THE ROLE OF PROCRASTINATION IN STUDENT AI USAGE: EMPIRICAL VALIDATION OF AN INSTRUMENT

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The Role of Procrastination in Student AI Usage: Empirical Validation of an Instrument

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Abstract

The rapid integration of generative Artificial Intelligence and Large Language Models in higher education has created new opportunities for learning while simultaneously challenging academic integrity and critical thinking. Students who struggle with academic procrastination are increasingly tempted to use these tools to complete assignments quickly. This pilot study focuses on the development and validation of a survey instrument to assess the relationships among academic procrastination, AI usage frequency, and uncritical acceptance of AI-generated content.

Keywords: academic procrastination, generative AI, instrument validation, uncritical acceptance

Introduction

The invasion of Large Language Models (LLMs) and other generative Artificial Intelligence (GenAI) tools into the academic community has presented opportunities for more personalized, accessible, and engaging educational content. However, LLMs pose a myriad of threats to academic integrity and students' critical thinking skills when used by students in ways that violate well-established ethical or conduct standards (Bittle & Gayar, 2025). Students who tend to procrastinate are increasingly tempted to use GenAI tools to complete their assignments. In response, academic institutions have primarily focused on implementing detection measures to curb inappropriate usage. However, these detection tools are often inaccurate or easily circumvented by students (Coffey, 2024).

The purpose of this pilot study is to develop and validate a survey instrument to assess the relationships among academic procrastination, AI usage frequency, and uncritical acceptance of AI-generated content among college students. Previous research estimates that approximately half of all college students regularly struggle with chronic procrastination, a habit that can harm both their academic success and overall mental well-being (Bhattacharjee et al., 2024; Grunschel & Schopenhauer, 2015). Student procrastination is facilitated by readily available GenAI tools that can produce responses quickly, fostering the belief that academic work requires less effort (Lahmer, 2025).

Recent research has established a strong correlation between AI dependence and procrastination (Mukhtar et al., 2025; Lahmer, 2025). However, a gap remains regarding how a student's level of procrastination influences both the frequency of AI use and the uncritical acceptance of its output. To address this gap, this pilot study aims to validate a survey instrument assessing the frequency of AI tool use and the extent to which students accept AI-generated responses without understanding the underlying concepts. The instrument will enable future researchers to develop predictive models to support the development of GenAI literacy programs and instructional design strategies that preserve academic standards in the age of AI. No validated instrument currently measures the relationship between procrastination, AI usage frequency, and uncritical acceptance among college students. To address this gap, this research focuses on the following questions:

RQ1: What is the underlying factor structure of the instrument designed to measure procrastination, AI usage, and uncritical acceptance of AI-generated content?

RQ2: To what extent are the resulting factors reliable based on internal consistency measures?

RQ3: What are the relationships among the validated factors measuring procrastination, AI usage frequency, and uncritical acceptance?

This instrument validation is structured as follows: it begins with a definition of terms. Followed by a preliminary review of the relevant literature, and a detailed description of the proposed methodology, including the instrument, participants, procedures, and data analysis plan.

Definition of Terms

Procrastination – the intentional postponement or delay in completing tasks despite the individual's awareness of negative consequences. It is a learned coping mechanism often used to regulate negative emotions associated with a difficult task (Di Nocera et al., 2023).

Academic Procrastination – Academic procrastination specifically refers to the delay of academic tasks to the point that the delay becomes detrimental to student performance (Svartdal & Lokke, 2022).

Generative AI (GenAI) Tools – Generative AI tools (GenAI) are platforms and Large Language Models (LLMs), such as ChatGPT and Gemini, that can generate human-quality output. These models can generate content such as audio, code, images, text, and videos (Kalota, 2024).

Frequency of AI Usage – The frequency of AI usage refers to the quantifiable pattern of engagement with Generative AI tools within the academic environment. This measures the regularity and scope of a student's utilization of the technology for tasks such as brainstorming, content drafting, or data processing. It reflects a behavioral measure of technology adoption.

Uncritical Acceptance – Uncritical thinking is defined as an unwillingness to ask questions (Khan, 2017). For this study, uncritical acceptance is defined as the likelihood that a student will use or submit AI-generated information in place of their own critical thinking and conceptual understanding. It is characterized by behaviors such as submitting AI text without verifying accuracy and assuming convincing answers are detailed enough for an assignment.

