Disciplinary Variations in Academic Motivation among Vietnamese Undergraduates: A Study Using the AMS Scale

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DOI: https://dx.doi.org/10.47772/IJRISS.2025.906000491

Received: 14 June 2025; Accepted: 24 June 2025; Published: 25 July 2025

ABSTRACT

Academic motivation plays a pivotal role in influencing student engagement, learning behaviors, and academic achievement in higher education. Grounded in Self-Determination Theory (SDT), this study aimed to compare the levels of intrinsic motivation, extrinsic motivation, and amotivation among undergraduate students enrolled in three academic disciplines: Mechanical Manufacturing Technology, Electrical Engineering, and Computer Engineering. A total of 187 students from a Vietnamese university participated in the study using a Vietnamese-adapted version of the Academic Motivation Scale (AMS), a widely recognized instrument for measuring educational motivation. Descriptive statistics, one-way analysis of variance (ANOVA), and Tukey HSD post-hoc tests were employed to examine group differences across motivational dimensions. The results revealed no statistically significant differences in intrinsic motivation or amotivation among the three majors, indicating a shared pattern of internal drive and disengagement across fields. However, extrinsic motivation showed a statistically significant difference, with students in Electrical Engineering reporting higher levels compared to those in Mechanical Manufacturing Technology. These findings suggest that while intrinsic motivation may remain relatively stable across disciplines, extrinsic factors such as perceived career prospects and curriculum structure can vary depending on the academic context. Additionally, the internal consistency reliability of the Vietnamese version of the AMS was confirmed with high Cronbach's alpha values across all subscales ($\alpha > .83$), supporting its validity in the local educational setting. The study highlights the importance of considering disciplinary contexts when developing motivational support strategies and curriculum designs in higher education. Tailoring educational approaches to match the motivational tendencies of specific academic programs may enhance student engagement and learning outcomes.

Keywords: Academic motivation; Self-Determination Theory; AMS scale; disciplinary differences; ietnamese undergraduates

INTRODUCTION

Academic motivation is widely recognized as a critical factor influencing student engagement, persistence, and achievement in higher education. Rooted in the Self-Determination Theory (SDT), motivation is conceptualized along a continuum ranging from intrinsic to extrinsic motivation, with amotivation representing a lack of drive or intentionality (Deci & Ryan, 1985; Deci et al., 1991). Intrinsic motivation, in particular, has been linked to deeper learning and long-term academic commitment.

To assess these motivational constructs, the Academic Motivation Scale (AMS) developed by Vallerand et al. (1992) has become one of the most widely used instruments. It has been validated across different populations and cultural contexts, including U.S. students (Cokley et al., 2001) and Vietnamese university students (Trần et al., 2023), ensuring its applicability to diverse educational settings.

Although much research has explored general factors influencing motivation (Otis et al., 2005; Saeed & Zyngier, 2012), growing attention has been paid to disciplinary differences in motivational profiles. Studies have suggested that students' academic motivation may vary significantly depending on their field of study, shaped by factors such as curriculum content, perceived career relevance, and learning environment (Maurer et al., 2013; Tackett et al., 2023). For example, Tackett et al. (2023) found notable differences in intrinsic and extrinsic motivation among students majoring in health sciences, education, and business.

This disciplinary perspective is also reflected in research on academic culture. According to Biesta (2011), academic disciplines are constructed through distinct epistemological, historical, and pedagogical traditions, which shape how knowledge is framed and experienced by students. Complementing this theoretical stance, Solodikhina and Solodikhina (2023) examined the development of critical thinking across three disciplinary contexts and found that differences in educational goals and methods directly affect students' engagement and motivation.

Furthermore, Hu and Luo (2021) investigated academic motivation among senior students in rehabilitation-related professions in China. Their findings highlight how the nature of professional training and future career expectations can influence motivational orientation within specific disciplines. In the Vietnamese context, similar patterns have been observed, with motivation differing between English majors and non-English majors due to variations in perceived value and engagement with course content (Ngo et al., 2015).

Additional studies have demonstrated that academic motivation is linked to broader outcomes, including risk-taking behavior (Abercrombie et al., 2022), dropout intention (Rump et al., 2017), and engagement in learning (Saeed & Zyngier, 2012). These findings underscore the importance of understanding how academic motivation varies across disciplines, especially in the context of improving student support and educational effectiveness.

