ACADEMIC PROCRASTINATION AND ACADEMIC PERFORMANCE AMONG CONVENTIONAL AND ONLINE LEARNERS: UNDERSTANDING ROLE OF LEARNERS' CHARACTERISTICS

Ayesha Farooq, Virtual University of Pakistan
Tanveer Shah, Virtual University of Pakistan
Farwa Amin, Virtual University of Pakistan

ABSTRACT

The present research was carried out to explore the relationship between academic procrastination and academic performance among virtual and conventional university students. The role of the demographic characteristics of the participants was also explored. Nonprobability convenience sampling technique was used to select a sample of 200 students. Academic procrastination scale (McCloskey, 2011) and students' CGPA were used to measure variables. Pearson product-moment correlation, multiple linear regression, and independent sample t-test were used to test study hypotheses. Among the demographic characteristics, level of education, living status, and mode of education were positively related to academic procrastination. Gender negatively predicted academic procrastination. Living status, mode of education, and job status positively predicted academic procrastination. Level of education and mode of education positively predicted academic performance. Academic procrastination negatively predicted academic performance. Men showed more academic procrastination than women. Graduate-level students had higher academic performance than undergraduate students. Students belonging to rural areas had significantly higher academic procrastination than urban students. Conventional university students showed less academic procrastination than virtual students. Working students had higher academic procrastination than nonworking students. The findings of the study can be used to provide pertinent recommendations to institutes and parents to overcome academic procrastination and enhance academic performance.

Keywords: *academic procrastination, academic performance, virtual students, conventional students, university students*

INTRODUCTION

Several changes in the attitudes and behavior of students have been observed in the 21st century, but procrastination in students has been proliferating for years. Academic procrastination is a widespread phenomenon observed among students of all ages in nearly all academic institutions across the world. Essentially, it involves intentionally postponing tasks related to coursework, such as submitting assignments late or taking quizzes at the last minute (Steel & Klingsieck, 2016). Between 80% and 90% of students engaged in procrastination (O'Brien, 2002) and 47.9% of students have reported it to be problematic (Hayat et al., 2020). Academic procrastination may not be considered as serious as a disease, but it can have several negative impacts, such as stress, anxiety, low self-efficacy, neuroticism, task delay, impulsivity, and non-conscientiousness (Dumitrescu et al., 2011). The adverse consequences of academic procrastination can significantly affect a student's performance, resulting in poor grades. Although postponing a task may initially seem harmless, it often leads to a more substantial workload, feelings of guilt and anxiety, and social disapproval for failing to meet commitments and fulfill responsibilities. Additionally, it could result in different types of academic dishonesty (Patrzek et al., 2015).

Although there are several empirical research studies devoted to academic procrastination and its impact on academic performance, the results of these studies have been inconsistent. Studies conducted by Aremu et al. (2011), as well as Balkis (2013), have reported negative effects of procrastination on students' learning, grades, and achievement, often leading to course withdrawal. Students often experience time pressure while delaying a task, which in turn results in task inaccuracy, reduced punctuality, and impacts on students' performance (van Eerde, 2003). On the other hand, few studies (e.g., Seo, 2011) have reported no significant association between academic procrastination and academic performance or explored a positive association between both variables, such as Brinthaupt and Shin (2001) and Schraw et al. (2007), who explored the positive effect of procrastination on academic achievement. Hence, the nature of the relationship between both variables remains ambiguous and inconsistent throughout the literature. Therefore, this research aims to re-explore these variables in the 21st century.

It is crucial to investigate this phenomenon in the modern era where technology is prevalent in almost every aspect of life, and many universities are either adopting online or hybrid modes of learning. This shift has become particularly noticeable in the past two years due to the COVID-19 pandemic, which forced universities to transition to digital modes of learning. As a result, students were at risk of experiencing academic procrastination and psychological distress (Stoliarchuk et al., 2022). However, only a few studies have been devoted to distance learning students, and there has been minimal exploration of the comparison between distance education and conventional/traditional education. The conventional/traditional university is where students take full-time, on-campus classes and have face-to-face interaction with the teachers, while a virtual university is where students never meet their lecturer face-to-face in a classroom but take classes virtually through a learning management system (LMS) (Pollock & Cornford, 2002). As both modes of education (virtual and traditional/conventional) are currently in use, it is important to explore differences among students in certain situations. The difference is significant to highlight because students studying in the conventional/traditional mode have direct access to instructors and face-to-face communication, which often makes it easier for them to request more time and justify their delays. However, in virtual modes of education, students are bound to submit their semester activities (i.e., assignments, projects, and quizzes) online through an LMS (e.g., Canvas, Moodle, etc.) that limits the submission of assignment or re-attempt of quizzes after the due date. Thus, procrastination in virtual modes of education may lead students to not complete quizzes due to going over time or they may fail to upload their assignments and projects online, resulting in submitting incomplete and disorganized work that leads to lower grades. Although virtual modes of education provide students the flexibility to attend lectures at their own time, they have more autonomy in deciding their schedule and when to take exams. Despite this flexibility in online distance learning, high dropout rates, low academic performance, and procrastination have been observed among students (Cerezo et al., 2017; Srinivasan et al. 2021).

