D. Raja Jebasingh, Naved Ahmad*, Somipam R. Shimray and A. Subaveerapandiyan*

Perceived Impact of Procrastination on Academic Performance Among Students and the Role of AI Tools

Abstract: This study investigates the perceived impact of procrastination on academic performance among undergraduate BBA students and evaluates the effectiveness of AI tools in mitigating procrastination. A structured questionnaire was administered to 202 respondents from St. Joseph's College of Commerce (Autonomous), Bengaluru. Results indicate that procrastination is prevalent, with assignments (58.9 %) and research tasks (53 %) being the most frequently delayed. The primary causes of procrastination include lack of motivation (54 %), distractions (47 %), and overwhelming workload (31.2 %). AI tools such as ChatGPT and Grammarly were widely used, with factor analysis identifying two key dimensions of AI effectiveness: Reduce Distractions and Task Completion. While no significant gender-based differences were observed, older students perceived AI tools as more effective in enhancing task management ($p = 0.041$). Simplified task breakdowns, task prioritization, and AI-generated summaries were identified as the most beneficial AI features. The study highlights the need for increased integration of AI tools into academic workflows, along with structured guidelines and digital literacy programs to maximize their perceived impact on reducing procrastination and enhancing academic performance.

1 Introduction

Procrastination, the habitual delay of academic tasks despite knowing the negative consequences, is a common challenge among university students. It affects time management, task completion, and academic performance, leading to increased stress and reduced productivity (Steel and Klingsieck 2016). Procrastination, the tendency to delay or defer tasks despite knowing the negative consequences, is a pervasive issue among university students, especially those pursuing Bachelor of Business Administration (BBA) programs. These students often face multiple academic, extracurricular, and personal commitments, making them more prone to procrastination (Rosário et al. 2009). This behavior, negatively perceived, impacts academic performance, increases stress levels, and contributes to missed opportunities for skill development and professional growth. Studies indicate that a significant proportion of students frequently postpone essential academic tasks such as assignments, research, and exam preparation, ultimately leading to poor academic outcomes and decreased overall productivity.

1.1 Need for the Study

With the increasing adoption of Artificial Intelligence (AI) tools designed to enhance productivity, time management, and learning efficiency, there is a growing interest in evaluating their effectiveness in addressing procrastination. AI-powered tools such as task management systems, writing assistants, and virtual learning aids offer structured task management, deadline reminders, and personalized feedback, potentially mitigating procrastination by improving focus and enhancing task completion. However, despite the widespread use of AI applications in education, their actual perceived impact on reducing procrastination among students remains underexplored. Understanding the relationship between AI tool

*Corresponding authors: Naved Ahmad, Department of Computer Science and Information Systems, College of Applied Sciences, AlMaarefa University, P.O. Box 71666, Riyadh 13713, Saudi Arabia, E-mail: nahmad@um.edu.sa. https://orcid.org/0000-0002-4932-401X; and
A. Subaveerapandiyan, Vinayaka Mission's Research Foundation (Deemed to be University), Salem 636308, Tamil Nadu, India, E-mail: subaveerapandiyan@gmail.com. https://orcid.org/0000-0002-2149-9897
D. Raja Jebasingh, Department of Commerce and Management, St. Joseph's College of Commerce (Autonomous), Bengaluru 560025, Karnataka, India, E-mail: rajajebasingh@sjcc.edu.in. https://orcid.org/0000-0001-6765-7478
Somipam R. Shimray, Department of Library and Information Science, Babasaheb Bhimrao Ambedkar University (A Central University), Lucknow, India, E-mail: srshimray@yahoo.com. https://orcid.org/0000-0001-7967-489X

adoption and its effectiveness in overcoming procrastination is essential for promoting academic productivity and fostering responsible AI use in higher education.

1.2 Scope of the Study

This study focuses exclusively on undergraduate BBA students from St. Joseph's College of Commerce (Autonomous), Bengaluru, examining their procrastination patterns, the perceived impact of procrastination on academic outcomes, and their awareness and adoption of AI tools. The study further evaluates the perceived effectiveness of AI tools in minimizing distractions, improving time management, and enhancing task completion. A structured questionnaire was used to collect data from 202 valid responses, and advanced analytical techniques, including factor analysis, t-tests and ANOVA, were employed to assess the effectiveness of AI tools and identify demographic differences.

1.3 Problem Statement

Despite the availability of various AI tools that facilitate academic task management, procrastination continues to be a prevalent concern among students. Although students are aware of AI-powered solutions, there is a lack of empirical evidence on how effectively these tools address procrastination and improve academic performance. Moreover, the specific features of AI tools that students find most useful in overcoming procrastination remain unclear. This study seeks to bridge this gap by providing empirical insights into the perceived impact of AI tools on procrastination reduction and identifying the most beneficial AI features that contribute to enhanced academic outcomes.

1.4 Objectives of the Study

The study aims to achieve the following objectives:
– To examine the prevalence and patterns of procrastination among BBA students and identify the most commonly postponed academic tasks
– To explore the primary reasons behind academic procrastination, including psychological, environmental, and workload-related factors
– To assess the perceived impact of procrastination on key academic performance areas, such as GPA, assignment quality, time management, and group collaboration

– To evaluate the awareness and usage of AI tools among BBA students in managing procrastination and enhancing academic efficiency
– To analyze the perceived effectiveness of AI-powered tools in reducing procrastination and improving task management, time management, and academic outcomes
– To identify the most beneficial AI features that assist students in overcoming procrastination and suggest practical ways to integrate AI tools into academic workflows

1.5 Significance of the Study

This study is significant for educators, policymakers, and technology developers in higher education as it highlights the potential of AI tools to address procrastination and improve academic outcomes. The findings provide actionable insights into students' perceptions of AI tool effectiveness, enabling the development of targeted intervention strategies to promote responsible AI adoption. Additionally, identifying the most beneficial AI features empowers institutions to design AI-driven educational environments that foster self-regulated learning and academic success.

2 Review of Literature

2.1 Understanding Procrastination in Academic Settings

The word "procrastination" consists of two components: "Pro," which signifies forward, ahead, or in favor of, and "Crastinus," which refers to tomorrow or the time leading up to tomorrow (Steel 2007). This term originates from the Latin word "Procrastinare," which encompasses meanings such as "to swallow," "to delay," "to pull," "to pause," "to cease movement," or "to defer a task" (Rosário et al. 2009). This term has been identified as a detrimental habit and a behavioral issue that numerous adults encounter in their everyday professional activities (Janssen and Carton 1999). Curtis (2017) defined procrastination as an act of deferring or putting off tasks, and it is a widespread human behavior that may result in missed deadlines, heightened stress, and a sense of inadequacy. Procrastination, whether considered a sporadic behavior or a persistent tendency, is a prevalent manifestation of self-regulation failure associated with adverse consequences (Sirois 2023). Procrastination is the tendency to delay or postpone activities, despite potential negative consequences, and is a common issue among

college students, with 80 %–95 % admitting to it. Factors influencing this tendency include personal characteristics, cognitive and emotional aspects, and contextual factors. Studies show that 80 %–95 % of college students experience procrastination to some extent (Jayalakshmi and Punithavalli 2024). It involves the awareness of the necessity to complete a task, yet the lack of motivation to do so within a specified timeframe. Individuals who procrastinate tend to possess a less defined sense of identity compared to those who initiate and finish tasks on time.

Research on procrastination reveals that several classifications have been suggested. Researchers categorize procrastination into two types: personal procrastination and social procrastination. Personal procrastination refers to situations where an individual delays personal commitments, impacting only themselves. On the other hand, social procrastination involves delays that inconvenience others, such as failing to complete group assignments on time or arriving late to meetings (Knaus 2000). Procrastination encompasses behavioral, emotional, and cognitive elements, which contribute to the development of different types of procrastination (Solomon and Rothblum 1984). Milgram et al. (1998) argue that the categorization and differentiation of procrastination types are inherently subjective, with significant overlap among these cases. He suggests that the classification of procrastination types serves primarily to facilitate understanding, emphasizing its subjective nature. It is conceivable that individuals may exhibit all forms of procrastination. The variations in cognitive, emotional, and behavioral elements contribute to the emergence of the concept of different types of procrastination. Golestani Bakht and Shokri (2013) stated that procrastination presents in various forms due to its intricate nature, which encompasses cognitive, emotional, and behavioral elements. These forms include general procrastination, decision-making procrastination, neurotic procrastination, obsessive procrastination, and academic procrastination.

The Temporal Motivation Theory (TMT) is likely the most significant theory that seeks to elucidate the phenomenon of procrastination, highlighting how the perception of time influences the distribution of attention and effort toward specific tasks (Steel and König 2006). Individuals often postpone tasks in an effort to minimize reflection and exert less energy on assignments (Zhang et al. 2019). This procrastination serves to evade feelings of anxiety and defers work until it becomes unavoidable (Netzer Turgeman and Pollak 2023). Temporal motivation theory serves as a comprehensive framework for understanding motivation by combining elements of expectancy theory and hyperbolic discounting, derived from behavioral decision theory, with need theory and prospect theory (Hodgkinson and Healey

2008). This theory posits that the driving force behind the motivation to accomplish a task can be fundamentally expressed through the following equation:

$$\text{Motivation} = \frac{\text{Expectancy} \times \text{Value}}{1 + \text{Impulsiveness} \times \text{Delay}}$$

According to expectancy theory, motivation is heightened when individuals believe they can achieve a desired reward or outcome. Conversely, behavioral decision theory and need theory suggest that motivation diminishes when there is a significant delay before the reward is received and when individuals exhibit sensitivity to such delays. To avoid the equation approaching infinity as the delay approaches zero, a constant value of "1" is included.

2.2 Prevalence and Perceived Impact of Procrastination Among Students

Procrastination occurs when an individual exhibits passivity in fulfilling academic responsibilities, such as preparing for an exam. In the academic realm, procrastination is a widely recognized and frequently encountered issue. Students frequently postpone essential tasks and activities related to their learning and studying, even though they are aware that such delays will ultimately have negative consequences for their performance (Steel and Klingsieck 2016). Academic procrastination is often perceived as a widespread and enduring tendency among students to delay their academic tasks, typically accompanied by feelings of anxiety (Solomon and Rothblum 1984). Active and passive procrastination are terms used to characterize academic procrastination. Passive procrastination, the more common form, arises when individuals take a passive approach to task completion, often leading to negative emotions during the process. In contrast, active procrastination involves delaying tasks without adversely affecting a person's overall effectiveness (Chun Chu and Choi 2005). For certain students, academic procrastination may be linked to particular circumstances (state procrastination), whereas for others it may manifest as a consistent behavior or tendency (trait procrastination).

