



Research article

Patterns in assignment submission times: Analysis of factors contributing to undergraduate students' commitment to core-curriculum related course

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ABSTRACT

Co-curricular activities equip students with essential skills and knowledge for personal and professional growth. Despite their importance, many students exert minimal effort to complete the assigned tasks. Instructors perceive that the lack of emphasis on final exams in co-curricular subjects reduces student effort and commitment. Moreover, poor time management and lack of effort in completing tasks have increased across various subjects in recent years. Therefore, it is important to investigate the factors that contribute to student commitment towards co-curricular subjects. In this study, the submission status of 339 tasks was retrieved from the student learning system to measure student commitment based on whether tasks were submitted on time, delayed, or not submitted. A chi-square test χ^2 was used to investigate the relationship between students' demographic characteristics and their commitment. The findings revealed a significant association between student commitment and the type of task given ($p < 0.001$). Students were more likely to submit presentations on time compared to written assignments. Projects were more likely to be delayed, while written assignments had a high frequency of no submission. Age was a significant predictor of commitment ($p < 0.05$), with students over 20 more likely to submit on time and students under 20 more likely to ignore submission. Gender was also a significant predictor of commitment ($p < 0.001$), with female students having a higher percentage and frequency of on-time submissions while male students having a higher number of no submissions. However, no significant association was found between the study year and commitment ($p > 0.05$), indicating that the year of the study could not determine the level of commitment to the course. Overall, these findings could be used to guide the preparation of tasks and assignments in co-curricular subjects to enhance student commitment and holistic development.

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1. Introduction

Assignments and examinations are commonly used in higher education to assess students' educational progress and performance. In many courses, assignments can account for 40–60% of a student's final grade [1,2]. Despite the potential impact on their grades, many students engage in academic procrastination, often causing them to delay the completion of their assignments [3,4]. Indeed, research has indicated that 80–95% of college students engage in this behavior [5], with some estimates suggesting that up to 90% of students procrastinate for more than an hour each day [5,6]. This widespread phenomenon has raised concerns among academics and educators, leading to numerous studies aimed at understanding the underlying causes and identifying effective solutions.

The investigation of strategies employed by students to manage their academic workloads and the correlation between these approaches and the accumulation of experience with age have been explored in prior research [7]. Additionally, the impact of electronic submission on student time management, as well as the effect of the duration of an exercise on submission, has been investigated. Accordingly, findings revealed that while many students find concomitant deadlines to be a source of significant stress, they perceive their ability to handle these constraints improves over time. They appreciate the versatility and efficiency that electronic systems provide, as well as the opportunity to collaborate with peers and exchange feedback when deadlines are extended.

Chabaya et al. [8] sought to ascertain the underlying causes of students' inability to timely deliver research projects in three Zimbabwe Open University departments. Employing a descriptive survey design, the study incorporated both quantitative and qualitative techniques. The data-gathering instrument was a questionnaire consisting of closed and open-ended sections. The findings from the study indicated that the inconsistency in consultation meetings between students and lecturers was a major contributor to the delay in feedback on submitted work, ultimately impeding research progression. Moreover, the authors observed that the institution did not follow-up on the research progress in the departments. It was recommended that supervisors and supervisees attend regular research workshops and seminars while students be directed to present their research findings within a reasonable timeframe.

A recent study investigated the levels of procrastination in Swedish university students and aims to differentiate between severe and less severe cases of procrastination [9]. A survey was conducted with 732 participants, using self-rated measures of procrastination, impulsivity, perfectionism, anxiety, depression, stress, and quality of life. Two groups were identified based on the Pure Procrastination Scale and the Pathological Delay Criteria: less severe procrastination ($n = 344$) and severe procrastination ($n = 388$). The severe group reported more problems in different domains of life, more psychological symptoms, and lower quality of life. The study recommends using the Pure Procrastination Scale as an initial screening tool and the Pathological Delay Criteria to determine the severity of procrastination.