Other significant factors that may contribute to academic procrastination and performance are the demographic characteristics of the learners (i.e., their age, gender, background, ethnicity, etc.), but these are less often explored in the existing literature. Stoter et.al. (2014) have supported the idea that the characteristics of distance learners are different from traditional learners, and their role in academic procrastination and academic performance is important to explore. As compared to traditional learning, online learning is more flexible in providing opportunities for individuals of all ages, genders, and educational backgrounds to engage in educational activities, regardless of any accessibility limitations they may face. Additionally, online education fosters a supportive environment for learners from diverse cultural and regional backgrounds that empowers them to actively participate and excel in courses spanning various disciplines (Xu & Rees, 2016). Demographic characteristics often reflect individuals' unique contexts and environments. Factors such as family responsibilities, employment status, and access to resources can differ among various demographic groups. Therefore, exploring these characteristics helps in understanding the contextual influences that may contribute to differences in procrastination levels between distance and traditional learners.

Most distance learners prefer this mode because of some family responsibility, employment status, or difficulty in attending on-campus classes. Employment status is one of the demographic characteristics of students that may impact their academic performance. Previous surveys have reported that most of the students in distance learning and telecourses were married and working full time while pursuing their studies (Galusha, 1998; Sheets, 1992; Wood, 1996). Management of professional and educational responsibilities at the same time put lot of challenges for students because online learning requires students to have self-regulating skills. The comparison of students based on their gender has also been a common theme in literature. Researchers have found that male students procrastinate more than female students (Balkis & Duru, 2009; Steel, 2007), while Rodarte-Luna and Sherry (2008) and Washington (2004) reported that female students have more academic procrastination. Özer (2011) reported no gender differences. Considering the inconsistent findings, the current research aims to explore gender differences as well.

Additionally, the environment in which students learn also plays a significant role in their academic performance. Students belonging to rural areas often have fewer facilities compared to those living in urban areas, as the development in both areas is not consistent (Mohammadi, 2015). Rural and urban students often differ in terms of the facilities available to them. Urban areas generally have better educational facilities, including schools with modern infrastructure, well-equipped classrooms, libraries, computer labs, and access to a wider range of educational resources. In contrast, rural areas often face challenges such as limited educational infrastructure, fewer resources, and a lack of access to technology, electricity, and the internet, which may contribute to their delaying tasks. Haider et al. (2022) also supported the idea that students belonging to rural areas show more academic procrastination than those belonging to urban areas.

As understood from the existing literature, it is important to explore the relationship between academic procrastination and academic performance. Moreover, the role of characteristics of the learners is also important to explore. Undertaking such studies can provide a better understanding of the phenomenon at hand. Therefore, the present study aimed to test the nine hypotheses mentioned below:

- H1. There is likely to be a negative relationship between academic procrastination and academic performance.
- H2. Demographic characteristics of the learners (gender, education, living status, mode of education, and job status) are likely to be related to academic procrastination and academic performance.
- H3. Demographic characteristics of the learners (gender, education, living status, mode of education, and job status) are likely to predict academic procrastination.
- H4. Demographic characteristics of the learners (gender, education, living status, mode of education, and job status) and academic procrastination are likely to predict academic performance.
- H5. Men are likely to differ from women in academic procrastination and academic performance.
- H6. Undergraduate students are likely to differ from graduate students in academic procrastination and academic performance.
- H7. Students living in urban areas are likely to differ from students living in rural areas in academic procrastination and academic performance.
- H8. Conventional university students are likely to differ from virtual students in academic procrastination and academic performance.

H9. Employed students are likely to differ from unemployed students in academic procrastination and academic performance.

METHOD

Participants and Procedure

The study was quantitative, using a correlational research design. The data were collected from both conventional/traditional university students who attend face-to-face, on-campus classes and virtual university students who take online classes. Following COVID-19 SOPs (i.e., social distancing), data for this research were collected online through a Google form using a nonprobability convenience sampling technique. Moreover, since virtual university students belong to different regions and do not attend on-campus classes, we were limiting to approaching them online for data collection. A Google form link was shared among students, and a total of 200 students with an age range of 21–28 (M = 22.76, SD = 1.59) responded to the questionnaire. Based on gender, an equal number of participants participated, with 100 males (50%) and 100 females (50%). All students were taking undergraduate (49%) and graduate (51%) classes from higher education conventional and online universities, among them 77 (38.5%) students were from conventional universities, and 123 (61.5%) were from virtual universities. Most of the students belonged to rural areas (68.5%) while the rest were from urban areas (31.5%). Out of 200 participants, 105 (52.5%) were unemployed and 95 (47.5%) were employed.

Measures

We used the Academic Procrastination Scale (McCloskey, 2011) to measure academic procrastination. The scale consists of 25 items with a 5-point Likert scale ranging from *strongly disagree* = 1 to *strongly agree* = 5. We replaced the term "school" with "university" because the data were collected from university students. Although the scale is validated on school students it has been used on university students by other researchers (Karla Silva Soares et. al. 2022; McCloskey, 2011). Moreover, the "school" refers to academic institutes internationally, but in Pakistan, "school" is used for grades 1 to 10. Therefore, we replaced the term with "university" to make it understandable for participants. The Cronbach's Alpha reliability of the scale in the present research was .86 indicating a reliable scale (Taber, 2018) while McCloskey has reported an excellent reliability of α = .95 (2011).