When examining various factors that influence students' achievement-related behaviors and overall well-being in higher education, procrastination appears to be the most significant contributor to negative outcomes for students (Schneider and Preckel 2017). Numerous cross-sectional studies indicate a positive correlation between procrastination and dissatisfaction with academic studies (Balkis and Duru 2016; Grunschel et al. 2016) and intention to withdraw from their university degree programs (Bäulke et al. 2022).

Research indicates that nearly all students experience procrastination occasionally, with 75 % identifying themselves as habitual procrastinators. Nearly 50 % of these chronic procrastinators experience procrastination as a significant and ongoing issue (Steel 2007). Solomon and Rothblum (1984) conducted a study involving 291 college students to examine how often they procrastinate on academic responsibilities, including studying for exams, managing assignments, and handling administrative duties, as well as the underlying reasons for their procrastination. To assess this behavior, the researchers utilized the Procrastination Assessment Scale-Students (PASS) and self-paced quizzes. Their findings indicated that the primary factors contributing to procrastination were the fear of failure and the aversion to tasks (Park and Sperling 2012).

Procrastination hinders productive studying (Bäulke and Dresel 2023) and results in negative outcomes, including diminished academic achievement (Kim and Seo 2015), reduced well-being (Steel 2007), and elevated stress levels (Tice and Baumeister 1997). Students often choose to participate in non-academic activities, such as sleeping, binge-watching series, or playing video games, rather than concentrating on their studies (Pychyl et al. 2000). Due to the adverse effects associated with this behavior, procrastination has attracted significant academic attention over the past few decades (Patrzek et al. 2015), leading to extensive research on its consequences (Steel 2007).

Research indicates that procrastination is inversely related to grade point average. This behavior can adversely affect a student's life, particularly as they encounter numerous exams, time-sensitive academic tasks, assignments, and projects throughout their medical career (Park and Sperling 2012). If not addressed properly, procrastination has been demonstrated through various studies and real-life instances to diminish self-confidence, foster a negative outlook on learning, and contribute to feelings of depression and anxiety. It can also lead to unhealthy and self-destructive behaviors, including poor eating habits and sleep deprivation. Consequently, it is crucial to assess the extent of procrastination among students to develop effective strategies for addressing and mitigating this problem.

2.3 Causes of Academic Procrastination

One of the most prevalent forms of procrastination is academic procrastination, which involves postponing tasks or activities associated with learning and studying (Chun Chu and Choi 2005). Academic procrastination refers to the inclination to postpone or delay engaging in learning activities and related behaviors (Schraw et al. 2007). Academic procrastination is prevalent across all educational stages. Studies indicate that it is particularly widespread among undergraduate university students, with some research revealing that over 70 percent of college students frequently engage in procrastination (Schraw et al. 2007).

The reported prevalence of academic procrastination in China ranges from 4 to 19 percent (Lowinger et al. 2014), whereas in the United States, it varies between 7 and 46 percent (Solomon and Rothblum 1984). Lowinger et al. (2014) noted that research on Asian populations indicated a lower incidence of procrastination, potentially attributed to the shame associated with such behavior. However, contrasting findings have emerged in other studies. Academic procrastination can lead to heightened stress and anxiety as individuals rush to meet deadlines at the last minute. Furthermore, neglecting or deferring responsibilities can adversely affect a person's sense of well-being and may also impact their interactions with others.

Several factors contribute to procrastination. One facet of procrastination involves psychological perceptions regarding one's capacity to perform effectively under pressure, and it has been characterized as "sensation-seeking" in related research (Steel 2010). Individuals who experience academic procrastination tend to prefer working under pressure, whether they engage in this actively or passively. They possess a strong conviction in their capacity to perform effectively in high-pressure situations. This belief has also been highlighted in another research study, where Sokolowska (2009) noted the concept of academic self-image, which refers to the way individuals perceive themselves in an academic context. This self-perception influences students' beliefs regarding their own effectiveness or lack thereof. When students possess a strong belief in their effectiveness, they are more likely to engage in procrastination, which often leads to a last-minute rush before exams. This behavior is linked to their self-assurance in their capabilities and a favorable self-assessment. Schraw et al. (2007) demonstrated that individuals who procrastinate, as well as those who study on the night before an exam, encounter a greater level of difficulty when they defer their studying until the last minute. Conversely, findings from another study indicate that students who postpone their studying until the night of the exam tend to perform poorly in classroom activities (Steel 2007).

Research shows that procrastinators are easily distracted by enjoyable activities, prioritizing these over essential tasks. They may choose to sleep, watch TV, or engage in recreational activities instead. This distraction is exacerbated by students' perception of assignments and projects as tedious. Studies show that less enjoyment of a task increases the likelihood of procrastination and seeking

more stimulating alternatives (Steel 2007). Insufficient perseverance combined with significant distractions during assignment completion, along with inadequate planning abilities, have been recognized as contributors to procrastination (Steel and Klingsieck 2016). A key trait of individuals who procrastinate is their tendency to avoid engaging with essential responsibilities. They frequently substitute attention to particular tasks and activities with alternative behaviors and pursuits (Klassen et al. 2008).

Research on procrastination suggests that individuals who procrastinate struggle with self-regulation, particularly when experiencing high levels of stress (Klassen et al. 2008). Self-regulation encompasses the capacity to adjust and manage one's performance across various settings. Consequently, individuals who struggle with procrastination tend to overlook project deadlines, particularly when faced with stressful circumstances. According to Steel and Klingsieck (2016), all research identifies a deficiency in self-regulation as the fundamental cause of academic procrastination. Social influences can contribute to task avoidance and the evasion of responsibilities. According to Schraw et al. (2007) these behaviors represent two facets of procrastination. Typically, students, who are often in the transitional phase of late adolescence to early adulthood, ranging from eighteen to twenty-three years of age, experience this phenomenon. This period is characterized by a quest for social acceptance and personal independence. Students frequently strive to balance their time between academic obligations and social interactions with friends and family. The emergence of newfound independence and a sense of autonomy can lead university students to prioritize socializing or leisure activities over meeting academic deadlines. Consequently, social factors play a significant role in both indicating and intensifying procrastination.

Time management refers to the skill of intentionally regulating activities and behaviors to optimize the use of available time. Individuals who struggle with procrastination often find it challenging to manage their time effectively, leading to a significant gap between their actual perceptions and their perceived behaviors. This issue of time management has been identified as a contributing factor to academic procrastination (Solomon and Rothblum 1984). Time management skills are not innate qualities; rather, they are acquired traits. Effective time management plays a crucial role in addressing procrastination within the academic setting. To achieve success in their studies, students must complete their assignments punctually and adhere to deadlines. Failing to manage time effectively can result in forgetting tasks, engaging in aimless studying until the last minute, or prioritizing less important activities over academic responsibilities. Consequently, ineffective time management can be identified

as a characteristic of individuals who struggle with academic procrastination (Sokolowska 2009).

2.4 AI Tools and Their Effectiveness in Reducing Procrastination

Procrastination is a prevalent challenge faced by university students, often leading to delayed task completion, increased stress, and reduced academic performance. Recent advancements in artificial intelligence (AI) have introduced tools that effectively address procrastination by improving task management, enhancing time management, and providing personalized reminders. This section reviews studies that evaluate the effectiveness of AI-powered tools in reducing procrastination and fostering self-regulated learning.

AI-powered task management systems have proven effective in mitigating procrastination by offering structured task breakdowns, deadline management, and automated reminders. According to Haderer and Ciolacu (2022), AI-assisted task and time planning systems designed for mobile devices and smartwatches improve students' self-regulated learning by helping them manage deadlines and maintain consistent progress. These systems incorporate task prioritization, progress tracking, and automated scheduling, which significantly reduce the likelihood of procrastination.

AI-powered reminder systems have been shown to improve task completion rates by enhancing user accountability and reducing task avoidance. Morrison et al. (2024) explored the perceived impact of AI-powered reminder systems integrated with Microsoft Viva Daily Briefing Email and demonstrated that automated reminders about commitments and deadlines positively influenced task completion rates and reduced instances of forgotten tasks. AI reminders extracted tasks from natural language communications and displayed them in a recurring daily briefing, which helped users stay on track and complete assignments on time.

AI-powered scheduling assistants and chatbots have also demonstrated effectiveness in reducing procrastination by facilitating efficient scheduling and task management. Shih (2021) examined the design and implementation of a mobile-based AI scheduling assistant and found that these assistants improved task organization and reduced cognitive overload by automating meeting schedules and identifying optimal time slots for tasks. The chatbot provided real-time feedback and adaptive task suggestions, enabling users to maintain a structured workflow and avoid procrastination.

Integrating AI tools with peer motivation mechanisms has shown promise in reducing procrastination among

students. Duan et al. (2024) developed the Academic Anti-Procrastination Approach, which combined AI-powered personalized reminders with peer motivation to address academic procrastination. The study concluded that the combination of peer motivation and AI-generated reminders improved task adherence and helped students stay committed to their academic goals, thereby reducing the likelihood of procrastination.

AI tools that assist students in research and academic writing also play a role in minimizing procrastination by facilitating information retrieval, improving writing quality, and automating citation management. Ibrahim et al. (2025) highlighted the role of AI-based research tools in supporting final-year students with thesis completion. These tools provided writing assistance, research insights, and structured workflows, reducing the time spent on complex academic tasks and mitigating procrastination associated with research fatigue.

Ma and Chen (2024) examined the influence of AI-empowered applications on academic procrastination among EFL learners and found that AI-driven learning platforms significantly reduced procrastination by providing interactive and engaging content. AI applications, including chatbots and automated writing assistants, facilitated real-time feedback and adaptive learning, thereby improving engagement and reducing delays in task completion.

Mukhtar et al. (2025) investigated the perceived impact of AI dependence on procrastination among university students and found a positive correlation between over-reliance on AI and increased procrastination tendencies. While AI tools can aid in task management and organization, excessive dependence on these technologies may lead to reduced self-regulation and diminished intrinsic motivation, highlighting the need for a balanced approach to AI integration in academic settings.

2.5 Student Perceptions and Adoption of AI Tools

The widespread adoption of generative artificial intelligence (GenAI) tools such as ChatGPT, Grammarly, and QuillBot has transformed the academic landscape. These tools facilitate learning by assisting students in academic writing, providing personalized feedback, and aiding in research. However, student perceptions and adoption of these technologies are influenced by various factors, including perceived usefulness, ease of use, ethical concerns, and institutional policies. This section explores the adoption patterns, attitudes, and challenges associated with student use of AI tools in higher education.