A similar study sought to determine the relationship between procrastination, motivation, anxiety, and academic achievement in university students using a causal research design [10]. The study group consisted of 211 participants and used the Academic Motivation Scale (AMS), the Foreign Language Classroom Anxiety Scale (FLCAS), and the Aitken Procrastination Inventory (API), to measure motivation, anxiety, and procrastination levels. Students' grades were used as a measure of academic achievement. A structural equation model (SEM) was used to analyse the data. The findings revealed that while there is no significant relationship between anxiety and academic achievement, there are significant relationships between academic procrastination and academic achievement as well as motivation and academic achievement. A significant negative relationship between academic procrastination and motivation was reported. Overall, the study indicated that procrastination and motivation may be significant predictors of academic achievement.

A further investigation has been conducted to examine the extent and severity of internet dependency among college students in Mexico and Spain. The authors also sought to identify potential socio-demographic variables that may impact internet addiction and to establish the correlation between internet addiction and academic procrastination [11]. Employing a cross-sectional research design, an online questionnaire was utilized to assess problematic internet usage and academic procrastination using convenience sampling from a single university in both Mexico and Spain. The final sample size consisted of 758 university students aged between 18 and 35 y, and findings indicated similar rates of problematic and daily internet usage for leisure across all three models (Mexico, Spain, and Total) and a significant positive correlation between problematic internet usage and academic procrastination. The outcomes of the study projected valuable insights into the prevalence of internet addiction in Mexican and Spanish university settings, as well as its socio-demographic implications.

Balkis and Duru [12], investigated the role of self-regulation failure in procrastination and its impact on affective well-being and academic life satisfaction among a sample of 328 undergraduate students. The results revealed that the deficiency or inadequacy of self-regulation skills could substantially contribute to procrastination behavior among college students. Hitherto, procrastination has been reported to have a negative impact on an individual's emotional well-being, regardless of whether it is a manifestation of under-regulation or misregulation of self-regulation failure.

The correlation between academic motivation, basic psychological needs, and academic procrastination amongst 583 undergraduate students from diverse departments was examined in the previous investigation [13]. Utilizing SEM, the researchers scrutinized the data and tested the hypothesis model and reported that the tendency to procrastinate may be anticipated through academic motivation and basic psychological needs and that academic motivation can be projected through basic psychological needs.

A different study looked into the correlation between academic procrastination, bedtime, and the consequential and mitigating impacts of sensation-seeking and goal disengagement among a sample of 199 Chinese undergraduate students [14]. The findings from regression analyses reveal a favorable relationship between academic procrastination and bedtime, wherein the association is more robust for students exhibiting elevated levels of goal disengagement. Path analyses indicated that sensation seeking has an indirect effect on bedtime through academic procrastination.

A more recent study provided a comprehensive outline of academic procrastination using Bibliometrix and the VOSviewer analysis technique [15]. Data from 1240 articles published between 1938 and 2021 in the Web of Science core collection database show a rapid increase in publications since 1993. The United States leads in influential countries and institutions, with the University of Washington and UCLA being the most productive. The authors further documented that the hot spots of academic procrastination research include procrastination, self-regulation, academic performance, and motivation.

The aforementioned studies suggested that academic procrastination is a widespread phenomenon among college students, and it can negatively impact the grades of the students and their overall quality of life. The reasons for procrastination vary and include poor time management, anxiety, perfectionism, and failure of self-regulation. Prior studies have further highlighted that strategies such as electronic submissions and regular research workshops can help improve students' time management and reduce procrastination. However, there are limited studies investigating the association of student characteristics and types of tasks with their commitment to a specific subject. Therefore, there is a need for more research to investigate the interaction of these variables to identify effective interventions and strategies to help students overcome procrastination to improve commitment to their course of study.