Review of Literature

Psychological Basis of Procrastination

At its core, procrastination is the intentional postponement of a task despite awareness of its negative consequences. Academic procrastinators often justify their actions by labeling the task as "boring," "too hard," or even mislabeling the assignment as "too easy." This issue affects 75% of students and approximately 15-20% of adults worldwide and is associated with high stress, guilt, low self-esteem, anxiety, and depression (Di Nocera et al., 2023).

Students who are less prone to procrastination tend to have a task-oriented coping style. A task-oriented coping style is a strategy for managing stress by taking direct action to address the stressor, in this case, a pending assignment, to minimize its overall impact. In a study by Di Nocera et al. (2023), students who scored high on the Italian version of the Coping Inventory for Stressful Situations (CISS) were productive

throughout the available time. In contrast, procrastinators were most productive at the end of the allotted time, even when the time frame was shortened (Di Nocera et al., 2023). Procrastinators are present-oriented and prioritize their current mood over that of their future self, even when doing so has negative consequences (Sirios & Pychyl, 2013).

Procrastination is a learned coping mechanism that helps regulate negative emotions (stress, anxiety, or boredom) associated with a difficult task (Di Nocera et al., 2023). Putting off a difficult task provides psychological relief, reinforced by dopamine release in the brain. If, when faced with a stressor, a student responds with avoidance behavior and their mood then improves, the cycle is self-strengthening (Svartdal & Lokke, 2022). AI tools allow students to delay task initiation longer because they provide quick answers, reducing the time students perceive as necessary to complete a task (Lahmer, 2025).

AI Usage Patterns in Higher Education

AI-powered chatbots, such as ChatGPT, first emerged in late 2022 and have generated significant debate in higher education. Large Language Models, or LLMs, can answer questions, translate, assist with coding, provide writing support, and provide continuous access for learning and feedback (Shabbir et al., 2024). Instructors can also benefit from using AI to support lesson development, design quiz questions, and provide feedback on students' writing (Das & Eliseev, 2025). AI support can also assist students by providing individualized tutoring for those facing challenges such as learning disabilities, language barriers, or cultural differences (Caffaratti et al., 2025).

However, students who use AI tools to circumvent ethical guidelines and academic standards represent a significant threat to academic integrity. Tools such as ChatGPT can correctly answer questions posed to both undergraduates and postgraduates, and as they continue to evolve, so will their ability to respond in a more human-like manner (Eke, 2023). Between December 2022 and January 2023, ChatGPT was cited as a co-author in at least four scientific research papers, and many others acknowledged AI assistance in the acknowledgements section (Bhatia & Kulkarni, 2023).

Cognitive Risks

The use of AI tools is believed to increase productivity and work efficiency. However, excessive reliance on tools can diminish critical thinking, creativity, and problem-solving skills (Caffaratti et al., 2025). When students turn to AI tools for help, they unintentionally engage less deeply with their studies, relying on technology to generate answers rather than building their own critical thinking skills. As a result, their opportunities for in-person interactions decline, and they miss the benefits of exchanging ideas with peers and teachers (Mukhtar et al., 2025). In a study by Bastani et al. (2024), students who used ChatGPT to solve math problems solved 48% more problems than students without access to the AI assistant, but they scored 17% lower on the test than students without access to AI.

Overreliance on AI tools can lead to cognitive offloading, in which tasks previously performed by the student are now handled by external aids, such as AI. With AI tools readily available and capable of completing undergraduate- and graduate-level work, students may be tempted to delegate their work to AI. A study by Gerlich (2025) found a significant positive correlation between cognitive offloading and higher rates of AI tool use, and a significant negative correlation between AI use and critical thinking. Suggesting that the more reliant a student becomes on AI tools, the less time they will spend on critical thinking.

Methodology

Questionnaire

The instrument for this study was designed to include three constructs. The constructs are procrastination, AI usage frequency, and uncritical acceptance. The constructs are as follows:

Procrastination Construct (measures the psychological tendency for academic procrastination). The construct utilizes the General Procrastination Scale-9 (GPS-9), developed by Sirois et al. and used with permission (2019). See section 2 of Appendix A for further details.

AI Usage Frequency Construct (measures the extent to which students rely on GenAI for academic tasks). This construct was created by the researcher for use in this study. See section 3 of Appendix A for further details.

Uncritical Acceptance Construct (measures the likelihood of a student accepting AI-generated answers without applying critical thinking). This construct was created by the researcher for use in this study. See section 4 of Appendix A for further details.