Research utilizing the Unified Theory of Acceptance and Use of Technology (UTAUT) has identified key determinants of student adoption of AI tools, including performance expectancy, effort expectancy, and social influence. Yakubu et al. (2025) found that performance expectancy and social influence significantly influenced students' behavioral intentions to adopt generative AI tools, while factors such as perceived risk and attitude toward technology had negligible perceived impact. The study emphasized the need for institutional policies to promote ethical and informed AI adoption (Yakubu et al. 2025).

Similarly, Aldreabi et al. (2025) investigated the determinants of student adoption of generative AI tools and highlighted the role of effort expectancy and perceived usefulness. Their findings indicated that students were more likely to adopt AI tools when they perceived them as enhancing their academic performance and reducing cognitive workload. However, concerns about the accuracy of information and ethical implications moderated their intentions to adopt these technologies (Aldreabi et al. 2025).

Johnston et al. (2025) explored how students use AI tools for academic writing and found that 70 % of the participants relied on AI tools for generating definitions, structuring essay plans, and providing examples. ChatGPT emerged as the most frequently used tool, with 60 % of the students opting for it. However, the study revealed a gap in referencing behavior, as none of the participants properly cited AI tools in their work. This suggests a need for clearer institutional guidelines on the appropriate use of AI-generated content (Johnston et al. 2025).

Albayati (2024) investigated undergraduate students' perceptions of using ChatGPT as a regular assistance tool and highlighted concerns about privacy, security, and data misuse. The study employed the Technology Acceptance Model (TAM) and found that although students valued the efficiency of AI tools, they remained skeptical about the ethical implications of data privacy and security breaches (Albayati 2024). Chen et al. (2024) explored generative AI literacy among university students and identified a critical need for ethical guidance and digital literacy education. Despite frequent interaction with AI tools, students expressed uncertainty about the ethical boundaries of AI usage and emphasized the importance of explicit guidelines in course syllabi to promote responsible AI adoption (Chen et al. 2024).

Despite the numerous advantages offered by AI tools, challenges such as technical constraints, lack of clear policies, and ethical dilemmas hinder their widespread adoption. Verma et al. (2025) examined predictors of generative AI acceptance and found that technical limitations, ethical concerns, and misinformation acted as key barriers. The

study highlighted the importance of developing institutional frameworks that promote ethical and transparent AI adoption while addressing issues related to academic integrity (Verma et al. 2025).

Institutional policies play a crucial role in shaping student attitudes towards AI tools. Khlaif et al. (2024) highlighted the need for developing institutional policies that promote ethical AI integration in higher education. Their study emphasized the role of faculty members in guiding students on the responsible use of AI tools, stressing the importance of professional development programs to address ethical concerns and ensure equitable access to AI technologies (Khlaif et al. 2024).

Student perceptions and adoption of AI tools are influenced by a combination of perceived usefulness, effort expectancy, ethical considerations, and institutional policies. While AI tools offer numerous advantages in enhancing academic productivity, challenges related to ethical use, privacy concerns, and inconsistent institutional guidelines persist. To ensure responsible and equitable AI adoption, universities should develop clear policies, promote digital literacy, and encourage ethical engagement with AI technologies. Future research should focus on longitudinal studies to assess the long-term perceived impact of AI adoption on academic performance and ethical behavior.

2.6 Hypotheses Tested

The study tested the following hypotheses:
– H1: There is a statistically significant difference in the effectiveness of AI tools in reducing procrastination between male and female students.
– H2: There is a statistically significant difference in the effectiveness of AI tools in reducing procrastination across different age groups.
– H3: There is a statistically significant difference in the effectiveness of AI tools in reducing procrastination based on academic year.

3 Methodology

3.1 Research Design

This study employed a quantitative, descriptive, and analytical research design to explore the perceived impact of procrastination on academic performance and evaluate the effectiveness of AI tools in mitigating procrastination. A structured, self-developed questionnaire was administered to collect primary data. Descriptive statistics were used to summarize demographic data and procrastination patterns, while inferential statistics (t-tests, ANOVA, and factor analysis) were applied to test hypotheses related to AI tool effectiveness.

3.2 Population and Sampling

The study focused exclusively on undergraduate BBA students from St. Joseph's College of Commerce (Autonomous), Bengaluru. The inclusion criterion was limited to students enrolled in the BBA program, while students from other academic programs were excluded to maintain focus on the academic and behavioral patterns specific to business education. A convenience sampling method was employed due to its practicality and accessibility. Out of 250 distributed questionnaires, 212 were returned. After data cleaning, 202 valid responses were used for analysis, yielding a response rate of 80.8 %.

3.3 Research Instrument

The instrument used for data collection was a self-developed structured questionnaire, specifically designed for this study. It comprised four sections:

Section 1: General Information – demographic details (age, gender, academic year) and frequency of procrastination.

Section 2: Procrastination and Academic Performance – common academic tasks delayed and factors contributing to procrastination.

Section 3: Awareness and Use of AI Tools – awareness, adoption, and types of AI tools used to manage procrastination.

Section 4: Effectiveness of AI Tools – perceived effectiveness of AI tools in task management, time management, and reducing procrastination.

3.4 Validity and Reliability

The instrument underwent face and content validation through consultation with two subject matter experts in education and psychology. A pilot study with 20 BBA students was conducted to test clarity and appropriateness. Feedback was incorporated to refine the instrument. Cronbach's alpha values exceeded 0.70 for all key constructs, indicating good internal consistency and reliability.

3.5 Ethical Considerations

Ethical approval was obtained from the competent authority of St. Joseph's College of Commerce (Autonomous), Bengaluru. An informed consent form was provided to all participants outlining the study's purpose, voluntary nature, and confidentiality measures. No personal or sensitive data was collected. All responses were anonymized and used solely for academic purposes.

3.6 Data Analysis Techniques

The data was analyzed using IBM SPSS Statistics to ensure accuracy and rigor. The following techniques were applied:
–   Descriptive Statistics: Frequencies, percentages, means, and standard deviations were computed to summarize demographic data, procrastination habits, and AI tool awareness.
–   Factor Analysis: Principal Component Analysis (PCA) was used to identify underlying factors related to AI tool effectiveness. Sampling adequacy was confirmed using the Kaiser–Meyer–Olkin (KMO) test and Bartlett's Test of Sphericity.
– t-Test: An independent sample t-test was conducted to determine differences in the perceived effectiveness of AI tools between male and female respondents.
–   ANOVA (Analysis of Variance): One-way ANOVA was used to assess differences in the effectiveness of AI tools based on age groups and academic years.
–   Reliability Analysis: Cronbach's alpha was calculated to assess the internal consistency of the questionnaire items related to AI effectiveness and procrastination.

To enhance interpretability and support data analysis, visual representations were developed using Python 3.10 with the Matplotlib and Pandas libraries.

3.7 Factor Analysis Results

Factor analysis was conducted on ten items related to AI tools' effectiveness in reducing procrastination. The KMO value was 0.865, and Bartlett's Test of Sphericity was significant ($p < 0.001$), indicating the suitability of the data for factor analysis. Two main factors were identified:
–   Factor 1: Reduce Distractions – AI tools that minimize distractions, provide motivational prompts, and track progress on long-term tasks

–   Factor 2: Task Completion – AI tools that help manage assignments, prioritize tasks, and ensure timely completion

4 Results

Figure 1 presents the demographic profile of the 202 BBA student respondents. The sample comprised more female (63.9 %) than male (36.1 %) students, and the majority were aged 18–21 years (64.9 %), consistent with traditional undergraduate enrollment. Most respondents were in their first (41.1 %) or second year (43.6 %), reflecting a relatively early academic stage.

Procrastination was widespread: only 3 % reported never procrastinating, while 84.2 % admitted to sometimes, often, or always procrastinating, highlighting it as a common academic behavior. These patterns establish a relevant context for exploring AI tool usage and effectiveness, particularly among younger and early-year students who may be forming their academic habits.

Figure 2 highlights the academic activities most frequently postponed by students. The most commonly delayed tasks were assignments (77.7 %), research and reading (72.8 %), and test/exam preparation (63.4 %). These are core academic responsibilities, indicating that procrastination predominantly affects areas directly tied to academic outcomes.

Tasks involving collaboration or verbal performance, such as presentations (42.1 %) and group projects (34.7 %), were also frequently delayed. This suggests possible discomfort or anxiety related to peer interaction or public speaking. Less frequently delayed were lab work (13.4 %) and extracurriculars (11.4 %), likely due to their structured or less cognitively demanding nature.

These findings underscore that procrastination is most prevalent in tasks requiring sustained focus, cognitive effort, or self-direction – key dimensions relevant to the study's exploration of how AI tools might assist in these areas.

Figure 3 identifies the main reasons students procrastinate. The leading factor was lack of motivation (54 %), followed closely by distractions (47 %) and lack of interest in the task (36.6 %), suggesting that internal disengagement plays a significant role. Overwhelming workload (31.2 %) and poor time management (26.7 %) also featured prominently, indicating a combination of psychological and structural challenges.