2. Problem statement

Co-curriculum activities are designed to equip students with essential skills and knowledge in different contexts to enhance and develop themselves throughout their college duration. The skills and knowledge acquired via co-curriculum enable students to be productive after graduation and assist them to excel in the workplace through the exhibition of a wider range of personnel qualities and experiences. The importance of core-curriculum-related courses cannot be overstated, as they provide students with the foundational knowledge and essential skills necessary for advanced studies and future career endeavours. Despite their significance, many undergraduate students struggle to commit to these courses, leading to poor academic performance and lower graduation rates. Consistent evidence has shown that students who do not enrol in core curriculum-related courses are at higher risk of dropping out or taking longer to complete their degree [16–18]. In this manuscript, we present a data-driven analysis of the factors contributing to undergraduate students' lack of commitment toward core-curriculum-related courses. By analysing various data points, students' characteristics, as well as types of tasks given to the students, we aim to gain a deeper understanding of the underlying causes of this problem. The findings presented in this manuscript will provide valuable insights for educators, policymakers, and other stakeholders on how to address this pressing issue and improve undergraduate students' academic performance and overall success.

3. Conceptual framework

Undergraduate students are required to take core-curriculum-related courses as part of their degree requirements. However, many students lack a commitment to these courses and often perform poorly in them. This lack of commitment can lead to poor overall academic performance and can have long-term consequences for careers and future prospects. The instructors often perceived that lack of emphasis on final examinations in co-curriculum subjects reduces the level of effort and commitment the students accord to the subjects. In recent times, there has been an increase in poor time management, diligence and in efforts in completing tasks assigned to students across various subjects.

It has been demonstrated from previous works that some academic-related elements could affect student commitment towards a given course of study. For example, the characteristics or types of tasks given to students could be a high predictor of the delay of the student in starting, working on, and finishing assignments [19]. Moreover, students' gender and age categories are associated with timely or delayed submissions of assignments [20]. Based on this perspective, therefore, we aimed to understand the factors that contribute to this lack of commitment and to develop strategies to address this issue. The purpose of this study is to conduct a data-driven analysis of the factors that contribute to undergraduate students' lack of commitment towards the core-curriculum-related course. By identifying these factors, the present study aims to provide insights into how this issue can be addressed and how academic performance and graduation rates can be improved. This is an important issue in higher education that has been linked to poor academic performance and low graduation rates. By identifying the factors that contribute to undergraduate students' lack of

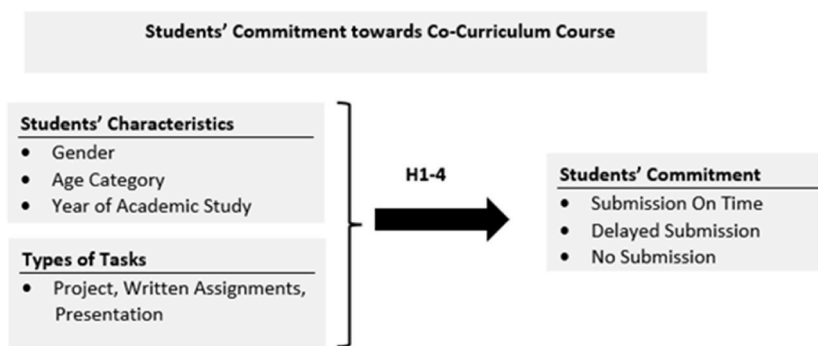


Fig. 1. Conceptual framework of the study.

commitment towards core-curriculum-related courses, this study aims to provide insights into how this issue can be addressed and how academic performance and graduation rates can be improved.

The study herein specifically focused on achieving four essential educational outcomes namely, exploring the association between gender type and student commitments, ascertaining the relationship between age categories and student commitments, year of academic study as well as the types of tasks given to the students. Student's commitments are evaluated based on assignment submission statuses i.e., submission, on time, delayed or no submission as these indicate a clear and objective way to measure the level of effort and dedication that students put into completing their assignments. Thus, the present study seeks to validate the framework through the collection of relevant data, since analysis and interpretation are crucial for the achievement of any desired outcome. Therefore, the following research questions and hypotheses are formulated to guide the conduct of the study as projected in Fig. 1.

Research questions

- RQ1.** Is there an association between the gender of the students and their commitment to the course?
- RQ2.** Is there an association between the age categories of the students and their commitment towards the course?
- RQ3.** Can students' commitment to the course be predicted based on their year of academic study?
- RQ4.** Is there a relationship between the types of tasks (projects, written assignments, presentations) and students' commitment to the course?