Subjects and procedure

The sample used in this study was composed of undergraduate students majoring in one of the seven information technology concentrations at a medium-sized university in the Southeastern United States. The survey was distributed electronically via an email, containing a link to a survey hosted by SurveyMonkey. The survey was available for six weeks, and a reminder email was sent every two weeks. The survey received 51 responses (n=51) from the sample population of 868 undergraduate students, yielding a response rate of 5.8%. However, nine responses were found to be incomplete, yielding an adjusted n of 42 and a usable response rate of 4.8%. All participants were 18 years or older and provided consent to participate in the study. No uniquely identifying data was collected, and IRB approval was granted prior to distributing the survey instrument.

Table 1: Demographics (N=42)

	N		N
Year of Study		**Gender**	
Freshman	9	Male	27
Sophomore	7	Female	13
Junior	7	Prefer not to say	2
Senior	19	**Age**	
		18-22	18
		23-27	14
		28-33	3
		34-39	4
		40-44	1
		45-49	2

Data Analysis

After the dataset was cleaned to remove incomplete surveys, an exploratory factor analysis was conducted to determine the underlying constructs for the set of measurable variables. This entails four preliminary tests to assess the suitability of the data for EFA, as recommended by Mertler and Vannatta (2010): the

Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity; eigenvalues, which indicate the explanation of variance; and the scree plot. Finally, Cronbach's alpha was computed to assess internal consistency for each component.

Results

The initial Exploratory Factor Analysis (EFA) using all 24 items from the survey generated a marginal Kaiser-Meyer-Olkin (KMO) measure of 0.567. KMO values below 0.6 indicate inadequate sampling. However, after examining the Anti-image Correlation Matrix to identify items with a measure of sampling adequacy below the 0.5 threshold, two items were identified as significant outliers:

- I use AI only to find reference materials (MSA = 0.250)
- I always cite or credit AI when I use it as a tool (MSA =0.396)

These items were removed, and following their removal, the KMO measure rose to 0.687, and Bartlett's Test of Sphericity was significant (χ^2 (231) =547.50, p<0.001) (see Table 2). Therefore, the data is suitable for factor analysis.

Table 2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.687
Bartlett's test of Sphericity	Approx Chi square	547.502
	df	231
	Sig.	< 0.001

Factor Analysis

Using the Kaiser Criterion (Eigenvalues > 1), five distinct components were extracted: frequency of AI academic support, procrastination, uncritical acceptance, efficiency, and AI irresponsibility. Table 3 displays the identified constructs, the items associated with each construct, and the associated loadings. The five constructs accounted for 72.54% of the overall variance.

Table 3: Rotated Component Matrix

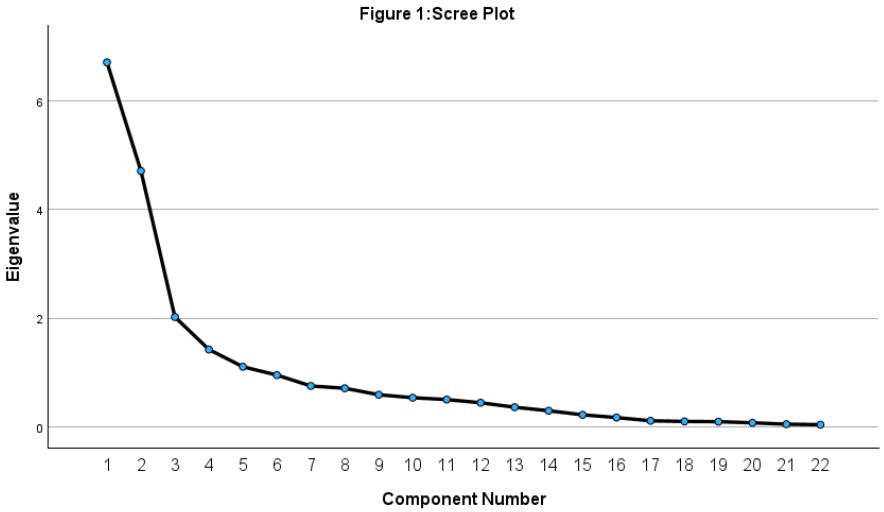
	Factor Loading				
Item Description	1	2	3	4	5
Factor 1: Frequency of AI Academic Support					
8.3 Support academic writing by proofreading	**0.907**	0.016	0.113	0.07	0.03
8.4 Support academic writing by improving clarity	**0.846**	0.1	0.133	0.176	0.071
8.1 Generate study guides or summarize course material	**0.845**	0.039	0.077	-0.149	-0.079