Notably, over one-fifth of students cited fear of failure (22.3 %), perfectionism (22.3 %), and task-related anxiety (22.8 %), pointing to performance pressure as a critical influence. These findings align with Temporal Motivation
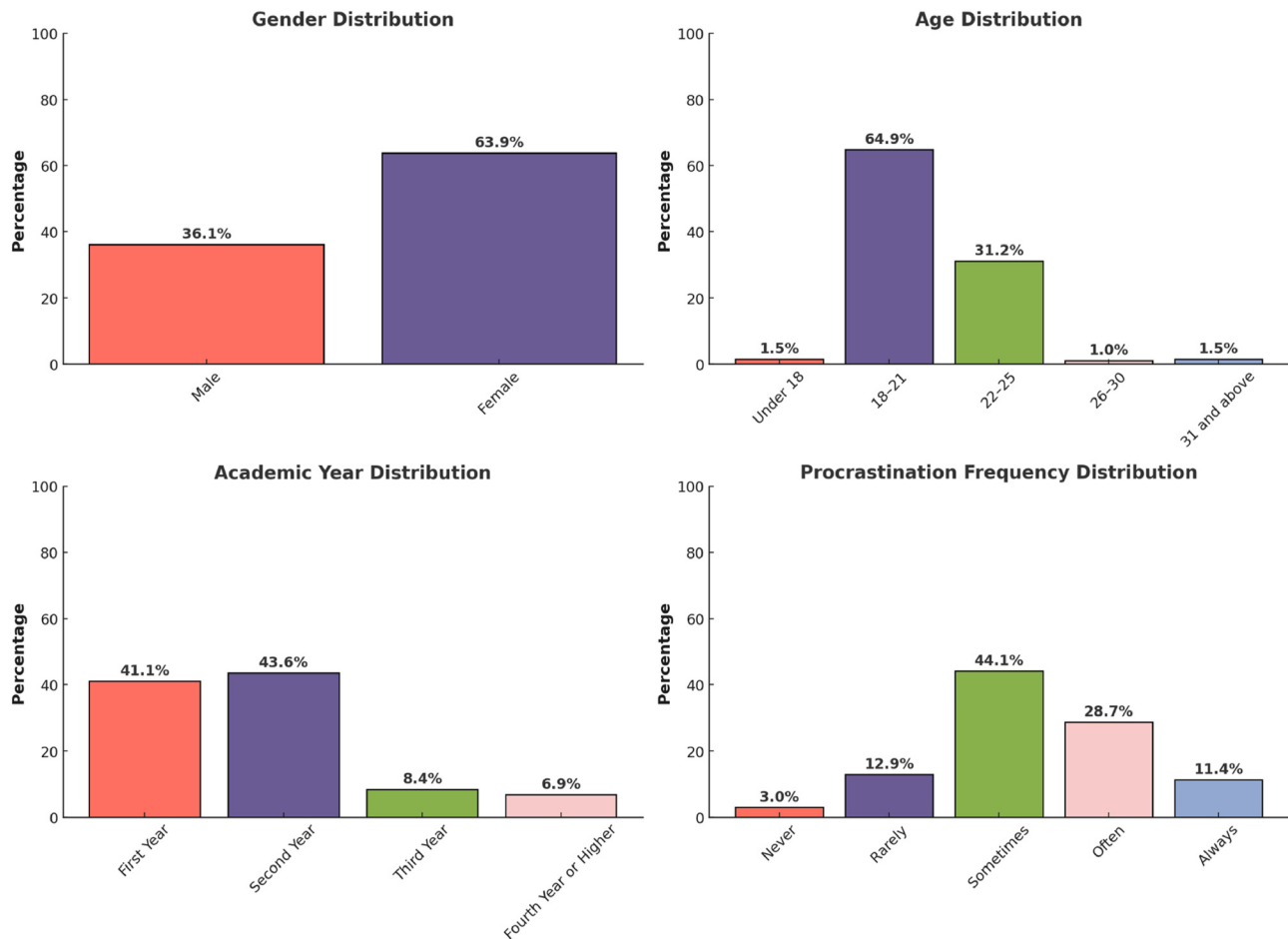
Figure 1: Demographic profile of BBA students.

Theory, where task aversiveness and low expectancy contribute to delay. The data reinforces the need for interventions – like AI tools – that can increase motivation, reduce cognitive load, and support time management.

Figure 4 illustrates students' perceptions of how procrastination impacts academic performance. The most commonly affected area was overall GPA (21.3 %), indicating that students recognize a direct consequence on academic outcomes. Test/exam performance (15.8 %) and time management (15.8 %) were also frequently cited, reflecting the broader impact on both results and study habits.

Other areas such as assignment quality (9.9 %) and deadline management (8.4 %) show that procrastination undermines task execution and planning. Notably, lower percentages for group collaboration (5 %) and class participation (3 %) suggest procrastination has a more pronounced effect on individual responsibilities than interactive or verbal tasks.

These findings support the view that procrastination not only delays task initiation but also disrupts academic consistency and perceived achievement – reinforcing the need

for tools that enhance planning, time use, and task engagement.

Figure 5 shows that 65.3 % of students are aware of AI tools designed to help manage tasks and reduce procrastination, while 34.7 % are not. This indicates a relatively high level of awareness among the sample, reflecting growing exposure to digital learning tools.

However, the one-third who lack awareness highlights a gap in digital literacy or tool promotion within academic settings. This suggests the need for targeted awareness campaigns or orientation programs to introduce students – especially in early academic years – to AI-based productivity aids.

Figure 6 reveals that chatbots like ChatGPT are the most widely used AI tool (94.6 %) among students, followed by writing assistants such as Grammarly (44.6 %) and virtual assistants (33.7 %). These tools are likely favored for their accessibility and direct academic utility, such as generating content, offering grammar support, and managing reminders.
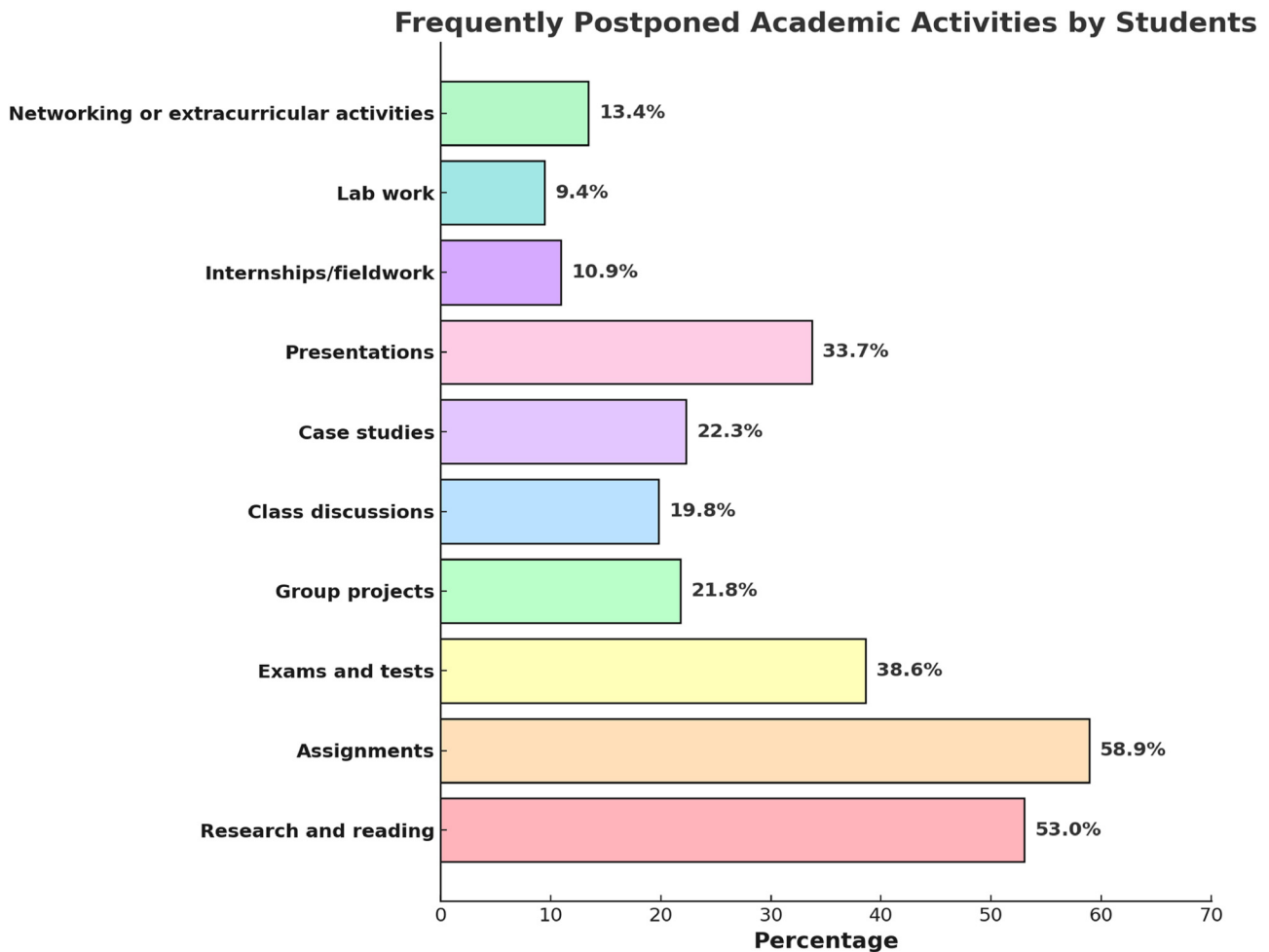
Frequently Postponed Academic Activities by Students

Figure 2: Academic activities frequently postponed by students.

In contrast, specialized tools like task managers (7.9 %), study planners (4.5 %), and productivity apps (2.5 %) were used far less frequently. This suggests a preference for familiar, general-purpose AI tools over structured academic planning platforms.

The relatively low use of AI research tools (5 %) and coding assistants (5.9 %) may reflect limited academic integration or awareness of these tools' benefits. Overall, the data indicates a strong reliance on conversational and writing-focused AI, with opportunities to promote broader tool adoption for enhanced academic management.

Figure 7 shows that writing assistants are perceived as the most effective AI tools (68.8 %) for managing procrastination, suggesting their strong role in reducing task initiation barriers such as drafting assignments. Tools that support planning and structure, including study planners (25.2 %), goal-setting apps (23.3 %), and task managers (22.3 %), also received notable endorsement.

Lower ratings for collaboration tools (6.4 %) and AI-powered feedback systems (15.3 %) indicate that students prioritize AI support that aids in personal productivity over tools that require peer interaction or reflective feedback.

These results highlight that students value AI functions that offer immediate, individual task support – an insight that aligns with theories emphasizing the role of self-regulation in reducing procrastination.