Hypotheses

- H1.** The gender of the students (male or female) will be associated with their commitment to the course.
- H2.** There will be an association between the students' age categories and their commitment towards the course.
- H3.** The year of academic study will be a predictor of the student's commitment to the course.
- H4.** There will be a relationship between the types of tasks (projects, written assignments, presentations) and students' commitment to the course.

The dependent variable for the first hypothesis is the gender of the students, while the independent variables are the students' commitment i.e., submission on time, delayed or no submission. The dependent variable for the second hypothesis is the age categories of the students, while the independent variable is the commitment of the students. Similarly, the dependent variable for the third hypothesis reflected the year of the academic study of the students while the independent variables constitute the commitment of the students. Lastly, the dependent variable for the fourth hypothesis is the types of tasks while the independent variable is the student's commitment.

4. Methodological approach to the problem

Before the commencement of the analysis in this study, students were informed about the purpose of the study and a verbal agreement was obtained from the study through a briefing at the beginning of the semester. Approval to carry out the study was obtained from the departmental ethics committee of Universiti Malaysia Terengganu (UMT/PPAL/500-28 JILID; 10 October 2021) and all students consented to the study. It is worth highlighting that the study was carried out anonymously as such no personal information of the student was disclosed. The following steps were taken towards addressing the research hypotheses formulated.

4.1. Participants

In the current investigation, a descriptive cross-sectional survey design was conducted on a sample of 113 undergraduate students (45 males and 68 females), aged 21.19 ± 1.03 y. A convenient sample technique was used in the study. The sample were undergraduate students of year one, two and three undertaking a physical education and sports science-related subject as a core curriculum subject in one of the public universities in Malaysia. The course entitled healthy lifestyle is primarily designed to equip the student with knowledge and skills regarding communication skills, and physical activity, as well as ways in which the students could live a healthy lifestyle through balanced nutrition and physical activity.

4.2. Evaluation of assignments' submission commitments

In the current study, submission of assignments on time, delayed and no submission was considered as measures for the commitments students exert upon the assignments given to them. These submission statuses were selected as the basis for evaluating students' commitments because they provide a clear and objective way to measure the level of effort and dedication that students put into completing their assignments. By tracking these submission statuses, we envisage gaining insight into how well students are managing their time and prioritising their work. It is worth noting that sufficient submission time was allocated to each task following the guidelines stipulated by the university [21].

4.3. Data collection process

The university learning management system (LMS) was used as the platform for data collection. The LMS platform was selected as the medium for data collection as all teaching and learning activity at the university is undertaken via the platform. The platform stored information about the students, such as age, gender, course as well as year of study. Instructors are required to upload all instructions, tutorials, learning materials, syllabuses, and other relevant documents into the system. Similarly, student activities, such as quizzes, assignments, and projects, are carried out through the system in real-time. This enables the tracking of students' submissions of assignments or any tasks easily as instructions of the assignment, due date, students involved, and submission status are visible on the system. Hence, a total of 339 submission statuses of various tasks were retrieved from the LMS. These tasks were categorised into projects where students were asked to implement a personal project on a specific topic (perform a personal exercise routine and report their progress after 5 weeks), written assignments in which students were required to write about a specific topic of interest while in the presentation, students were requested to conduct a short presentation on a selected topic of interest. It is worth noting that these tasks were tailored to achieve the learning outcomes designed for the subject i.e., lifelong learning ability, sourcing for reliable information as well as communication skills respectively. The summary of the methodological approach employed in the current study is projected in Fig. 2.

5. Statistical analysis

In this study, we used the Chi-square test to explore the relationship between the characteristics (age category, gender, and year of study) and their commitment to submitting assignments on time. We also examine how different types of tasks (written assignments, projects, and presentations) affect submission rates. The Chi-square test is a robust tool for analysing categorical data and is well-suited for this type of analysis. However, it's important to note that the test only works with counted and classified data sets – not with continuous or parametric numeric data. Therefore, the data used in the analysis must be in the form of frequencies (counts) rather than percentages or relative frequencies [22,23]. Moreover, Cramer's V analysis was employed to ascertain the degree of association between the variables of the study.