Academic performance was assessed using the Cumulative Grade Point Average (CGPA) of the students. All participants were studying in the semester system, and they were asked to mention their overall CGPA for the semesters they had qualified for so far.

Data Analysis

To test Hypotheses 1 and 2, Pearson product-moment correlation analysis was used. The third and fourth hypotheses were tested through multiple linear regression analysis. An independent sample t-test was used to test the 5th, 6th, 7th, 8th, and 9th hypotheses.

Table 1.
Pearson Product Moment Correlation between Study Variables (n=200)

Variables	1	2	3	4	5	6	7	8	M	SD
Age	-	.19**	-.06	-.03	-.05	.09	-.07	-.04		
Gender		-	-.04	.18**	.11	.19*	-.14*	-.03		
Level of Education			-	-.10	.02	.01	.01	.15*		
Living status				-	.10	.17*	.18**	-.09		
Mode of education					-	.15*	.23**	.09		
Job status						-	.24***	-.00		
Academic procrastination							-	-.15*	55.80	12.60
Academic performance								-	3.19	.29

Note: *p<.05, **p<.01, ***p<.001, M=mean, SD=standard deviation, for gender 0=male, 1=female, for level of education 0=undergraduate, 1=graduate, for living status 0=urban, 1=rural, for mode of education 0=conventional, 1=online, for job status 0=unemployed, 1=employed.

RESULTS

Pearson correlation coefficients were computed among the study variables as a preliminary analysis (Table 1). Among demographic variables, gender (male/female) was negatively related to academic procrastination. Level of education (undergraduate/graduate) was positively related to academic performance. The living status (rural/urban), mode of education (online/conventional), and job status (employed/unemployed) of the participants were positively related with academic procrastination. Besides demographic characteristics, the main variables of the study were negatively correlated with each other, as an increase in academic procrastination showed a decrease in academic performance.

As there was a significant correlation between the study variables, initially multiple linear regression was run to predict academic procrastination from the characteristics of the learners including gender, level of education, living status, mode of education, and job status. (Table 2). The overall regression model was a good fit for the data, F (5, 194) = 8.07, $p < .001$, R2 = .17. Among demographic characteristics, gender (male = 0, female = 1) negatively predicted academic procrastination ($\beta = -.24$, $p < .001$). Living status (urban = 0, rural = 1) ($\beta = .17$, $p < .05$), mode of education (conventional = 0, online = 1) ($\beta = .21$, $p < .01$), and job status (unemployed = 0, employed = 1) ($\beta = .22$, $p < .01$), positively predicted academic procrastination. While education (undergraduate = 0, graduate = 1) did not predict academic procrastination.

Another multiple linear regression analysis was run to predict academic performance from gender, level of education, living status, mode of education, job status, and academic procrastination. (Table 3). The overall regression model was a good fit for the data (F (6, 193) = 2.67, $p < .05$, R2 = .07). Among the demographic characteristics, gender, living status, and job status did not predict academic performance while education ($\beta = .14$, $p < .05$) and mode of education ($\beta = .14$, $p < .05$) positively predicted academic performance. Academic procrastination negatively predicted academic performance ($\beta = -.20$, $p < .01$).

Table 2.
Multiple Linear Regression Analysis Predicting Academic Procrastination (N=200).

Variables	Academic Procrastination		
	β	SE	95% CI
Constant			[45.31, 53.47]
Gender	−.24***	1.69	
Level of Education	.01	1.65	
Living status	.17*	1.83	
Mode of education	.21**	1.72	
Job status	.22**	1.70	
F	8.07***		
R^2	.17***		

Note: **p*<.05, ***p*<.01, ****p*<.001, βBeta, SE=standard error, CI=confidence interval, for gender 0=male, 1=female, for Level of Education 0=undergraduate, 1=graduate, for living status 0=urban, 1=rural, for mode of education 0=conventional, 1=online, for job status 0=unemployed, 1=employed.

Table 3.
Multiple Linear Regression Analysis Predicting Academic Performance (N=200).

Variables	Academic Performance		
	β	SE	95% CI
Constant			[3.19, 3.59]
Gender	-.07	.04	
Level of Education	.14*	.04	
Living Status	-.04	.04	
Mode of Education	.14*	.04	
Job Status	.04	.04	
Academic Procrastination	-.20**	.00	
F	2.67*		
R2	.07*		

Note: *p<.05, **p<.01, βBeta, SE=standard error, CI=confidence interval, for gender 0=male, 1=female, for Level of Education 0=undergraduate, 1=graduate, for living status 0=urban, 1=rural, for mode of education 0=conventional, 1=online, for job status 0=unemployed, 1=employed.

To compare the gender differences in academic procrastination and academic performance, an independent sample t-test was run (Table 4). Men (M = 57.58, SD = 16.73) reported significantly higher academic procrastination than women (M = 54.01, SD = 5.74), t (198) = 2.01, $p < .01$. There were no significant gender differences in academic performance.

Table 4.
Independent Samples t-test Comparing Study Variables in Men and Women (N=200)

Variable	Men (n=100)		Women (n=100)		t(198)	p	95% CI		Cohen's d
	M	SD	M	SD			LL	UL	
Academic procrastination	57.58	16.73	54.01	5.74	2.01	.04	.06	7.07	.28
Academic performance	3.20	.32	3.17	.26	.53	.59	−.06	.10	.10

Note: M=mean, SD=Standard Deviation, CI=Confidence Interval, LL=Lower Limit, UL=Upper Limit.