4.1 Factor Analysis of AI Tools' Effectiveness in Reducing Procrastination

Table 1 confirms the suitability of the dataset for factor analysis. The Kaiser–Meyer–Olkin (KMO) value of 0.865 indicates excellent sampling adequacy, suggesting that the variables share sufficient common variance. Additionally, Bartlett's Test of Sphericity is significant (χ^2 = 976.777, $p < 0.001$), confirming
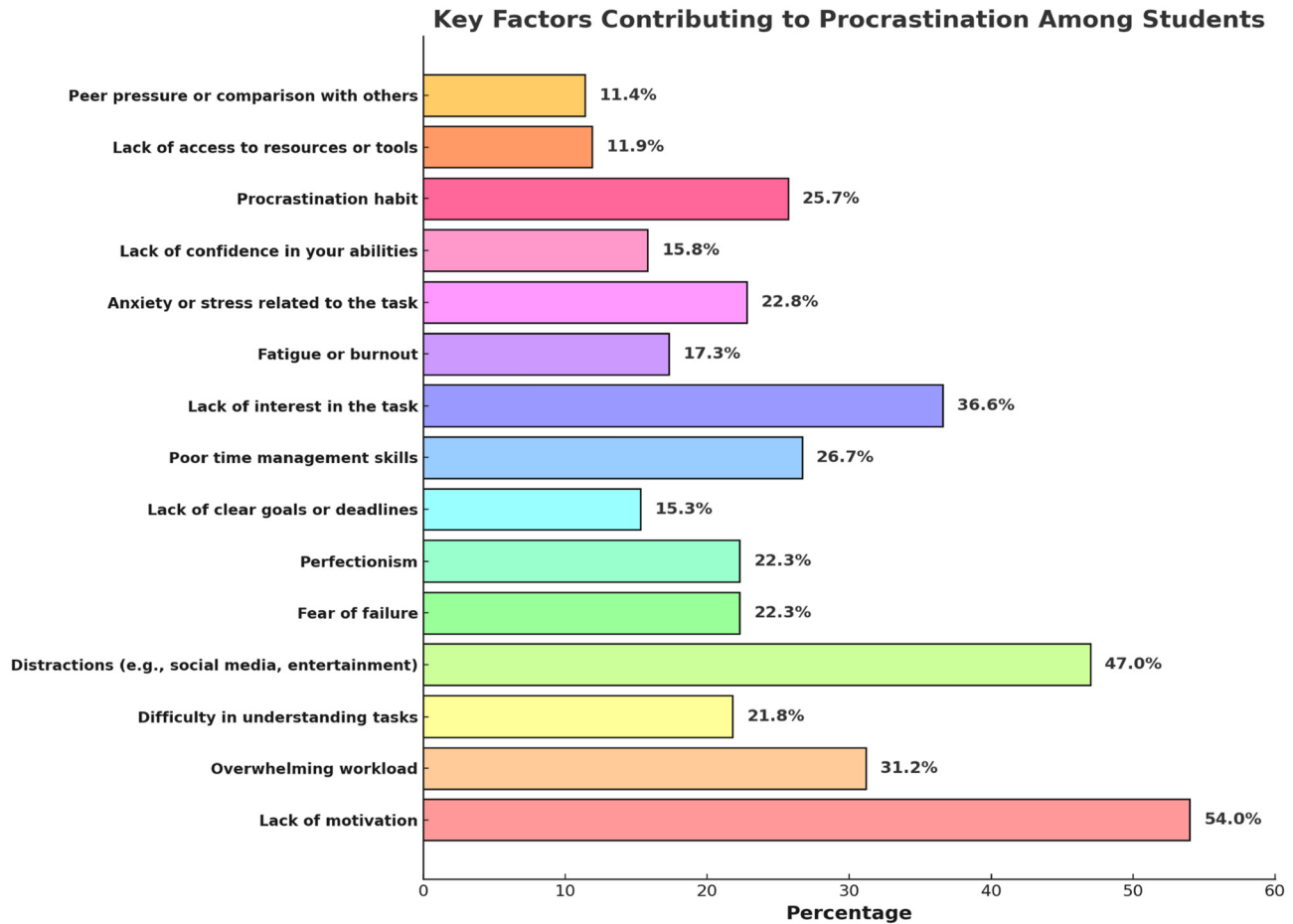
Key Factors Contributing to Procrastination Among Students

Figure 3: Key factors contributing to procrastination among students.

that correlations between items are strong enough to justify factor analysis. These results validate the structure of the instrument used to assess perceptions of AI tool effectiveness and support the reliability of subsequent factor extraction.

Table 2 presents the results of factor analysis, identifying two distinct dimensions of AI tool effectiveness: "Reduce Distractions" and "Task Completion." The first factor, Reduce Distractions, accounts for 50.9 % of the variance and includes items related to managing distractions, providing motivation, and supporting time management – indicating AI's role in enhancing focus and reducing avoidance behaviors. The second factor, Task Completion, explains 10.9 % of the variance and clusters items related to drafting, organizing, and prioritizing tasks.

Both factors showed strong internal consistency, with Cronbach's alpha values of 0.852 and 0.836, respectively, confirming reliability. These dimensions suggest that students perceive AI tools as supporting both behavioral (focus and motivation) and cognitive (task planning and execution) aspects of procrastination management.

4.2 *t*-Test on AI Tools' Effectiveness in Reducing Procrastination

Table 3 shows no significant gender differences in students' perceptions of AI tools' effectiveness in reducing procrastination. Although female students reported slightly higher mean scores for both "Reduce Distractions" (M = 3.00) and "Task Completion" (M = 3.06) compared to males, the differences were not statistically significant (p = 0.158 and 0.914, respectively).

This suggests that both male and female students perceive AI tools similarly, reinforcing the general applicability of such tools across gender in academic procrastination management.

Table 4 examines differences in perceptions of AI tools' effectiveness based on age and academic year. For the "Reduce Distractions" factor, no statistically significant differences were observed across age groups (p = 0.115) or academic years (p = 0.166), indicating a generally consistent perception.
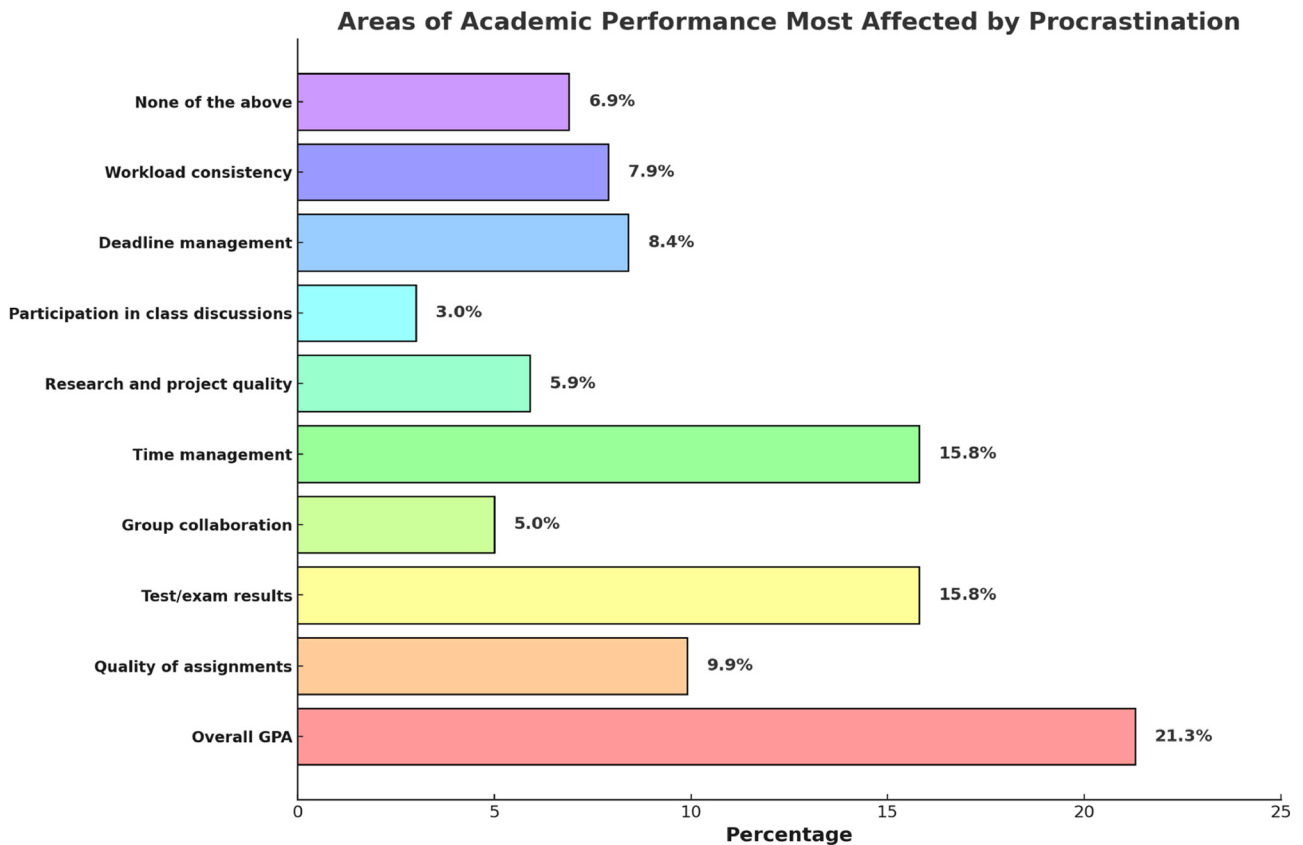
Areas of Academic Performance Most Affected by Procrastination

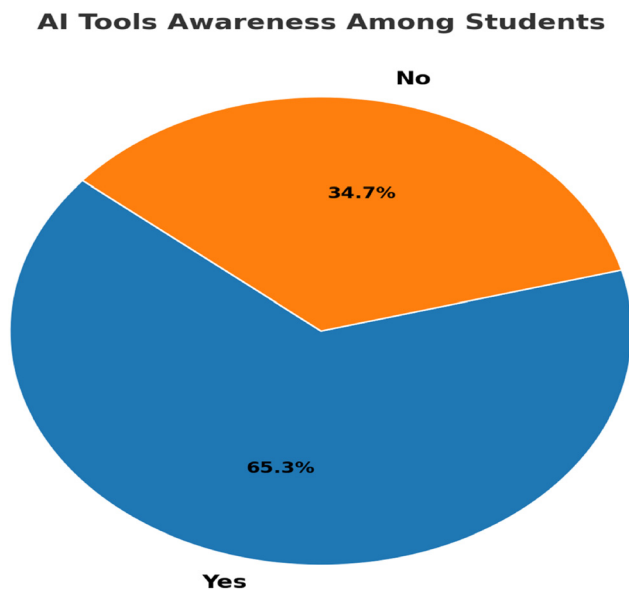None of the above — 6.9%
Workload consistency — 7.9%
Deadline management — 8.4%
Participation in class discussions — 3.0%
Research and project quality — 5.9%
Time management — 15.8%
Group collaboration — 5.0%
Test/exam results — 15.8%
Quality of assignments — 9.9%
Overall GPA — 21.3%

Percentage

Figure 4: Areas of academic performance most affected by procrastination.

AI Tools Awareness Among Students

No — 34.7%
Yes — 65.3%

Figure 5: Awareness of AI tools to manage tasks and reduce procrastination.

However, for the "Task Completion" factor, a significant difference by age was found (p = 0.041). Older students, particularly those aged 26–30 (M = 4.08) and 22–25 (M = 3.28), reported higher perceived effectiveness compared to younger groups. This suggests that maturity or academic experience may enhance students' ability to leverage AI tools for task execution.

No significant differences by academic year were found for task completion (p = 0.084), though fourth-year students reported the highest mean (M = 3.60), hinting at a trend toward increased AI tool appreciation in later academic stages.