8.2 Prepare or brainstorm ideas	**0.76**	-0.02	0.078	-0.191	0.042
8.5 Draft or produce large sections of text	**0.73**	0.01	0.4	0.251	0.166
9.3 Rely heavily on AI to synthesize answers (last minute)	**0.709**	0.088	0.43	0.112	0.082
8.8 Solve math problems	**0.53**	-0.06	0.448	-0.131	0.211
Factor 2: Procrastination					
7.2 Even with jobs... find they seldom get done for days	0.017	**0.841**	0.098	0.044	0.133
7.3 I generally delay before starting work I have to do	0.109	**0.84**	0.064	0.177	0.157
7.1 I often find myself performing tasks intended for days before	0.235	**0.766**	0.069	-0.042	-0.224
7.4 In preparing for deadlines, I waste time on other things	-0.093	**0.753**	-0.101	0.351	0.098
7.8 I am continually saying I'll do it tomorrow	-0.164	**0.747**	-0.054	0.275	0.201
Factor 3: Uncritical Acceptance					
9.4 Submit AI text without independently verifying accuracy	0.228	0.178	**0.768**	0.157	0.169
8.7 Create computer code	0.132	-0.071	**0.721**	-0.271	0.023
9.5 Assume AI answers are detailed enough...	0.376	-0.007	**0.688**	0.15	0.298
8.6 Perform statistical analysis	0.50	-0.109	**0.624**	-0.008	0.054
7.6 I usually buy even an essential item at the last minute	0.014	0.439	**0.534**	0.318	0.183
Factor 4: Efficiency					
7.7 I usually accomplish all the things I plan to do in a day	0.016	0.106	0.151	**0.882**	0.039
7.9 Take care of tasks before settling down/relaxing	-0.062	0.446	-0.265	**0.717**	0.178
7.5 I often have a task finished sooner than necessary	0.102	0.414	0.051	**0.674**	-0.195
Factor 5: AI Academic Responsibility					
9.6 No responsibility for errors in AI-generated content	0.197	0.145	0.123	-0.058	**0.884**
9.7 Submitted AI-generated content without reading the output	0.008	0.167	0.355	0.088	**0.786**

The factor analysis revealed three items that were cross-loaded. Cross-loading occurs when an item loads onto more than one factor with a value of .32 or higher and shows a difference of less than .10 between the factor loadings (Guvendir & Ozkan, 2022). Item 8.8 loaded on factor one (0.53), but also loaded onto factor 3 (0.448). Item 7.6 loaded the strongest on factor 3 (0.534) but loaded higher than 0.32 on factor 2 (0.439) and factor 4 (0.318). Since these items have approximate loadings on more than one factor and do not measure individual behavior, these questions will be removed from the survey instrument as it is used in future studies (Guvendir & Ozkan, 2022).

Scree Plot

Figure 1 shows the Scree Plot. This graphical representation plots the eigenvalues for each component to identify the breakpoint at which the variance explained by additional factors begins to level off. The test confirms that five components should be retained.



Cronbach's alpha

Following factor analysis, Cronbach's alpha coefficients were calculated for the remaining items in each of the five extracted constructs to evaluate the internal consistency and reliability of the scales. As shown in Table 3, all reliability constructs ranged from 0.785 to 0.903, indicating acceptable to excellent internal consistency for all measures used in the study.

Table 3: Cronbach's Alpha

Construct	Number of Items	Cronbach's Alpha
Frequency of AI Academic Support	6	0.903
Procrastination	5	0.858
Uncritical Acceptance	4	0.785
Efficiency	3	0.789
AI Responsibility	2	0.799

Discussion

The purpose of this pilot study was to validate an instrument designed to measure the relationships between academic procrastination, AI usage frequency, and the uncritical acceptance of GenAI content. The exploratory factor analysis successfully identified a five-factor structure: frequency of AI academic support, procrastination, uncritical acceptance, efficiency, and AI irresponsibility. The efficiency construct is not a true factor since it is the inverse loading of the procrastination factor. The frequency of AI academic support factor showed the highest internal consistency (α = 0.903). This suggests that students' use of AI for drafting, proofreading, and brainstorming forms a highly cohesive behavioral pattern. The additional factor of AI irresponsibility further suggests that students who rely on GenAI tools may feel a lower sense of accountability for the accuracy and integrity of the generated output.

A critical finding in the factor analysis was the presence of two cross-loaded items. Item 7.6 ("Buying essential items at the last minute") cross-loads between procrastination, uncritical acceptance, and efficiency. Item 8.8 ("solve math problems") shared variance between academic support and uncritical acceptance. Following established guidelines, these items should be removed in future iterations of the survey to ensure that each item measures a distinct behavior.