Furthermore, students were compared based on their level of education (Table 5). Graduate students (M = 3.14, SD = .27) reported significantly higher academic performance than undergraduate students (M = 3.23, SD = .31). There were no significant differences in academic procrastination based on level of education.

Students were also compared based on their living area (rural/urban) using an independent sample t-test (Table 6). Students belonging to rural areas (M = 57.39, SD = 12.36) showed more academic procrastination than those living in urban areas (M = 52.32, SD = 12.52). However, there were no significant differences in academic performance based on the living status of students.

Both conventional and virtual university students participated in this research. Therefore, a comparison was made of academic procrastination and academic performance among virtual and conventional students (Table 7). Virtual and conventional students did not differ in their academic performance; however, students studying in the virtual mode of education showed more academic procrastination (M = 58.16, SD = 13.02) than conventional students (M = 52.01, SD = 10.95).

Table 5.
Independent Samples t-test Comparing Study Variables in Undergraduate and Graduate Student (N=200)

Variable	Undergraduate(n=98)		Graduate (n=102)		t (198)	p	95% CI		Cohen's d
	M	SD	M	SD			LL	UL	
Academic procrastination	55.64	12.52	55.94	12.74	−.16	.86	−3.82	3.22	.02
Academic performance	3.14	.27	3.23	.31	−2.26	.02	−.17	−.01	.30

Note: M=mean, SD=Standard Deviation, CI=Confidence Interval, LL=Lower Limit, UL=Upper Limit.

Table 6.
Independent Samples t-test Comparing Study Variables in Rural and Urban Students (N=200)

Variable	Urban (n=63)		Rural (n=137)		t(198)	p	95% CI		Cohen's d
	M	SD	M	SD			LL	UL	
Academic procrastination	52.32	12.52	57.39	12.36	−2.68	.08	−8.80	−1.35	.40
Academic performance	3.22	.28	3.17	.30	1.27	.20	−.03	.14	.17

Note: M=mean, SD=Standard Deviation, CI=Confidence Interval, LL=Lower Limit, UL=Upper Limit.

Table 7.
Independent Samples t-test Comparing Study Variables in Virtual and Conventional University Students (N=200)

Variable	Conventional (n=77)		Virtual (n=123)		t(198)	p	95% CI		Cohen's d
	M	SD	M	SD			LL	UL	
Academic procrastination	52.01	10.95	58.16	13.02	−3.58	.00	−9.66	−2.63	.51
Academic performance	3.15	.32	3.21	.27	−1.29	.19	−.14	.02	.20

Note: M=mean, SD=Standard Deviation, CI=Confidence Interval, LL=Lower Limit, UL=Upper Limit.

Assuming that working students may differ in their level of academic procrastination and academic performance from nonworking students, an independent sample t-test was run to assess differences between employed and unemployed students (Table 8). There were significant differences in academic procrastination, with employed students showing more procrastination (M = 59.02, SD = 12.14) than unemployed, full-time students (M = 52.88, SD = 12.35). However, there were no significant differences in academic performance between employed and unemployed students.

DISCUSSION

Academic performance is a crucial indicator of an institute's success and education excellence. However, this performance can be significantly impacted by various internal and external factors. One of the key factors that has been a cause of concern over the years is academic procrastination (Pychyl & Flett, 2012). To address this issue, this research aims to investigate the relationship between academic procrastination and academic performance. The first hypothesis put forward is that there is a negative correlation between these variables, and the correlation coefficients validate this assumption. The results reveal a significant negative relationship between the two variables, with academic procrastination being a negative predictor of academic performance. The existing literature also supports this relationship. Bashir and Gupta (2018) confirmed the existence of a negative relationship between both variables in university students. Asikhia (2010) and Steel and Klingsieck (2016) reported that it was a major obstacle in the progress and academic achievement of students. Procrastination has a negative association with the performance of students and results in lower grades and less effective learning in the field of education (Akinsola et al., 2007; Aremu et al., 2011; Balkis, 2013; Fernie et al., 2017; Goroshit, 2018; Grunschel et al., 2016; Hayat et al., 2020; Hen & Goroshit, 2018; Karmen et al., 2015; Kim & Seo, 2015; Lakshminarayan et al., 2013; Lee, 2005; Okoye & Onokpaunu, 2020; Roghani et al., 2015; van Eerde, 2003; You, 2015). Kljajic and Gaudreau (2018) also reported academic procrastination to be negatively related to the student's learning. The findings of these studies showed that academic procrastination may badly impact the grades of the students, their performance, and their achievement, as well as other aspects of their academic and personal lives.

Table 8.
Independent Samples t-test Comparing Study Variables in Employed and Unemployed University Students (N=200)

Variable	Unemployed (n=105)		Employed (n=95)		t(198)	p	95% CI		Cohen's d
	M	SD	M	SD			LL	UL	
Academic procrastination	52.88	12.35	59.02	12.14	−3.54	.00	−9.56	−2.72	.50
Academic performance	3.19	.30	3.19	.29	.10	.91	−.07	.08	0

Note: M=mean, SD=Standard Deviation, CI=Confidence Interval, LL=Lower Limit, UL=Upper Limit.