Figure 8 reveals that "simplified task breakdowns" (50.5 %) was perceived as the most helpful AI feature, highlighting students' preference for tools that reduce cognitive overload by structuring complex tasks. Other highly valued features include task prioritization (35.1 %), AI-generated summaries (34.2 %), and deadline reminders (29.2 %), all supporting task clarity and time sensitivity.

Motivational aids like prompts (25.2 %) and goal setting (15.3 %) were moderately selected, suggesting that students rely more on AI for functional rather than emotional support. Features related to distraction blocking and focus timing received lower ratings (<14 %), indicating limited awareness or use of these capabilities. Overall, students favor practical, action-oriented AI features that aid planning
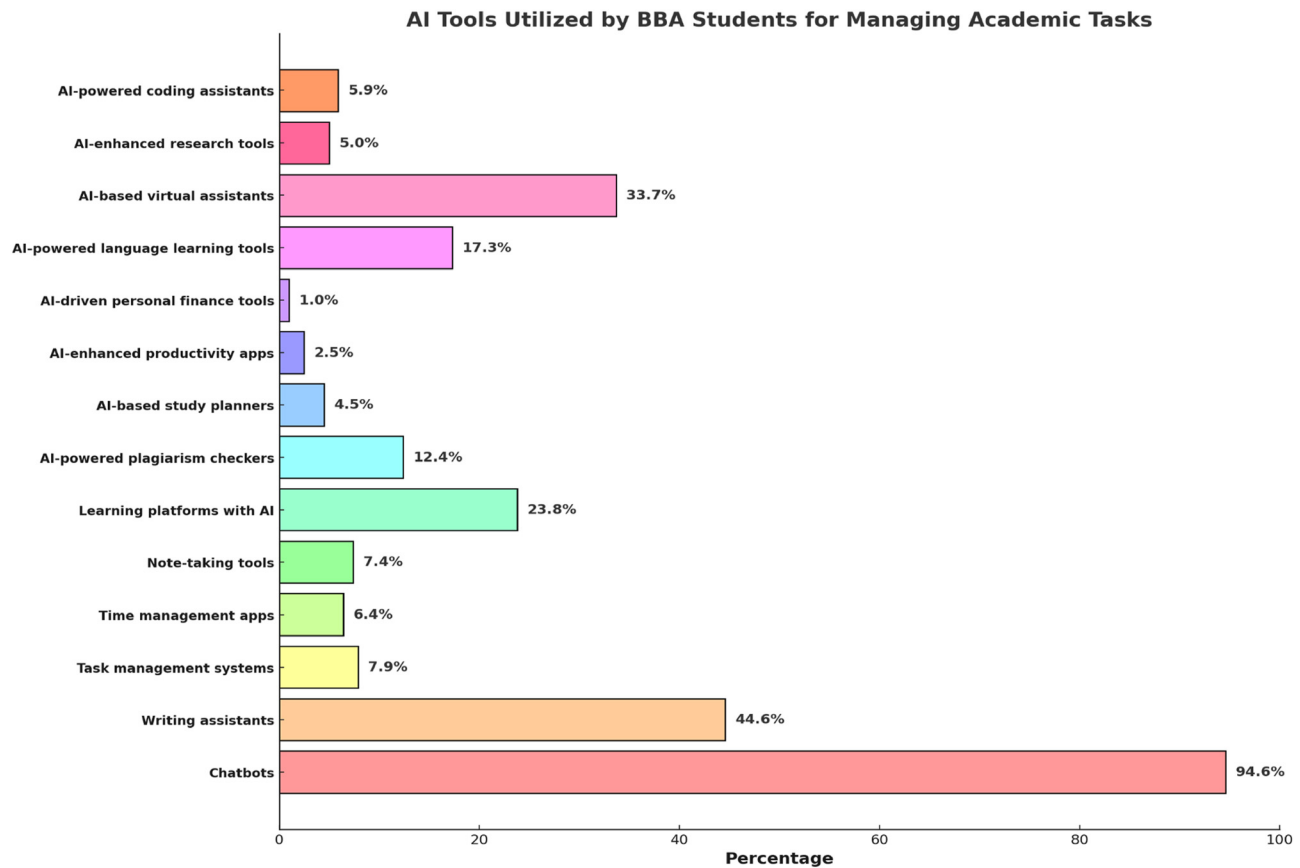
Figure 6: AI tools utilized by BBA students for managing academic tasks.

and execution – reinforcing the role of AI in supporting self-regulation and time management.

5 Discussion

5.1 Prevalence and Patterns of Procrastination

The findings from this study indicate that procrastination is a widespread challenge among BBA students, with 44.1 % of respondents reporting that they procrastinate "sometimes" and 28.7 % admitting to procrastinating "often." These results align with prior studies, where researchers such as Steel and Klingsieck (2016) identified procrastination as a prevalent behavior among college students, contributing to academic inefficiency and increased stress. Assignments (58.9 %) and research/reading (53 %) emerged as the most frequently postponed academic tasks in this study, consistent with the findings of Solomon and

Rothblum (1984) that academic procrastination primarily affects tasks involving cognitive effort and long-term deadlines.

5.2 Causes of Procrastination

The study identified lack of motivation (54 %), distractions (47 %), and lack of interest in the task (36.6 %) as the most common factors contributing to procrastination. These findings echo previous research, such as that of Steel (2007), which highlighted psychological factors such as task aversion, perfectionism, and a lack of intrinsic motivation as primary causes of procrastination. The influence of distractions, particularly from social media and entertainment, reinforces the assertion of Pychyl et al. (2000) that task avoidance often results from competing sources of immediate gratification. Furthermore, the role of poor time management (26.7 %) and habitual procrastination (25.7 %) suggests that procrastination may become a recurring pattern, confirming insights by
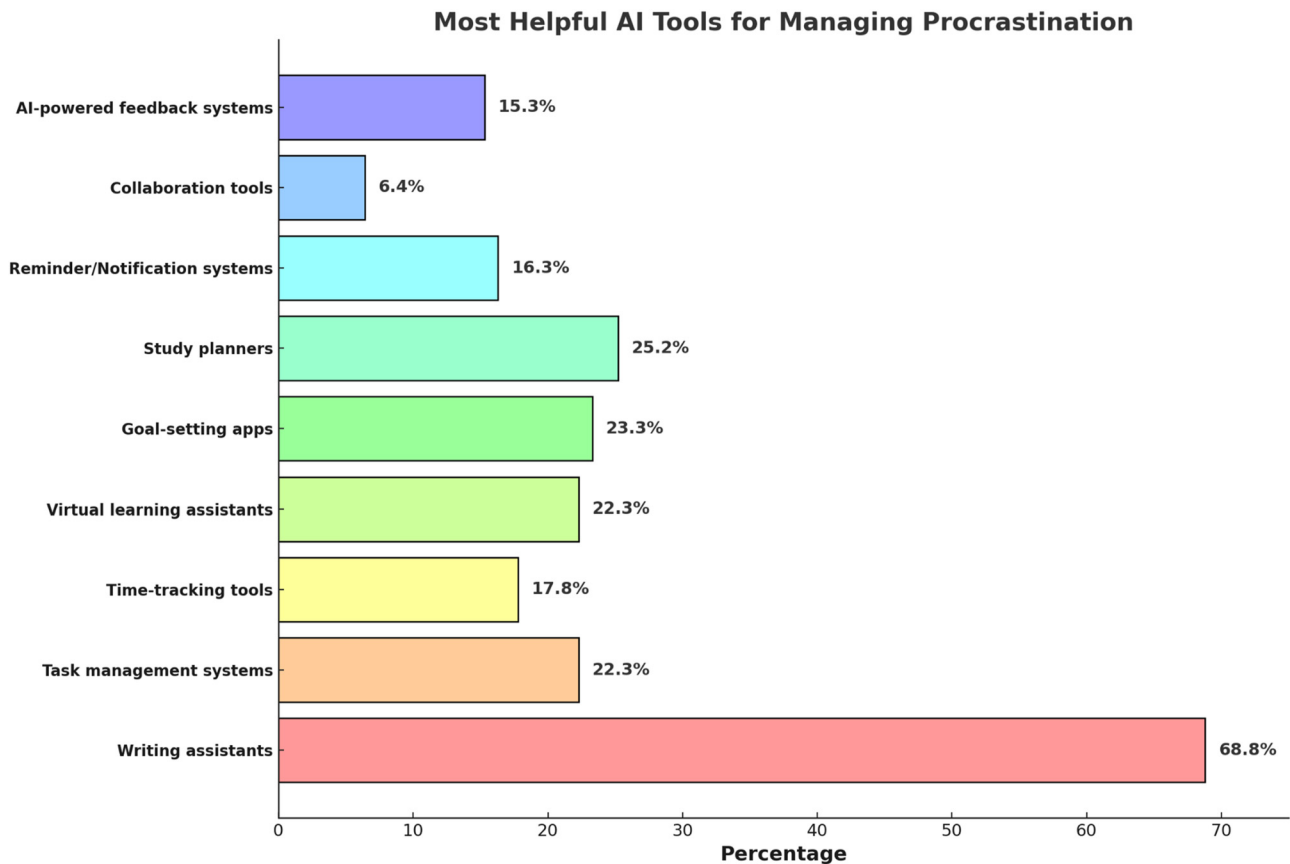
Figure 7: AI tools perceived as most effective in managing procrastination.

Table 1: KMO and Bartlett's test results for sampling adequacy.

Kaiser–Meyer–Olkin measure of sampling adequacy		0.865
Bartlett's test of sphericity	Approx. chi-square	976.777
	df	45
	Sig.	0.000

Schraw et al. (2007) that self-regulation deficits contribute significantly to procrastination.

5.3 Perceived Impact of Procrastination on Academic Performance

The study revealed that procrastination significantly affects key academic performance areas, with overall GPA (21.3 %), test/exam results (15.8 %), and time management (15.8 %) being the most impacted. These findings corroborate the work of Kim and Seo (2015), who demonstrated a negative correlation between procrastination and academic achievement. The observed perceived impact on time management aligns with the conclusions of Bäulke and Dresel (2023), who emphasized that procrastination disrupts effective planning and task prioritization, thereby compromising academic outcomes.

5.4 Awareness and Usage of AI Tools

A majority of students (65.3 %) was aware of AI tools designed to manage procrastination and enhance academic efficiency, indicating a high level of awareness among BBA students. However, despite this awareness, only 44.6 % reported using writing assistants, and 7.9 % reported using task management systems. This discrepancy highlights a gap between awareness and adoption, consistent with the findings of Yakubu et al. (2025), who identified perceived usefulness and ease of use as critical factors influencing AI adoption among students. The predominant use of chatbots (94.6 %) such as ChatGPT suggests that students prefer interactive and readily accessible AI tools, while less adoption of task management and time management tools suggests a lack of integration between AI tools and academic workflows.

