi-square analysis indicated that the disparities in awareness among respondents regarding the pocket money spent by peers between males and females were statistically insignificant (Chi-square = 0.871, df = 4, $p = 0.929 > 0.05$).

Table 10: Students responses on the influence of taking exams together with peers.

Sex	Taking exams together with peers influence on academic performance			
	S-disagree	Disagree	Agree	Strongly Agree
Males	10(8.3)	23(19.0)	75(62.0)	13(10.7)
Females	04(5.0)	16(20.3)	47(59.5)	12(15.2)

Note: Numbers in the brackets represent percentage.

The Chi-square analysis revealed that the difference between males and females on this aspect was statistically insignificant (Chi-square = 1.542, df = 3, $p = 0.673 > 0.05$).

The advantages and disadvantages of peer groups were acknowledged by students across different years of study and types of universities, with no significant variations noted. Despite these diverse influences, the overall impact of peer groups on academic performance did not exhibit significant differences between genders or universities, underscoring the intricate nature of peer dynamics in shaping student outcomes.

Table 11: Responses of students on the performance of mathematics courses.

Sex	Peers' influence on performance of mathematics courses
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	Strongly disagree	Disagree	Agree	Strongly agree
Males	31(25.6)	46(38.0)	34(28.1)	10(8.3)
Females	28(35.4)	28(35.4)	19(24.1)	4(5.1)

Source: *Field data(2023)*

The chi-square test analysis indicates that there was no significant difference in the influence of peers on the performance of mathematics courses between females and males. This suggests that gender does not play a significant role in how peers influence performance in mathematics courses. With a Pearson Chi-square value of 2.644 and 3 degrees of freedom, along with a p-value of 0.450 (>0.05), the data suggests that both genders are similarly influenced by peers when it comes to their performance in mathematics courses.

Table 12: Students' views by sex on the contribution of peer advice to performance.

	Males	Females
Yes	99(81.8)	63(79.7)
No	22(18.2)	16(20.3)

Source: *Field data(2023)*

The chi-square test analysis reveals that there is no statistically significant difference between male and female students. The analysis yielded a chi-square value of 0.133 with 1 degree of freedom and a p-value of 0.715, which is greater than the commonly used significance level of 0.05. Therefore, based on this analysis, there is no significant difference between male and female students.

Relating these findings to academic performance in mathematics courses, it appears that while peer influence plays a role in various aspects of university life, including decision-making and social interactions, its direct impact on academic performance in mathematics courses may be nuanced and multifaceted. Factors such as individual study habits, teacher quality, and intrinsic motivation likely interact with peer influence to determine academic outcomes in specific subjects like mathematics. Therefore, future research in this area could explore these interactions further to gain deeper insights into the dynamics of peer influence on academic performance in mathematics courses specifically.

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