Given this background, the present study aims to compare academic motivation among undergraduate students across three academic disciplines at a Vietnamese university, employing the AMS as the primary measurement tool. By focusing on disciplinary distinctions, this research seeks to contribute to a deeper understanding of how academic motivation is shaped by educational context and field of study.

Based on the literature and theoretical framework, this study was guided by the following research questions:

1. To what extent do levels of intrinsic motivation, extrinsic motivation, and amotivation differ among students in three academic disciplines: Mechanical Manufacturing Technology, Electrical Engineering, and Computer Engineering?

2. Which specific dimensions of academic motivation show statistically significant differences across disciplines, if any?

3. How reliable is the Vietnamese version of the Academic Motivation Scale (AMS) when applied in this disciplinary context?

METHODOLOGY

Participants

The study involved a total of 187 undergraduate students enrolled at a Vietnamese university, drawn from three academic disciplines: Electrical Engineering (n = 68), Mechanical Manufacturing Technology (n = 65), and Computer Engineering (n = 54). All participants were full-time students at the time of data collection. The sample included both male and female students, spanning different academic years. Participation in the study was voluntary, and all respondents were informed about the anonymity and confidentiality of their responses.

Instrument

To measure academic motivation, the Vietnamese-translated version of the Academic Motivation Scale (AMS) originally developed by Vallerand et al. (1992) was used. The AMS consists of 28 items divided into seven subscales: three types of intrinsic motivation, three types of extrinsic motivation, and one amotivation subscale. Each item was rated on a 7-point Likert scale ranging from 1 (“Does not correspond at all”) to 7

("Corresponds exactly"). The Vietnamese version of the scale was linguistically adapted and reviewed by bilingual experts to ensure semantic clarity and cultural appropriateness, following the guidelines of cross-cultural adaptation. Previous applications of the Vietnamese AMS have shown satisfactory internal consistency and construct validity (Trần et al., 2023).

Procedure

The survey was administered in person during regular class sessions, with prior permission from course instructors. Respondents were given approximately 10–15 minutes to complete the questionnaire. The researcher provided a short introduction to the purpose of the study and clarified any questions related to item meaning. Completed questionnaires were screened for completeness, and only valid responses were included in the final analysis.

Data Analysis

Data were analyzed using IBM SPSS Statistics version 26. Descriptive statistics, including means and standard deviations, were calculated for each motivation dimension—intrinsic motivation, extrinsic motivation, and amotivation—across the three academic disciplines. One-way analysis of variance (ANOVA) was used to determine whether statistically significant differences in motivation existed among the groups. The assumption of homogeneity of variances was tested using Levene's Test and was met for all variables, allowing the use of standard one-way ANOVA. Tukey's Honest Significant Difference (HSD) test was employed for post-hoc comparisons in the case of significant ANOVA results. Additionally, Cronbach's alpha coefficients were computed to assess the internal consistency of each motivational subscale and the overall Vietnamese version of the AMS.

RESULTS

This section presents the results in response to the research questions guiding this study. To address Research Question 1**,** descriptive statistics were calculated to examine the levels of intrinsic motivation, extrinsic motivation, and amotivation among students across the three academic disciplines. For Research Question 2, one-way ANOVA was conducted to test whether there were statistically significant differences in motivation levels between groups. Post-hoc analyses were used to further explore pairwise differences where appropriate. Finally, to answer Research Question 3, Cronbach's alpha coefficients were computed to assess the internal consistency of the Vietnamese version of the AMS.

Test of Homogeneity of Variances

To assess whether the assumption of homogeneity of variances was met prior to conducting ANOVA, Levene's test was performed for each of the three motivational dimensions. The results indicated that the assumption was not violated for amotivation ($p = .519$), intrinsic motivation ($p = .735$), or extrinsic motivation ($p = .486$). Therefore, one-way ANOVA was considered appropriate for comparing group means.

Descriptive Statistics

Table 1 presents the mean and standard deviation of amotivation, intrinsic motivation, and extrinsic motivation across the three academic majors. Students in Mechanical Manufacturing Technology reported the highest level of amotivation (M = 2.76, SD = 1.40), suggesting a relatively greater tendency toward disengagement or lack of purpose in learning compared to students in the other disciplines. In contrast, students in Electrical Engineering demonstrated the lowest level of amotivation (M = 2.26, SD = 1.34), indicating a stronger sense of direction or relevance in their academic efforts.