Table 2: Factor analysis of AI tools' effectiveness in reducing procrastination.

Factors	Factor loading	Eigen values	% of variance	Cronbach's alpha
Reduce distractions				
How effective do you find AI tools in reducing distractions while working on academic tasks?	0.819	5.086	50.862	0.852
How effective do you find AI tools in helping you track your progress on long-term projects?	0.793			
How effective do you find AI tools in providing motivational prompts or encouragement to stay on track?	0.784			
How effective do you find AI tools in improving your overall time management and reducing procrastination?	0.730			
Task completion				
How effective do you find AI writing assistants in reducing the time spent on drafting assignments?	0.817	1.095	10.945	0.836
How effective do you find AI tools in breaking down complex tasks into smaller, manageable steps?	0.801			
How effective do you find AI tools in helping you prioritize tasks based on deadlines and importance?	0.663			
How effective do you find AI-powered chatbots in helping you stay focused on tasks?	0.595			
How effective do you find AI tools in providing personalized reminders to complete tasks on time?	0.552			
How effective do you find AI-based task management systems (e.g., Notion, Trello) in organizing your academic workload?	0.494			

Table 3: t-Test results on AI tools' effectiveness in reducing procrastination by gender.

AI tools' effectiveness in reducing procrastination	Male	Female	t-value	p-value
Reduce distractions	2.8014	3.0000	−1.418	0.158
Task completion	3.0457	3.0594	−0.108	0.914

Table 4: ANOVA on AI tools' effectiveness in reducing procrastination by age and academic year.

Variable	Indicator	Mean	F-value	p-value
Reduce distractions				
Age	Under 18	2.6667	1.884	0.115
	18–21	2.8397		
	22–25	3.0675		
	26–30	4.3750		
	31 and above	3.1667		
Current academic year	First year	2.7801	1.711	0.166
	Second year	3.0142		
	Third year	2.8824		
	Fourth year or higher	3.3214		
Task completion				
Age	Under 18	2.7222	2.545	0.041[*]
	18–21	2.9453		
	22–25	3.2778		
	26–30	4.0833		
	31 and above	2.7778		
Current academic year	First year	2.9960	2.250	0.084
	Second year	2.9981		
	Third year	3.1863		
	Fourth year or higher	3.5952		

[*]Significant at 0.05.

5.5 Effectiveness of AI Tools in Reducing Procrastination

Factor analysis identified two primary factors associated with AI effectiveness – Reduce Distractions and Task Completion – which explained 50.86 % and 10.95 % of the variance, respectively. AI tools that minimize distractions, provide motivational prompts, and track progress were perceived as effective, confirming prior research by Haderer and Ciolacu (2022), who found that AI-assisted task management systems improve self-regulated learning and reduce procrastination. Similarly, AI tools that aid task breakdown, prioritize deadlines, and offer personalized
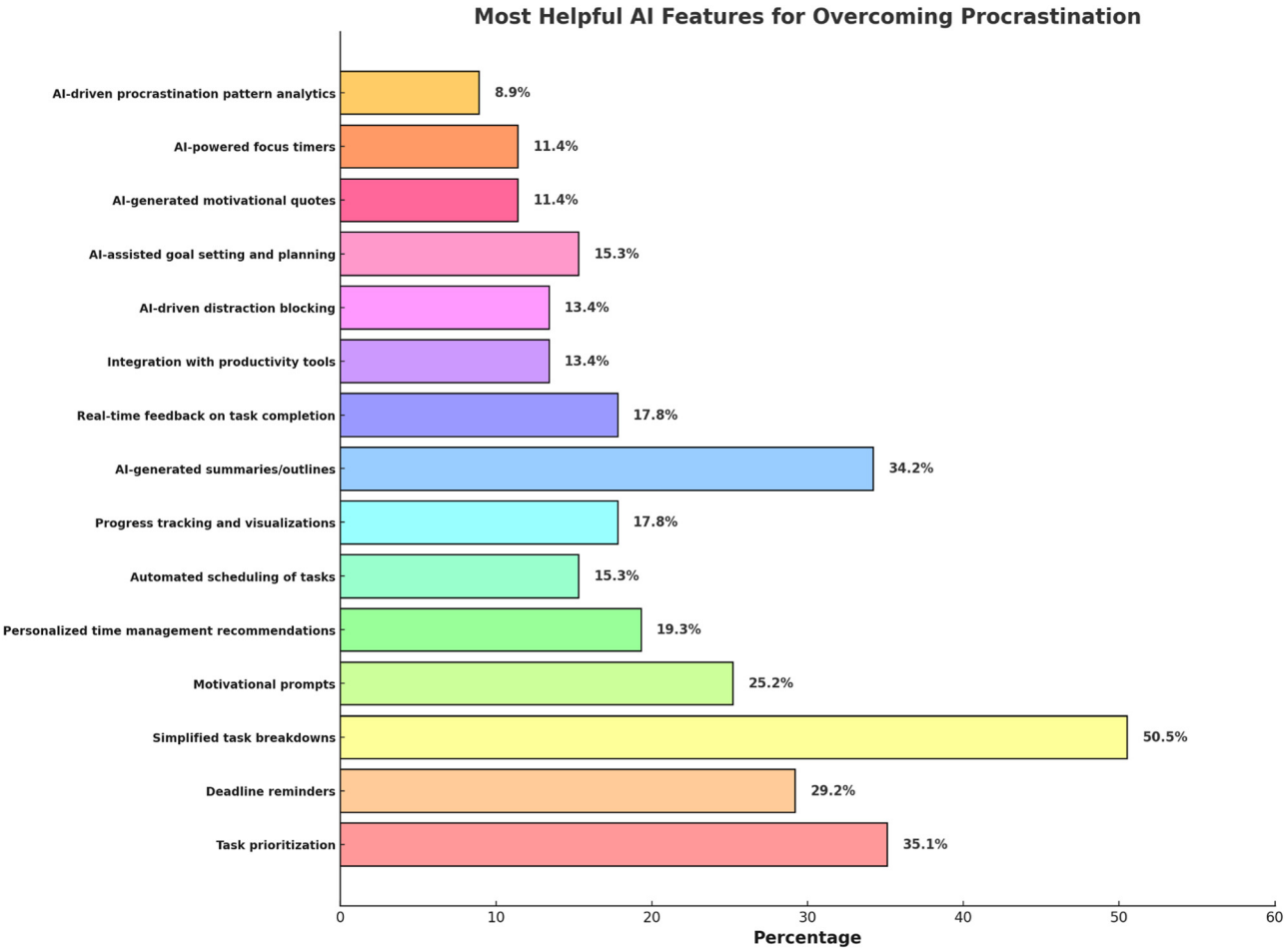
Most Helpful AI Features for Overcoming Procrastination

Figure 8: AI features perceived as most effective in overcoming procrastination.

reminders were perceived as enhancing task completion, supporting findings by Li and Jan (2023), who highlighted the effectiveness of AI in simplifying complex academic tasks.

conclusions of Shih (2021), who found that more experienced users tend to engage more effectively with AI-driven scheduling assistants.

5.6 Gender, Age, and Academic Year Differences in AI Effectiveness

The t-test results indicated no statistically significant differences between male and female students in the perceived effectiveness of AI tools in reducing procrastination. This finding contrasts with previous studies such as Duan et al. (2024), who found gender-based differences in technology adoption and task management preferences. However, ANOVA results revealed that older students (aged 26–30) perceived AI tools as significantly more effective in task completion compared to younger students ($p = 0.041$). These findings suggest that older students, with more academic and professional experience, may better utilize AI tools for managing academic workloads, aligning with the

5.7 Most Beneficial AI Features for Reducing Procrastination

Simplified task breakdowns (50.5 %), task prioritization (35.1 %), and AI-generated summaries for complex tasks (34.2 %) emerged as the most effective AI features in reducing procrastination. These findings resonate with the work of Morrison et al. (2024), who demonstrated that AI-powered task breakdown and deadline management significantly enhance task adherence and reduce procrastination. Deadline reminders (29.2 %) and motivational prompts (25.2 %) were also moderately effective, suggesting that a combination of task structuring and personalized feedback is essential for managing procrastination effectively.

5.8 Implications for AI Integration in Academic Workflows

The study highlights the need for greater integration of AI tools into academic workflows to optimize their effectiveness in reducing procrastination. Institutional policies should encourage the adoption of AI-powered task management and scheduling systems while promoting digital literacy and responsible AI usage. Additionally, educators should provide structured guidance on selecting and utilizing AI features that align with students' academic goals, thereby enhancing task completion and minimizing procrastination.

6 Conclusion

This study examined the perceived impact of procrastination on academic performance among BBA students and assessed the effectiveness of AI tools in mitigating procrastination. The findings indicate that procrastination is prevalent among students, with assignments and research tasks being the most frequently delayed. Psychological factors, such as lack of motivation and distractions, were identified as the primary contributors to procrastination, leading to adverse effects on GPA, time management, and overall academic performance.

AI tools were found to be effective in reducing procrastination by minimizing distractions and enhancing task completion. Chatbots and writing assistants were the most commonly used AI tools, while task management and time-tracking systems were less frequently adopted. Factor analysis revealed two key dimensions of AI effectiveness – Reduce Distractions and Task Completion – highlighting the importance of task structuring and personalized feedback. Although no significant gender differences were observed, older students perceived AI tools as more effective in improving task management.

The most beneficial AI features included simplified task breakdowns, task prioritization, and AI-generated summaries, underscoring the need for integrating AI tools into academic workflows. To optimize AI adoption, institutions should promote digital literacy, provide structured guidelines for AI usage, and encourage the incorporation of AI-powered task management systems to enhance academic productivity and reduce procrastination.

References

Albayati, H. 2024. "Investigating Undergraduate Students' Perceptions and Awareness of Using ChatGPT as a Regular Assistance Tool: A User Acceptance Perspective Study." *Computers and Education: Artificial Intelligence* 6: 100203. https://doi.org/10.1016/j.caeai.2024.100203.

Aldreabi, H., N. K. S. Dahdoul, M. Alhur, N. Alzboun, and N. R. Alsalhi. 2025. "Determinants of Student Adoption of Generative AI in Higher Education." *Electronic Journal of E-Learning* 23 (1): 15–33. https://doi.org/10.34190/ejel.23.1.3599.

Balkis, M., and E. Duru. 2016. "Procrastination, Self-Regulation Failure, Academic Life Satisfaction, and Affective Well-Being: Underregulation or Misregulation Form." *European Journal of Psychology of Education* 31 (3): 439–59. https://doi.org/10.1007/s10212-015-0266-5.