Limitations

The primary limitation of this study is its small sample size. While 51 responses were collected, only 42 were suitable for the final analysis. Small sample sizes can lead to less stable factor loadings and may limit the generalizability of the findings. Additionally, the sample consisted of undergraduate students enrolled in an IT-related program. IT students may have higher-than-average GenAI literacy or different usage patterns compared to students in other disciplines, which may have influenced the resulting factor structure.

Conclusion

The pilot study successfully validated a new survey instrument to explore the intersection of procrastination and AI use in higher education. The identified factors differentiate between productive AI support and problematic, uncritical acceptance. As GenAI tools become more integrated into academic workflow, institutions must move beyond simple detection measures and focus on the psychological drivers of inappropriate use, such as procrastination. By refining this instrument to remove cross-loaded items, future researchers can develop more accurate predictive models.

While the study is limited by its small sample size and use of only IT undergraduate students, it serves as a critical first step. Future research should use this instrument across a variety of academic disciplines and larger populations to further stabilize factor loadings.

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Appendix A

Student Survey Instrument

1. I have read and understand the consent form and am at least 18 years of age.
    - **a.** Yes
    - **b.** No

Demographics

2. What is your age?
    a. 18-22
    b. 23-28
    c. 29-34
    d. 35-40
    e. 41-55
    f. 55+
3. Gender
    a. Male
    b. Female
    c. Other _____
    d. Prefer not to say
4. What is your year of study?
    a. Freshman
    b. Sophomore
    c. Junior
    d. Senior
5. What is your main concentration?
    a. Cyber forensics
    b. Cybersecurity
    c. Data Analytics
    d. Financial Technology
    e. Integrated Digital Media & Game Design
    f. Networking Technologies & Administration
    g. Software Engineering
    h. Web Applications Development
    i. Health Informatics
    j. Technology Entrepreneurship
6. Have you used Generative AI (ChatGPT, Gemini, Copilot, etc) for any academic task?
    a. Yes
    b. No

Section 2: Procrastination

Please be honest and accurate as you can throughout. Try not to let your response to one statement influence your response to other statements. There are no "correct" or "incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer.

1 False	2 Not usually true for me	3 Sometimes false/true for me	4 Mostly true for me	5 True of me

7. I often find myself performing tasks that I had intended to do days before.
8. Even with jobs that require little else except sitting down and doing them, I find they seldom get done for days.
9. I generally delay before starting work I have to do.
10. In preparing for some deadlines, I often waste time by doing other things.
11. I often have a task finished sooner than necessary.
12. I usually buy even an essential item at the last minute.
13. I usually accomplish all the things I plan to do in a day.
14. I am continually saying I'll do it tomorrow.
15. I usually take care of all the tasks I have to do before I settle down and relax for the evening.

Section 3: AI Usage

1 Never Use	2 Almost Never	3 Occasionally/Sometimes	4 Almost Every Time	5 Every time

How often have you used Generative AI tools (e.g., ChatGPT, Gemini, etc.) to do each of the following academic tasks?

16. Generate study guides or summarize course material
17. Prepare or brainstorm ideas
18. Support academic writing by proofreading
19. Support academic writing by improving clarity or helping to refine arguments
20. Draft or produce large sections of text
21. Perform statistical analysis
22. Create computer code
23. Solve math problems

Section 4: Uncritical Acceptance

1 Strongly Disagree	2 Disagree	3 Undecided	4 Agree	5 Strongly Agree

How much do you agree with the following statements regarding your use of Generative AI for academic tasks?

24. I use AI only to find reference materials.
25. I always cite or credit AI when I use it as a tool.
26. I rely heavily on AI to synthesize answers if I wait until the last minute to complete the assignment.
27. I submit AI-generated text without independently verifying the accuracy of the information provided.
28. I assume that if the AI provides a convincing answer, it is detailed enough for my assignment without further development.
29. I do not feel responsible for errors in an assignment if the content was generated by an AI tool.
30. I have submitted AI-generated content without reading the generated output.

Appendix B

GPS-9 DOWNLOADS

Below you can download the GPS-9 for use in your research. The scoring is included in the English version.

Currently the GPS-9 is available in English and Chinese.

Please remember to cite the following when using the GPS-9:

Sirois, F. M., *Yang, S., & van Eerde, W. (2019). Development and validation of the GPS-9, a short and reliable measure of trait procrastination. *Personality and Individual Differences.146, 26-33*.