In addition, the outcomes of our study supported the notion that certain characteristics of learners may contribute to academic procrastination and affect their academic performance. The results of the regression analysis indicated that the gender of the participants negatively predicted academic procrastination, whereas living status (rural/urban), level of education (undergraduate/graduate), and job status (employed/unemployed) had a positive correlation with academic procrastination. Furthermore, when we examined the predictors of academic performance, we found that level of education and mode of education had a positive relationship with academic performance. Comparing male and female students, we found that male students had higher levels of academic procrastination than female students. These findings align with the research conducted by Hayat et al. (2020). Although few studies have reported no gender differences (Watson, 2001), some reported that women procrastinate more (Solomon & Rothblum, 1984), while other findings were in line with the current findings, such as Özeret al. (2009) and Kim et al. (2017), who confirmed more procrastination in males. Although the study confirmed differences in procrastination, no significant gender differences were found in academic performance. Some studies have reported that females have higher academic performance (e.g., Kusnierz et al., 2020), while Trick et al. (1988) reported that men perform better academically. However, few studies have found no significant differences, such as Faisal et al.'s (2017) comparison of medical students, which found no significant differences between male and female academic performance. Similarly, Abubakar & Bada (2012) found insignificant differences in college students. Other studies conducted in the West Indies (Mlambo, 2011), Kenya (Kangahi et al., 2012), and Nigeria (Raheem, 2012) also reported insignificant results.

We also examined the differences in level of education, mode of education, and living status. Moreover, we found that education level (undergraduate/graduate) had a positive correlation with academic performance. However, we did not observe significant differences between undergraduate and graduate students for procrastination, although graduate students showed higher academic performance than undergraduate students. One possible reason for this could be that undergraduate students usually come from colleges with annual systems (where they take classes throughout the year and attempt their exams after one year rather with a gap of six months as observed in the semester system), which may make it difficult for them to adjust to university environments, semester systems, and higher-level concepts. In contrast, graduate students have already been through these stages and may struggle more to achieve good grades. However, there is limited literature to support these differences. The mode of education (conventional/online) significantly predicted both academic procrastination and performance. Additionally, online learners displayed more academic procrastination. Studies by Hooshyar et al. (2020) and Azevedo et al. (2004) reported that due to procrastination and insufficient time, online learners experience more failures and sometimes even drop their courses. Rakes and Dunn (2010) highlighted that procrastination is higher in distance learning students and they are required to have more self-regulation than conventional students. Although there is a significant amount of research on procrastination in distance learners, the difference between traditional and virtual learners is often overlooked. Therefore, the findings of this study can be used to initiate future research, as this difference needs to be explored more extensively in various cultures. One of the reasons why distance/online learners procrastinate more is that they must manage most of their activities in isolation, which requires them to be more self-regulated. As a result, the lack of self-regulation and no direct access to instructors can contribute more to procrastination (Ucar et al., 2021).

Another reason that could cause students to procrastinate more is their living situation and employment status. Many of the students in our sample come from rural areas where they have limited resources to complete their tasks on time, and many of them also have to work to make ends meet. Therefore, the lack of resources and the conflict between work and education can significantly contribute to procrastination, as demonstrated in this study. Employed students and those from rural areas showed more academic procrastination, supporting this claim. The results are consistent with previous literature. Manichander (2019) reported that urban students score high on a few dimensions of academic procrastination, such as time management, sincerity, and personal initiative, compared to rural students. The study by Haider et al. (2022) also supports the finding that learners belonging to rural areas have high levels of procrastination. The job status of the students also creates conflict between managing their university-related and job-related tasks. Mortensen (2022) also supports the idea that students can easily be distracted by their part-time jobs, which can result in procrastination. Huus (2015) reported that adult students have more responsibilities to fulfill, often working full time or part time, and therefore, students with no job are better prepared for lectures than those who have a job.

STRENGTHS, LIMITATIONS, AND SUGGESTIONS

The current study has contributed to defining the nature of the relationship between academic procrastination and performance, which has been inconsistent in previous literature. Our findings show a negative relationship between these variables and emphasize the role of learners' characteristics, which have been overlooked by previous researchers. Specifically, the comparison between traditional and online learners, and employed versus unemployed students, has been overlooked in the literature, and the role of learners' locality has been the least explored. Thus, our significant findings can open new horizons for future researchers to explore these characteristics under different circumstances. Like other research, this study is not without limitations, but future research can overcome them. The sample in this research was limited as only 200 participants responded to the questionnaire. Future research can be carried out on a larger sample. Moreover, the sample based on the mode of learning was inconsistent, therefore, more conventional, and online learners are needed in future studies. The data for this study were collected online due to COVID-19 restrictions; therefore, there may be response biases. Face-to-face data collection and in-depth interviews are necessary to explore these factors in more detail. Academic performance is measured mostly through the CGPA of the students so there is a need to develop a relevant scale covering all aspects of performance. There is a need to distinguish the factors of procrastination in conventional and virtual students as each of them studies in entirely different modes and the factors can also be different. Future researchers can split data of conventional and virtual learners while doing analysis and explore all characteristics of the learners separately (e.g., whether working or nonworking virtual or conventional students procrastinate more). Online learning requires students to have stronger self-regulation skills, which is why it is important to investigate the moderating role of self-regulation in the relationship between academic procrastination and performance. Additionally, we should also examine the impact of learning motivation and learning self-efficacy on the study variables. Regardless of limitations, the findings of the study are helpful for future researchers to explore this phenomenon in-depth and for instructors to plan interventions to help students to overcome this problem and enhance their performance. Instructors are required to play a more active role to understand these factors and there should be a proper channel of feedback so any students facing procrastination and low grades can be guided towards success.