Regarding intrinsic motivation, Electrical Engineering students also exhibited the highest mean score (M = 5.27, SD = 1.15), followed closely by Computer Engineering (M = 5.03, SD = 1.29). This suggests that students in these fields are generally motivated by an internal desire to learn and understand, rather than by external rewards. In comparison, Mechanical Manufacturing Technology students reported a slightly lower level of intrinsic motivation (M = 4.90, SD = 1.17), although the difference was not statistically significant, as shown in later analyses.

In terms of extrinsic motivation, a similar pattern emerged. Electrical Engineering students had the highest score (M = 5.63, SD = 1.08), suggesting they are more driven by external factors such as grades, recognition, or career prospects. Computer Engineering students followed with a mean of 5.24 (SD = 1.15), while Mechanical Manufacturing students scored the lowest (M = 5.07, SD = 0.88).

Overall, the descriptive statistics point to notable differences in motivational tendencies among the three disciplines. Electrical Engineering students consistently reported higher levels of both intrinsic and extrinsic motivation, along with lower levels of amotivation. This may reflect the structured, application-oriented nature of their curriculum and the strong industry alignment of their field. Conversely, the relatively higher amotivation among Mechanical Manufacturing students could be attributed to a mismatch between the curriculum and students' expectations or perceived value. These trends set the foundation for the inferential analysis presented in the following sections.

Table 1. Mean and Standard Deviation of Motivation by Academic Major

Academic Major	N	Intrinsic Motivation (M ± SD)	Extrinsic Motivation (M ± SD)	Amotivation (M ± SD)
Mechanical Manufacturing	65	4.90 ± 1.17	5.07 ± 0.88	2.76 ± 1.40
Electrical Engineering	68	5.27 ± 1.15	5.63 ± 1.08	2.26 ± 1.34
Computer Engineering	54	5.03 ± 1.29	5.24 ± 1.15	2.35 ± 1.25
Total	187	5.07 ± 1.20	5.32 ± 1.06	2.46 ± 1.35

One-Way ANOVA

To examine whether motivation levels significantly differed across academic majors, one-way ANOVA was conducted. As shown in Table 2, there was no statistically significant difference among majors in amotivation ($F(2, 184) = 2.562$, $p = .080$) or intrinsic motivation ($F(2, 184) = 1.631$, $p = .199$). These results suggest that, on average, students across the three disciplines experienced similar levels of internal motivation and disengagement. While minor variations in mean values were observed in the descriptive analysis, these differences were not large enough to reach statistical significance, indicating that the underlying internal drive to learn and overall detachment from studies are relatively consistent among the disciplines.

However, a significant effect of academic major was found for extrinsic motivation ($F(2, 184) = 5.054$, $p = .007$), indicating that students' responses to external motivators such as grades, recognition, or future job expectations differ notably across disciplines. This result reinforces the descriptive finding that Electrical Engineering students reported the highest level of extrinsic motivation, while Mechanical Manufacturing students showed the lowest. The statistically significant difference warrants further exploration through post-hoc testing to determine which specific pairs of majors differ meaningfully in their extrinsic motivation scores.

This divergence in extrinsic motivation across academic majors could reflect differences in curricular design, perceived career pathways, or institutional emphasis on performance-related incentives. Such distinctions highlight the need for more tailored motivational strategies at the program level, particularly when aiming to enhance student engagement through external drivers.

Table 2. One-Way ANOVA Results for Academic Motivation by Major

Motivation Type	Sum of Squares	df	Mean Square	F	p-value
Amotivation	9.134	2	4.567	2.562	.080
Intrinsic Motivation	4.687	2	2.343	1.631	.199
Extrinsic Motivation	10.887	2	5.443	5.054	.007

Post-Hoc Comparisons

To further investigate the significant difference in extrinsic motivation found in the ANOVA, a Tukey HSD post-hoc analysis was performed (Table 3). The results indicated a statistically significant difference between students in Mechanical Manufacturing and Electrical Engineering majors (p = .006), with the latter reporting higher extrinsic motivation. This finding supports the interpretation that Electrical Engineering students are more strongly influenced by external factors such as academic recognition, employability prospects, and performance outcomes.

No statistically significant differences were found between other group pairs. Specifically, the difference in extrinsic motivation between Mechanical Manufacturing and Computer Engineering was not significant (p = .637), nor was the difference between Electrical Engineering and Computer Engineering (p = .105). Although the mean score for Electrical Engineering was higher than that of Computer Engineering, the difference did not reach the threshold for statistical significance, possibly due to overlapping variability or insufficient power to detect smaller effects.