6. Results

Table 1 projects the distribution of the submission status with regard to the student's gender. There was a statistically significant difference between gender in submission status as demonstrated by the Chi-square and Cramer's V analysis ($p < 0.001$). It could be seen from the table that females recorded 33.9 percent of submissions on time while male students have only 18%. However, a total of 26 percent of delayed submissions were attributed to females in comparison with the male who recorded a total percent of 17.4. It is also observed that a total percent of 4.4 of no submissions were from the male category while only 0.3 percent of the same case was observed in the female category.

Fig. 3 displays the graphical illustration of the association between assignments submission status and students' gender. Female students recorded a higher frequency of submission on time while male students recorded a high number of no submissions. Similarly, it is indicated from the figure that female students are more likely to delay the submission of the assignments whilst male students are more inclined to ignore the submission.

Table 2 reveals the distribution of the assignment submission status with respect to the age categories of the students. A statistically significant difference was observed between age categories and submission status, as reflected in the Chi-square and Cramer's V analysis ($p < 0.05$). It could be seen from the table that students above the age of 20 have 33.9 percent of submissions on time, while students under the age of 20 have only 18 percent. However, a total of 23.3 percent of the student above 20 years were delayed in submissions in comparison with students under 20 years who recorded a total percent of 20.1. It is also observed that a total percent of

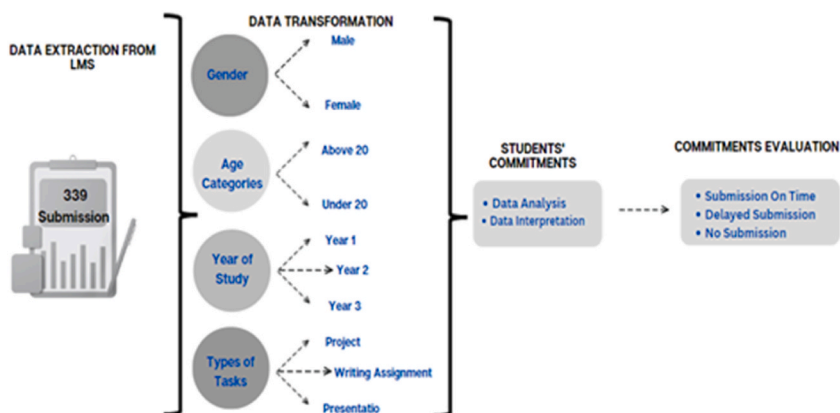


Fig. 2. Flow chart of the methodological approach of the study.

Table 1
Association of gender and student commitment toward submission of assignments.

Submission Status	Gender		Total (%)
	Male (%)	Female (%)	
On-Time	18.0	33.9	51.9
Delayed	17.4	26.0	43.4
Not Submitted	4.4	0.3	4.7
Overall Total (%)	39.8	60.2	100

$\chi^2(2) = 21.381$; $p = 0.001$, Cramer's $V = 0.251$; $P = 0.001$.



Fig. 3. Relationship of assignments submission status with gender.

Table 2
Age categories and students' commitment toward submission of assignments.

Submission Status	Age Categories		Total (%)
	Above-20 (%)	Under-20 (%)	
On-Time	33.9	18.0	51.9
Delayed	23.3	20.1	43.4
Not submitted	2.1	2.7	4.7
Overall Total (%)	59.3	40.7	100

$\chi^2(2) = 6.146$; $p = 0.046$, Cramer's $V = 0.135$; $P = 0.046$.

2.7 students under 20 years failed to submit the assignments, while 2.1 percent of the students over 20 years recorded no submission. The exact frequency summary of these findings is shown in Fig. 4.

The relationship between students' assignment submission and their year of academic study is tabulated in Table 3. No statistically significant differences were observed between submission status and the student's study year indicated by the Chi-square and Cramer's V analysis ($p > 0.05$). These findings highlight that the commitment of students to the course is not affected by their year of study.