References

Abubakar, R. B., & Bada., A. I. (2012). Age and gender as determinants of academic achievements in college mathematics. Asian Journal of Natural and Applied Sciences, 1(2), 121–127.

Akinsola, M. K., Tella, A., & Tella, A. (2007). Correlates of academic procrastination and mathematics achievement of university undergraduate students. Eurasia Journal of Mathematics, Science and Technology Education, 3(4), 363–370. https://doi.org/10.12973/ejmste/75415

Aremu, A. O., Williams, T. M., & Adesina, F. T. (2011). Influence of academic procrastination and personality types on academic achievement and efficacy of in-school adolescents in Ibadan. IFE PsychologIA, 19(1), 93–113. http://dx.doi.org/10.4314/ifep.v19i1.64591

Asikhia, O. A. (2010). Students and teachers' perception of the causes of poor academic performance in Ogun State secondary schools [Nigeria]: Implications for counseling for national development. European Journal of Social Sciences, 13(2), 229–242.

Azevedo, R., Cromley, J. G., & Seibert, D. (2004). Does adaptive scaffolding facilitate students' ability to regulate their learning with hypermedia? Contemporary Educational Psychology, 29(3), 344–370. https://doi.org/10.1016/j.cedpsych.2003.09.002

Balkis, M. (2013). Academic procrastination, academic life satisfaction and academic achievement: The mediation role of rational beliefs about studying. Journal of Cognitive and Behavioral Psychotherapies, 13(1), 57–74.

Balkis, M., & Duru, E. (2009). Prevalence of academic procrastination behavior among pre-service teachers, and its relationship with demographics and individual preferences. Journal of Theory & Practice in Education (JTPE), 5(1), 18–32.

Bashir, L., & Gupta, S. (2018). A deeper look into the relationship between academic procrastination and academic performance among university students. Research Guru: Online Journal of Multidisciplinary Subjects, 12(3), 531–540. https://www.researchguru.net/volume/Volume%2012/Issue%203/RG69.pdf

Brinthaupt, T. M., & Shin, C. M. (2001). The relationship of academic cramming to flow experience. College Student Journal, 35(3), 457–471.

Cerezo, R., Esteban, M., Sánchez-Santillán, M., & Nunez, J. C. (2017). Procrastinating behavior in computer-based learning environments to predict performance: A case study in Moodle. Frontiers in Psychology, 8, 1403. https://doi.org/10.3389/fpsyg.2017.01403

Dumitrescu, A. L., Dogaru, B. C., Dogaru, C. D., & Manolescu, B. (2011). The relationship between self-reported oral health, self-regulation, proactive coping, procrastination, and proactive attitude. Community Dental Health, 28(2), 170–173.

Faisal, R., Shinwari, L., & Hussain, S. S. (2017). Academic performance of male in comparison with female undergraduate medical students in pharmacology examinations Journal of the Pakistan Medical Association, 67(2), 204–208.

Fernie, B. A., Bharucha, Z., Nikčević, A. V., Marino, C., & Spada, M. M. (2017). A metacognitive model of procrastination. Journal of Affective Disorders, 210, 196–203. https://doi.org/10.1016/j.jad.2016.12.042

Galusha, J. M. (1998). Barriers to learning in distance education (ED416377). ERIC. https://files.eric.ed.gov/fulltext/ED416377.pdf

Goroshit, M. (2018). Academic procrastination and academic performance: An initial basis for intervention. Journal of Prevention & Intervention in the Community, 46(2), 131–142. https://doi.org/10.1080/10852352.2016.1198157

Grunschel, C., Schwinger, M., Steinmayr, R., & Fries, S. (2016). Effects of using motivational regulation strategies on students' academic procrastination, academic performance, and well-being. Learning and Individual Differences, 49, 162–170. https://doi.org/10.1016/j.lindif.2016.06.008

Haider, A., Najam, S., Sherazi, S. N., & Akmal, T. (2022). Self-regulated learning and academic procrastination among young adult e-learners: moderating role of gender. ASEAN Journal of Psychiatry, 23(3).