These results suggest that the observed difference in extrinsic motivation is primarily driven by the contrast between Electrical Engineering and Mechanical Manufacturing Technology, rather than being a general trend across all three groups. The significantly higher extrinsic motivation in Electrical Engineering may reflect that students in this major perceive clearer or more immediate connections between academic achievement and career outcomes. In contrast, students in Mechanical Manufacturing may be less influenced by such external cues, possibly due to differences in program structure, institutional support, or labor market visibility.

Understanding these motivational distinctions is essential for designing interventions that address the specific motivational profiles of students in different fields. For instance, increasing the visibility of career opportunities and aligning coursework with industry demands could potentially enhance extrinsic motivation in disciplines where it is currently lower.

Table 3. Tukey HSD Post-Hoc Comparisons for Extrinsic Motivation

Comparison (I–J)	**Mean Difference**	**Std. Error**	**p-value**	**95% CI (Lower, Upper)**
Mechanical Manufacturing – Electrical Eng.	-0.55939	0.18002	**.006**	(-0.9847, -0.1340)
Mechanical Manufacturing – Computer Eng.	-0.17331	0.19108	.637	(-0.6248, 0.2782)
Electrical Eng. – Computer Eng.	0.38607	0.18916	.105	(-0.0609, 0.8330)

Reliability Analysis

To assess the internal consistency of the Vietnamese version of the Academic Motivation Scale (AMS), Cronbach's alpha coefficients were calculated for each of the three primary motivational subscales, as well as for the overall scale. As shown in Table 4, all subscales demonstrated high reliability, with alpha values exceeding the commonly accepted threshold of .70. Specifically, intrinsic motivation showed the highest internal consistency ($\alpha = .934$), followed by extrinsic motivation ($\alpha = .903$) and amotivation ($\alpha = .837$). The overall 28-item AMS scale also showed excellent reliability ($\alpha = .924$).

Table 4. Cronbach's Alpha Coefficients for AMS Subscales

Subscale	Number of Items	Cronbach's Alpha
Intrinsic Motivation	12	.934
Extrinsic Motivation	12	.903
Amotivation	4	.837
Overall Scale	28	.924

DISCUSSION

The present study aimed to compare academic motivation across three academic disciplines—Mechanical Manufacturing Technology, Electrical Engineering, and Computer Engineering—among undergraduate students at a Vietnamese university. Using the Vietnamese-translated version of the Academic Motivation Scale (AMS), three dimensions of motivation were evaluated: intrinsic motivation, extrinsic motivation, and amotivation.

The findings indicated that there were no significant differences among the three groups in terms of intrinsic motivation and amotivation, suggesting that students across disciplines are similarly driven by internal interests and experience comparable levels of demotivation. These results are consistent with previous work by Maurer et al. (2013), who found that intrinsic motivation was relatively stable across disciplines, possibly due to shared characteristics in academic environments, such as goal-oriented tasks and standardized instructional approaches.

However, the study revealed a statistically significant difference in extrinsic motivation, particularly between students in Electrical Engineering and Mechanical Manufacturing Technology. Electrical Engineering students reported the highest levels of extrinsic motivation. This finding is aligned with Tackett et al. (2023), who observed that students in technical and health-related fields often exhibit higher extrinsic motivation, likely due to clearer professional pathways and stronger perceived job prospects.

These disciplinary differences may also be explained through the lens of disciplinary identity and culture**.** As Biesta (2011) argued, academic disciplines are constructed through epistemological and pedagogical traditions that shape student engagement. Electrical Engineering, with its emphasis on structured curricula and direct industry relevance, may foster a stronger sense of external reward and purpose, thus elevating extrinsic motivation. Similarly, Solodikhina and Solodikhina (2023) emphasized that educational goals and learning methods vary across fields, contributing to students' differentiated motivational orientations.

Furthermore, Hu and Luo (2021) noted that professional orientation plays a central role in shaping academic motivation in applied disciplines. This perspective helps contextualize why Electrical Engineering students in this study, who are typically more exposed to industry-oriented tasks and clearer career trajectories, reported significantly higher extrinsic motivation than their peers in Mechanical Manufacturing.

The lack of significant difference in amotivation is also notable. It suggests that despite varying disciplinary demands, students across fields may face similar challenges—such as academic overload or lack of personal interest—that could contribute to demotivation. Nonetheless, the relatively moderate levels of amotivation ($M \approx 2.46$ overall) indicate that most students in the sample still maintained some level of motivational engagement, which is consistent with previous findings among Vietnamese students (Trần et al., 2023).