Table 4 shows the distribution of the assignment submission status with respect to the types of tasks that are assigned to the students. A statistically significant difference was observed between different tasks and submission status as reflected by the Chi-square and Cramer's V analysis ($p < 0.001$). It could be seen from the table that presentations recorded higher rates of submission on time with 24.5 percent, followed by written assignments with 18.3 percent, whilst the project has the lowest submission rates on time with only 9.1 percent. It is also observed that the students delayed assignment submission mainly on the project with a total percent of 23.6 followed by a written assignment with 12.4 and presentation with 7.4 percent, respectively. Conversely, failure to submit the task was highly attributed to written assignments, at 2.7 percent, followed by a presentation, at 1.5 percent, and lastly projects, at only 0.6 percent.

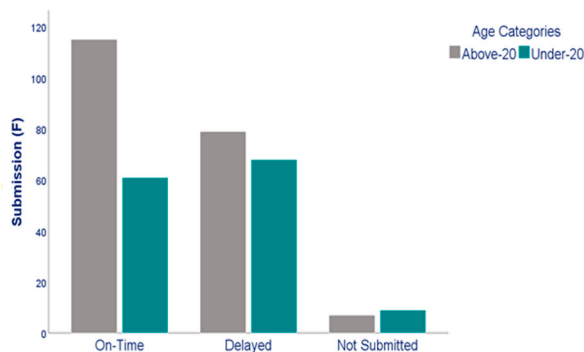


Fig. 4. Assignment submission frequency statuses based on students' age categories.

Table 3
Relationship between assignments submission status and students' year of study.

Submission Status	Year of Study			Total (%)
	1st Year (%)	2 nd Year (%)	3rd Year (%)	
On-Time	50.1	0.3	1.5	51.9
Delayed	41.9	0.3	1.2	43.4
Not submitted	4.4	0.3	0	4.7
Overall Total (%)	96.5	0.9	2.7	100

$\chi^2(4) = 5.936; p = 0.204$, Cramer's V = 0.094; P = 0.204.

Table 4
Association between Assignment Submission Status and types of tasks.

Submission Status	Types of Assignments			Total (%)
	Project (%)	Written Assignment (%)	Presentation (%)	
On-Time	9.1	18.3	24.5	51.9
Delayed	23.6	12.4	7.4	43.4
Not submitted	0.6	2.7	1.5	4.7
Overall Total (%)	33.3	33.3	33.3	100

$\chi^2(4) = 60.332; p = 0.001$, Cramer's V = 0.298; P = 0.001.

Fig. 5 highlights the association between assignments submission status and various tasks given to the students. It can be seen from the figure that students are more likely to submit tasks on time when it is related to the presentation as compared to written assignments. Similarly, it was observed that the project was most likely to be delayed while writing assignments recorded a high frequency of no submission.

7. Discussion

Considering that this problem has been identified as a significant issue in higher education and has been linked to poor academic performance and low graduation rates, the current study sought to explore the perceived lack of commitment among undergraduate students to core curriculum-related courses. It should be noted that, to the best of our knowledge, the current investigation is the first attempt to explore the association between students' commitments to the core curriculum-related course based on various inter-connecting elements, that is, student characteristics as well as types of tasks given to students. Owing to the importance of the data-driven approach in discerning reliable information about a given phenomenon, we sought to investigate the roles of these elements towards the commitment of the students through the collection of relevant data in a case-study format since analysis and interpretation are crucial towards the successful attainment of any predetermined objective.