Bäulke, L., and M. Dresel. 2023. "Higher-Education Course Characteristics Relate to Academic Procrastination: A Multivariate Two-Level Analysis." *Educational Psychology* 43 (4): 263–83. https://doi.org/10.1080/01443410.2023.2219873.

Bäulke, L., C. Grunschel, and M. Dresel. 2022. "Student Dropout at University: A Phase-Orientated View on Quitting Studies and Changing Majors." *European Journal of Psychology of Education* 37 (3): 853–76. https://doi.org/10.1007/s10212-021-00557-x.

Chen, K., A. C. Tallant, and I. Selig. 2024. "Exploring Generative AI Literacy in Higher Education: Student Adoption, Interaction, Evaluation and Ethical Perceptions." *Information and Learning Sciences* 126 (1–2): 132–48. https://doi.org/10.1108/ILS-10-2023-0160.

Chun C., A. Hsin, and J. N. Choi. 2005. "Rethinking Procrastination: Positive Effects of 'Active' Procrastination Behavior on Attitudes and Performance." *The Journal of Social Psychology* 145 (3): 245–64. https://doi.org/10.3200/SOCP.145.3.245-264.

Curtis, R. C. 2017. "Self-Defeating Behaviors☆." In *Reference Module in Neuroscience and Biobehavioral Psychology*. Elsevier.

Duan, X., Z. Yi, Y. Sun, and I. Shabtai. 2024. "The Academic Anti-Procrastination Approach: Combining Peer Motivation and Personalized Artificial Intelligence Reminders." *International*

Conference on AI Research 4 (1): 99–107. https://doi.org/10.34190/icair. 4.1.3222.

Golestani B., Tahereh, and M. Shokri. 2013. "Relationship Between Academic Procrastination with Meta Cognitive Beliefs." *Social Cognition* 2 (1): 89–100.

Grunschel, C., M. Schwinger, R. Steinmayr, and S. Fries. 2016. "Effects of Using Motivational Regulation Strategies on Students' Academic Procrastination, Academic Performance, and Well-Being." *Learning and Individual Differences* 49: 162–70. https://doi.org/10.1016/j.lindif. 2016.06.008.

Haderer, B., and M. Ciolacu. 2022. "Education 4.0: Artificial Intelligence Assisted Task- and Time Planning System." *Procedia Computer Science* 200: 1328–37. https://doi.org/10.1016/j.procs.2022.01.334.

Hodgkinson, G. P., and M. P. Healey. 2008. "Cognition in Organizations." *Annual Review of Psychology* 59 (1): 387–417. https://doi.org/10.1146/ annurev.psych.59.103006.093612.

Ibrahim, M. B., T.Mujahid, and M. I. Anshori. 2025. "Optimization of Artificial Intelligence-Based Research in Minimizing Student Academic Procrastination." *International Conference on Research Issues and Community Service (ICORES)* 1 (1): 240–53. https://doi.org/10.31332/i-cores.v1i1.11217.

Janssen, T., and J. S. Carton. 1999. "The Effects of Locus of Control and Task Difficulty on Procrastination." *The Journal of Genetic Psychology* 160 (4): 436–42. https://doi.org/10.1080/00221329909595557.

Jayalakshmi, V. J., and M. Punithavalli. 2024. "Exploring Academic Procrastination: An In-Depth Survey of Procrastination Patterns." *Remote Sensing in Earth Systems Sciences* 7 (4): 524–31. https://doi.org/ 10.1007/s41976-024-00144-w.

Johnston, H., M. Eaton, I. Henry, E.-M. Deeley, and B. N. Parsons. 2025. "Discovering How Students Use Generative Artificial Intelligence Tools for Academic Writing Purposes." *Journal of Learning Development in Higher Education* (34). https://doi.org/10.47408/jldhe. vi34.1301.

Khlaif, Z. N., A. Ayyoub, B. Hamamra, E. Bensalem, M. A. A. Mitwally, A. Ayyoub, et al. 2024. "University Teachers' Views on the Adoption and Integration of Generative AI Tools for Student Assessment in Higher Education." *Education Sciences* 14 (10): 1090. https://doi.org/10. 3390/educsci14101090.

Kim, K. R., and E. H. Seo. 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.

Klassen, R. M., L. L. Krawchuk, and S. Rajani. 2008. "Academic Procrastination of Undergraduates: Low Self-Efficacy to Self-Regulate Predicts Higher Levels of Procrastination." *Contemporary Educational Psychology* 33 (4): 915–31. https://doi.org/10.1016/j.cedpsych.2007.07. 001.

Knaus, W. J. 2000. "Procrastination, Blame, and Change." *Journal of Social Behavior and Personality* 15 (5): 153–66.

Li, E. Y., and A. Jan. 2023. "Impact of Artificial Intelligence (AI) in Enhancing Productivity and Reducing Stress Among Students." In *ICEB 2023 Proceedings*, 334–42. AIS eLibrary. https://aisel.aisnet.org/iceb2023/ 33 (accessed October 20, 2025).

Lowinger, R., Z. He, M. Lin, and M. Chang. 2014. "He Impact of Academic Self-Efficacy, Acculturation Difficulties, and Language Abilities on Procrastination Behavior in Chinese International Students." *College Student Journal* 48 (1): 141–52.

Ma, Y., and M. Chen. 2024. "AI-Empowered Applications Effects on EFL Learners' Engagement in the Classroom and Academic

Procrastination." *BMC Psychology* 12 (1): 739. https://doi.org/10.1186/ s40359-024-02248-w.

Milgram, N., G. Mey-Tal, and Y. Levison. 1998. "Procrastination, Generalized or Specific, in College Students and Their Parents." *Personality and Individual Differences* 25 (2): 297–316. https://doi.org/10.1016/S0191-8869(98)00044-0.

Morrison, K., S. T. Iqbal, and E. Horvitz. 2024. "AI-Powered Reminders for Collaborative Tasks: Experiences and Futures." *Proceedings of the ACM on Human-Computer Interaction* 8 (CSCW1): 1–20. https://doi.org/10. 1145/3653701.

Mukhtar, M., S. S. Firdos, I. Zaka, and S. Naeem. 2025. "Impact of AI Dependence on Procrastination Among University Students." *Research Journal of Psychology* 3 (1): 246–57. https://doi.org/10.59075/rjs.v3i1. 62.

Netzer Turgeman, R., and Y. Pollak. 2023. "Using the Temporal Motivation Theory to Explain the Relation Between ADHD and Procrastination." *Australian Psychologist* 58 (6): 448–56. https://doi.org/10.1080/ 00050067.2023.2218540.

Park, S. W., and R. A. Sperling. 2012. "Academic Procrastinators and Their Self-Regulation." *Psychology* 3 (1): 12–23. https://doi.org/10.4236/ psych.2012.31003.

Patrzek, J., S. Sattler, F. Van Veen, C. Grunschel, and S. Fries. 2015. "Investigating the Effect of Academic Procrastination on the Frequency and Variety of Academic Misconduct: A Panel Study." *Studies in Higher Education* 40 (6): 1014–29. https://doi.org/10.1080/ 03075079.2013.854765.

Pychyl, T. A., J. M. Lee, R. Thibodeau, and A. Blunt. 2000. "Five Days of Emotion: An Experience Sampling Study of Undergraduate Student Procrastination." *Journal of Social Behavior & Personality* 15 (5): 239–54.

Rosário, P., M. Costa, J. C. Núñez, J. González-Pienda, P. Solano, and A. Valle. 2009. "Academic Procrastination: Associations with Personal, School, and Family Variables." *The Spanish Journal of Psychology* 12 (1): 118–27. https://doi.org/10.1017/S1138741600001530.

Schneider, M., and F. Preckel. 2017. "Variables Associated with Achievement in Higher Education: A Systematic Review of Meta-Analyses." *Psychological Bulletin* 143 (6): 565–600. https://doi.org/10.1037/ bul0000098.

Schraw, G., T. Wadkins, and L. Olafson. 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.

Shih, H.-B. Benjamin. 2021. "Designing a Text-Based AI Scheduling Assistant Chatbot for a Business Environment." In *Degree Project in Information and Communication Technology (ICT)*. Stockholm: KTH Royal Institute of Technology.

Sirois, F. M. 2023. "Procrastination and Stress: A Conceptual Review of Why Context Matters." *International Journal of Environmental Research and Public Health* 20 (6): 5031. https://doi.org/10.3390/ijerph20065031.

Sokolowska, J. 2009. "Behavioral, Cognitive, Affective, and Motivational Dimensions of Academic Procrastination Among Community College Students: A Q Methodology Approach." Doctor of Philosophy. Fordham University.

Solomon, L. J., and E. D. Rothblum. 1984. "Academic Procrastination: Frequency and Cognitive-Behavioral Correlates." *Journal of Counseling Psychology* 31 (4): 503–9. https://doi.org/10.1037/0022-0167.31.4.503.

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. 2010. "Arousal, Avoidant and Decisional Procrastinators: Do They Exist?" *Personality and Individual Differences* 48 (8): 926–34. https://doi.org/10.1016/j.paid.2010.02.025.

Steel, P., and K. B. Klingsieck. 2016. "Academic Procrastination: Psychological Antecedents Revisited." *Australian Psychologist* 51 (1): 36–46. https://doi.org/10.1111/ap.12173.

Steel, P., and C. J. König. 2006. "Integrating Theories of Motivation." *Academy of Management Review* 31 (4): 889–913. https://doi.org/10.5465/amr.2006.22527462.

Tice, D. M., and R. F. Baumeister. 1997. "Longitudinal Study of Procrastination, Performance, Stress, and Health: The Costs and Benefits of Dawdling." *Psychological Science* 8 (6): 454–8. https://doi.org/10.1111/j.1467-9280.1997.tb00460.x.

Verma, S., N. Kashive, and A. Gupta. 2025. "Examining Predictors of Generative-AI Acceptance and Usage in Academic Research: A Sequential Mixed-Methods Approach." *Benchmarking: An International Journal*. March. https://doi.org/10.1108/bij-07-2024-0564.

Yakubu, M. N., Nakama David, and N. H. Abubakar. 2025. "Students' Behavioural Intention to Use Content Generative AI for Learning and Research: A UTAUT Theoretical Perspective." *Education and Information Technologies* 30 (13): 17969–94. https://doi.org/10.1007/s10639-025-13441-8.

Zhang, S., P. Liu, and T. Feng. 2019. "To Do It Now or Later: The Cognitive Mechanisms and Neural Substrates Underlying Procrastination." *WIREs Cognitive Science* 10 (4): e1492. https://doi.org/10.1002/wcs.1492.