Taken together, these findings highlight the importance of considering disciplinary context when designing motivational support strategies. While intrinsic motivation may be more resistant to external factors, extrinsic drivers appear to vary substantially by major. Educational policies and curriculum development should therefore be sensitive to these differences in order to foster more effective student engagement across academic programs.

Implications

The findings of this study carry several important implications for educators, academic advisors, and higher education policymakers seeking to enhance student engagement and motivation across diverse disciplines.

First, the significant difference in extrinsic motivation between academic majors highlights the importance of discipline-specific support strategies**.** Programs such as Electrical Engineering, where students demonstrate higher extrinsic motivation, may benefit from initiatives that further strengthen links between coursework and future employment, such as internships, industry partnerships, and guest lectures from professionals. In contrast, for majors with lower extrinsic motivation, such as Mechanical Manufacturing Technology, efforts could focus on enhancing perceived value and career relevance of the curriculum.

Second, the generally high levels of intrinsic motivation across disciplines suggest a promising foundation for implementing student-centered pedagogies that tap into learners' natural curiosity and autonomy. Instructors should be encouraged to adopt teaching methods that promote exploration, problem-solving, and self-directed learning, which are aligned with intrinsic drivers of motivation.

Third, the relatively low but present levels of amotivation across groups indicate a need for early intervention mechanisms to identify and support students at risk of disengagement. Academic advising and psychological counseling services should be equipped to recognize motivational issues and provide timely, targeted support.

Finally, at the institutional level, these findings suggest that motivation should not be addressed with a one-size-fits-all approach. Rather, motivational support should be customized based on the unique characteristics and needs of each discipline. Faculty development programs and curriculum design processes should incorporate knowledge about disciplinary motivational profiles to create more engaging and relevant learning environments.

By acknowledging and responding to these disciplinary nuances, higher education institutions can foster more effective motivation-enhancing strategies that contribute to improved academic performance, reduced dropout rates, and a more meaningful university experience for students.

CONCLUSION

This study investigated differences in academic motivation among undergraduate students across three academic disciplines—Mechanical Manufacturing Technology, Electrical Engineering, and Computer Engineering—using the Vietnamese-translated version of the Academic Motivation Scale (AMS). While intrinsic motivation and amotivation did not differ significantly between majors, a statistically significant difference was found in extrinsic motivation, with Electrical Engineering students exhibiting higher levels compared to their peers.

These findings underscore the role of disciplinary context in shaping certain types of motivation, particularly those related to external goals such as career expectations and structured learning environments. The results also reinforce previous literature suggesting that while intrinsic motivation may remain relatively consistent across fields, extrinsic drivers can be influenced by curriculum design and perceived relevance to future careers.

The study contributes to the growing body of research on academic motivation by providing cross-disciplinary insights from a Vietnamese university context. These insights can inform the development of more targeted strategies to foster student engagement and support across academic programs. Future research may expand on these findings by exploring longitudinal changes in motivation or examining the mediating role of instructional methods, institutional support, or socio-cultural factors.

Limitations and Future Research

Despite providing meaningful insights into the differences in academic motivation across disciplines, this study is subject to several limitations.

First, the sample was limited to undergraduate students from a single Vietnamese university, which may restrict the generalizability of the findings to other institutions or cultural contexts. Future research should consider expanding the sample across multiple universities or regions to enhance external validity.

Second, the study employed a cross-sectional design, capturing student motivation at a single point in time. As motivation can change over the course of an academic program or in response to external events, longitudinal studies are recommended to explore how motivation evolves over time within and across disciplines.

Third, although the Vietnamese version of the AMS demonstrated high internal consistency, the study relied entirely on self-reported data, which may be subject to social desirability bias or inaccurate self-perception. Including qualitative methods such as interviews or focus groups could enrich the understanding of how students interpret their motivational experiences within disciplinary settings.

Finally, the study focused on three broad dimensions of motivation (intrinsic, extrinsic, and amotivation). Future research could delve deeper into subtypes of motivation (e.g., identified vs. external regulation) or explore mediating factors such as teaching style, perceived competence, or peer influence that may explain disciplinary differences in more detail.

By addressing these limitations, future investigations can contribute to a more comprehensive and nuanced understanding of academic motivation in higher education, ultimately supporting the development of discipline-specific strategies to enhance student engagement and success.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the support provided by Thai Nguyen University of Technology (TNUT) for this research.

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