It was demonstrated from the findings of the current study that there was a statistically significant difference between gender in assignments submission status, as evident in Table 1 and Fig. 3. Females were observed to have a higher percentage and frequency of submission on time while male students recorded a high number of no submissions. Similarly, it is indicated from the figure that female students are more likely to delay the submission of the assignments whilst male student students are more inclined to ignore the submission. This finding is consistent with the previous investigation in which the completion time completely mediates gender differences in non-exam components, whereby procrastination mediates the gender differences in performance on the components of the non-exam [24,25]. It is also important to note that the core curriculum subjects are often not emphasized in final examinations but rather in continuous assessment of the student's progress hence it has been documented that female students tend to turn in their

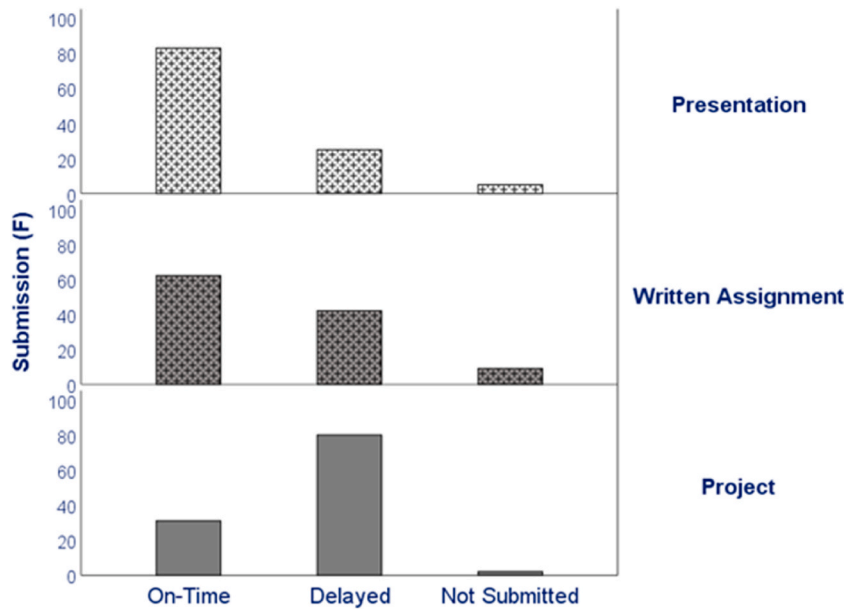


Fig. 5. Assignment' submission frequency status on various types of tasks.

assignments relatively earlier than their male counterparts [20]. The findings also revealed that male students are more likely to completely ignore the submission of the assignments compared with female students. Evidence from a previous study has shown that female students tend to have higher academic conscientiousness, which often resulted in overperforming on the noncognitive components compared to males [26,27,27].

It was hypothesised (H2) that there would be an association between the students' age categories and their commitment towards the course. The findings from the current investigation revealed that students above the age of 20 y are more likely to be highly committed through the submission of their assignments when compared with students under the age of 20 y, as depicted in Table 2 and Fig. 4. Acquiring time management skills is an important part of a student's university experience. Students and academics face challenges in managing their workload, indeed, initially, students may struggle with time management and rely on deadlines to dictate their actions. However, as they progress through their course, their time management skills often improve [7,28,29]. Therefore, maturity level, life experience, and academic preparedness can contribute to this improvement. Consequently, younger undergraduate students may be less familiar with college-level expectations and may need more time to adjust to managing their time and understanding complex concepts.

There was not sufficient evidence to support our third hypothesis (H3), which states that the student's year of academic study will be a predictor of their commitment towards the course. As detailed in Table 3, the year of the academic study of the students does not influence their assignment submission statuses. This finding reflects that students can fully or partially commit to a course irrespective of their year of academic study because their level of commitment may be influenced by other factors. These factors could include their interest in the subject matter, their motivation to learn, the quality of instruction, and the level of support they receive from their peers and instructors [30–32]. As a result, a student's year of academic study may not necessarily be a reliable predictor of their commitment towards a course.