Hayat, A. A., Jahanian, M., Bazrafcan, L., & Shokrpour, N. (2020). Prevalence of academic procrastination among medical students and its relationship with their academic achievement. Shiraz E-Medical Journal, 21(7). https://doi.org/10.5812/semj.96049

Hen, M., & Goroshit, M. (2018). Prevention and intervention for academic procrastination in academic communities. Journal of Prevention & Intervention in the Community, 46(2), 113–116. https://doi.org/10.1080/10852352.2016.1198149

Hooshyar, D., Pedaste, M., Saks, K., Leijen, A., Bardone, E., & Wang, M. (2020). Open learner models in supporting self-regulated learning in higher education: a systematic literature review. Computers & Education 154, 103878. https://doi.org/10.1016/j.compedu.2020.103878

Huus, A. M. (2015). Academic procrastination: Present bias and lecture preparations [Master's Thesis, University of Oslo]. UiO DUO Research Archive. https://www.duo.uio.no/handle/10852/45877

Kangahi, M., Indoshi, F. C., Okwach, T. O., & Osodo, J. (2012). Gender and students academic achievement in Kiswahili language (in Kenya). Journal of Emerging Trends in Educational

Research and Policy Studies, 3, 716–720. https://repository.maseno.ac.ke/handle/123456789/3147

Karla Silva Soares, A., Lins de Holanda Coelho, G., Alves Freires, L., & Nunes da Fonseca, P. (2022). Psychometric properties of the academic procrastination scale (APS) in Brazil. Journal of Psychoeducational Assessment, 40(5), 634–648. https://doi.org/10.1177/07342829221079948

Karmen, D., Kinga, S., Edit, M., Susana, F., Kinga, K. J., & Reka, J. (2015). Associations between academic performance, academic attitudes, and procrastination in a sample of undergraduate students attending different educational forms. *Procedia—Social and Behavioral Sciences,* 187, 45–49. https://doi.org/10.1016/j.sbspro.2015.03.009

Kim, K. R., & Seo, E. H. (2015). The relationship between procrastination and academic performance: A meta-analysis. Personality and Individual Differences, 82, 26–33. https://doi.org/10.1016/j.paid.2015.02.038

Kim, S., Fernandez, S., & Terrier, L. (2017). Procrastination, personality traits, and academic performance: When active and passive procrastination tell a different story. Personality and Individual Differences, 108, 154–157. https://doi.org/10.1016/j.paid.2016.12.021

Kljajic, K., & Gaudreau, P. (2018). Does it matter if students procrastinate more in some courses than in others? A multilevel perspective on procrastination and academic achievement. Learning and Instruction, 58, 193–200. https://doi.org/10.1016/j.learninstruc.2018.06.005

Kuśnierz, C., Rogowska, A. M., & Pavlova, I. (2020). Examining gender differences, personality traits, academic performance, and motivation in Ukrainian and Polish students of physical education: A cross-cultural study. International Journal of Environmental Research and Public Health, 17(16), 5729. https://doi.org/10.3390/ijerph17165729

Lakshminarayan, N., Potdar, S., & Reddy, S. G. (2013). Relationship between procrastination and academic performance among a group of undergraduate dental students in India. Journal of Dental Education, 77(4), 524–528. https://doi.org/10.1002/j.0022-0337.2013.77.4.tb05499.x

Lee, E. (2005). The relationship of motivation and flow experience to academic procrastination in university students. The Journal of Genetic Psychology. 166(1), 5–14https://doi.org/10.3200/GNTP.166.1.5-15

Manichander, T. (2019). An investigation of academic procrastination of graduate students. Research Tracks, 6(2), 10–13. https://www.ycjournal.net/ResearchTracks/ResearchPapers.aspx

McCloskey J. D. (2011). Finally, my thesis on academic procrastination [Unpublished master's thesis]. The University of Texas at Arlington.

Mlambo, V. (2011). An analysis of some factors affecting student academic performance in an introductory biochemistry course at the University of the West Indies. Caribbean Teaching Scholar, 1(2), 79–92. https://journals.sta.uwi.edu/ojs/index.php/cts/article/view/10

Mohammadi, H. (2015). An appropriate policy to achieve sustainable development in Iran. Work and Society Journal, 189, 39–50.

Mortensen, S. (2022). Academic procrastination in college students [Senior honors thesis, Liberty University]. Scholars Crossing. https://digitalcommons.liberty.edu/honors/1165

O'Brien, W. K. (2002). Applying the transtheoretical model to academic procrastination [Doctoral dissertation, University of Houston]. Dissertation Abstracts International: Section B: The Sciences and Engineering, 62(11-B), 5359.

Okoye, K. R. E., & Onokpaunu, M. O. (2020). Relationship between self-esteem, academic procrastination and test anxiety with academic achievement of Post Graduate Diploma in Education (PGDE) students in Delta State University, Abraka. International Scholars Journal of Arts and Social Science Research. https://ssrn.com/abstract=3542761

Özer, B. U. (2011). A cross sectional study on procrastination: Who procrastinate more. In International Conference on Education Research and Innovation, (vol. 18) 2011, (pp. 34–37). IACSIT Press.

Özer, B. U., Demir, A., & Ferrari, J. R. (2009). Exploring academic procrastination among Turkish students: Possible gender differences in prevalence and reasons. *Journal of Social Psychology,* 149(2), 241–257. https://doi.org/10.3200/SOCP.149.2.241-257.

Patrzek J., Sattler, S., van Veen, F., Grunschel, C., & Fries S. (2015). Investigating the effect of academic procrastination on the frequency and variety of academic misconduct: A panel study. Studies in Higher Education, 40(6), 1014–1029. https://doi.org/10.1080/03075079.2013.854765

Pollock, N., & Cornford, J. (2002). The theory and practice of the virtual university: Working through the work of making work mobile. Minerva 40, 359–373. https://doi.org/10.1023/A:1020977705523

Pychyl, T. A., & Flett, G. L. (2012). Procrastination and self-regulatory failure: An Introduction to the special issue. Journal of Rational-Emotive & Cognitive-Behavior Therapy, 30(4), 203–212. https://doi.org/10.1007/s10942-012-0149-5

Raheem, B. A. (2012). The influence of gender on secondary school students' academic performance in South-West, Nigeria. Journal of Social Sciences, 31(1), 93–98. https://doi.org/10.1080/09718923.2012.11893018

Rakes, G. C., & Dunn, K. E. (2010). The impact of online graduate students' motivation and self-regulation on academic procrastination. Journal of Interactive Online Learning, 9(1), 78–93. https://www.ncolr.org/jiol/issues/pdf/9.1.5.pdf

Rodarte-Luna, B., & Sherry, A. (2008). Sex differences in the relation between statistics anxiety and cognitive/learning strategies. Contemporary Educational Psychology, 33(2), 327–344. https://doi.org/10.1016/j.cedpsych.2007.03.002

Roghani, L., Aghahoseini, T., & Yazdani, F. (2015). The relationship between the academic procrastination and the academic self-efficacy for academic achievements in female high school students in Isfahan in the 2013-2014 academic year. Journal of Management Sciences, 1(12), 385–390.

Schraw, G., Wadkins, T., & Olafson, L. (2007). Doing the things we do: A grounded theory of academic procrastination. Journal of Educational Psychology, 99(1), 12–25. https://doi.org/10.1037/0022-0663.99.1.12

Seo, E. H. (2011). The relationships among procrastination, flow, and academic achievement. Social Behavior and Personality: An International Journal, 39(2), 209–217. https://doi.org/10.2224/sbp.2011.39.2.209

Sheets, M. F. (1992). Characteristics of adult education students and factors which determine course completion: A review. New Horizons in Adult Education and Human Resource Development, 6(1), 3–18. https://doi.org/10.1002/nha3.10034

Solomon, L. J., & Rothblum, E. D. (1984). Academic procrastination: Frequency and cognitive behavioral correlates. Journal of Counseling Psychology, 31(4), 503–509. https://doi.org/10.1037/0022-0167.31.4.503

Srinivasan, S., Ramos, J. A. L., & Muhammad, N. (2021). A flexible future education model—Strategies drawn from teaching during the covid-19 pandemic. Education Sciences, 11(9), 557. https://doi.org/10.3390/educsci11090557

Steel, P. (2007). The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure. Psychological Bulletin, 133(1), 65–94. https://doi.org/10.1037/0033-2909.133.1.65

Steel, P., & Klingsieck, K. B. (2016). Academic procrastination: Psychological antecedents revisited. Australian Psychologist, 51(1), 36–46. https://doi.org/10.1111/ap.12173

Stoliarchuk, O., Khrypko, S., Olga, D., Ishchuk, O., Kokhanova, O., Sorokina, O., & Salata, K. (2022). Academic procrastination as a challenge for students' mental health in the context of distance learning and the virtual world during the Covid-19 pandemic. International Journal of Computer Science and Network Security, 22(3), 276–282. https://doi.org/10.22937/IJCSNS.2022.22.3.36

Stoter, J., Bullen, M., Zawacki-Richter, O., & von Prummer, C. (2014). From the back door into the mainstream—The characteristics of lifelong learners. In O. Zawacki-Richter & T. Anderson (Eds.), Online distance education—Towards a research agenda (pp. 421–457). Athabasca University Press.

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. Research in Science Education, 48, 1273–1296. https://doi.org/10.1007/s11165-016-9602-2

Trick, L. R., Davis, S., Wolf, B. B., & Hirata, M. (1988). A comparison of academic performance of female and male optometry students at the University of Missouri-St. Louis. Journal of the American Optometric Association, 59(2), 89–92.

Ucar, H., Bozkurt, A., & Zawacki-Richter, O. (2021). Academic procrastination and performance in distance education: A causal-comparative study in an online learning environment. Turkish Online Journal of Distance Education, 22(4), Article 2.

van Eerde, W. (2003). A meta-analytically derived nomological network of procrastination. Personality and Individual Differences, 35(6), 1401–1418. http://doi.org/10.1016/S0191-8869(02)00358-6

Washington, J. A. (2004). The relationship between procrastination and depression among graduate and professional students across academic programs: Implications for counseling (Publication no. 3155848) [Doctoral dissertation, Texas Southern University]. ProQuest Dissertations Publishing.

Watson, D. C. (2001). Procrastination and the five-factor model: A facet level analysis. *Personality and Individual Differences,* 30(1), 149–158. https://doi.org/10.1016/S0191-8869(00)00019-2

Wood, H. (1995). Designing study materials for distance students. In P. Donnan & A. McDonald, (Eds.), Occasional Papers in Open and Distance Learning, Number 17(pp. 25–32). Charles Sturt University. https://files.eric.ed.gov/fulltext/ED385222.pdf

Xu, J., & Rees, T. (2016). Distance learning course design expectations in China and the United Kingdom. American Journal of Distance Education, 30(4), 250-263. https://doi.org/10.1080/08923647.2016.1235395

You, J. W. (2015). Examining the effect of academic procrastination on achievement using LMS data in e-learning. Educational Technology & Society, 18(3), 64–74. https://www.jstor.org/stable/jeductechsoci.18.3.64