Our final hypothesis (H4), which states that there would be a relationship between the types of tasks (project, written assignments, presentations) and the commitment to the course can, therefore, be accepted. Research has shown that task aversion or level of unpleasantness, perceptions of boredom or uninteresting a student associates with a task could be a significant factor in student delay in starting, working on, and finishing assignments [19,33,34]. It is demonstrated in our study that students are more likely to submit the task on time when it is related to the presentation as compared to written assignments which also recorded a high percentage and frequency of no submission. Writing has been reported to be a daunting task that does not evoke the enthusiasm and curiosity of students when compared with presentations. In contrast, students view presentations as a way to express themselves through visual and verbal communication. Presentations allow students to engage with their audience and convey their ideas more interactively and dynamically. This can make presentations a more appealing and enjoyable learning experience for students [35–37]. Similarly, it is observed that the project is most likely to be delayed. It should be noted that the project herein constitutes an aspect of the students' lifelong learning where they are expected to record and track their exercise routine for five weeks. This task may seem challenging to students because it requires consistent effort and discipline over an extended period. Additionally, students may face difficulties in finding the time and motivation to regularly engage in physical activity, especially if they have other commitments or responsibilities [38–40]. As a result, some students may struggle to complete the project(s) on time. These findings are consistent with a previous study that suggested that tasks that are too challenging or not challenging enough can lead to procrastination [19,41]. It has been suggested students tend to procrastinate more when faced with difficult tasks, whilst, on the other hand, when a task is perceived as easy,

students are more likely to find it uninteresting.

8. Conclusion

In the current investigation, we explored the factors that are associated with the commitment towards a core curriculum related course. The study was essentially aimed at addressing the increasing procrastination and poor time management when submitting assignments. It was demonstrated from the findings of the investigation that students' demographic characteristics influence their commitment to core-curriculum subjects. There is a significant association between student commitment and the type of task given. Students are more likely to submit presentations on time than written assignments. Projects are often delayed, and written assignments have a high frequency of no submission. Age and gender are significant predictors of commitment, with students over 20 y and female students more likely to submit on time. However, the year of study appears not to be a significant predictor of commitment. The data-driven approach used in this study could be valuable for academics, professionals, and other stakeholders in identifying factors that affect student commitment in any subject. This approach can provide insights and help develop strategies to improve student engagement and success.

9. Practical application and recommendations

Co-curricular activities offer numerous benefits to students. Participation in such activities promotes well-rounded learning and the development of key skills that are valuable in the professional world. With academic pressure increasing globally, a significant proportion of students are vulnerable to anxiety and stress. Co-curricular activities provide an effective means of mitigating academic stress. However, despite these benefits, recent trends have shown an extension of the normal study period and poor graduation rates due to poor academic performance in core-curriculum courses. As such, it is essential to redesign co-curricular subjects to meet the current needs of students. In this study, we provide data that can guide the preparation of tasks and assignments in co-curricular subjects to enhance student commitment and holistic development. Furthermore, we strongly recommend that time management training be provided to all students to reduce procrastination and improve the allocation of time for assignments and other tasks.

10. Study limitations

It is important to acknowledge that this study has certain limitations. First, the study only measured student commitment based on whether tasks were submitted on time, delayed, or not submitted. It did not take into account the quality of the submissions. Second, the study only analyzed the submission status of 339 tasks, which may not be representative of all students. Third, the study only investigated the relationship between students' demographic characteristics and their commitment. Other factors such as motivation, interest, and workload as well as the quality of instruction, and support from peers and instructors could also affect student commitment towards co-curricular subjects. Finally, the study was conducted in a specific context and may not be generalizable to other contexts. Future research should consider these factors when evaluating the commitment of the student to a given subject.

Ethics committee approval

Verbal informed consent was obtained, and all the participants have agreed to the publication of this data. Approval to carry out the study was obtained from the departmental ethics committee of Universiti Malaysia Terengganu (UMT/PPAL/500-29 JILID; 10 October 2021). It is worth highlighting that the study was carried out anonymously as such no personal information of the student was disclosed.

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Data availability statement

Data will be made available upon request to the corresponding author.

CRediT authorship contribution statement

Ahmad Bisyril Husin Musawi Maliki: Methodology, Investigation, Formal analysis, Conceptualization. **Abd Majid Mohd Isa:** Project administration, Methodology, Investigation. **Mohamad Nizam Nazarudin:** Writing – original draft, Visualization, Validation, Supervision, Resources. **Mohamad Razali Abdullah:** Software, Resources, Project administration, Investigation. **Siti Musliha Mat-Rasid:** Software, Resources, Project administration, Methodology. **Rabiu Muazu Musa:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2024.e26214>.

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