

Why is it coding instead of academic performance?
Are there any unexpected outcome?
How did we come up with these questions?
What is your research gap? AI dependency and the lack of research about this inside PUPQC

CHAPTER 1

Research Points	Relevance/Application	Author/ Title	Page
What motivated your research?	As technology advances, Artificial Intelligence (AI) has become an integral tool across various fields, particularly in education. While these tools enhance productivity, excessive reliance on them may hinder students' ability to think critically and solve problems independently.	Obiwuru 2024	1
	Concerns arise about students becoming overly reliant on these tools, potentially diminishing their problem-solving skills and critical thinking abilities... especially in the early stages of learning how to code, where developing independent troubleshooting skills is essential.	Silva et al., 2024	1
What is the main goal of your study?	Provide a framework to aid PUPQC in balancing ChatGPT dependency The main goal of our study is to assess how BSIT students from PUPQC use ChatGPT for coding tasks the students' level of dependency their relationship and the strategies to be developed to balance the dependency of students to AI		
How do you come up with this research?	We came up with this research paper because we've seen how AI tools, particularly ChatGPT, are becoming increasingly common in schools, raising concerns about their effect on student learning and potential overdependence, especially in coding activities within IT education. This led us to investigate how IT students at PUPQC are utilizing ChatGPT for coding tasks, assess their levels of dependency, and ultimately propose a framework for its balanced and responsible use.		
	Recent studies show a significant adoption of AI tools by students, with ChatGPT being the most commonly used AI assistant in academic contexts. A Global AI Student Survey by the Digital Education Council (2024), revealed that 86% of students worldwide use AI tools in their studies, and		

	<p>66% specifically use ChatGPT. This highlights ChatGPT's growing importance for learning support, including coding, writing, and problem-solving activities. This prevalence underscores the increasing reliance on AI-driven platforms to enhance educational experiences.</p>		
	<p>Specific Challenges in Coding Education: Research by Silva et al. (2023), Ghimire and Edwards (2024), and Al-Zahrani (2024) specifically points out that while AI aids in coding, it can also lead to over-reliance and hinder the development of essential programming and cognitive skills, making it crucial to study its effect on IT students.</p>	<p>Silva et al. (2023)</p> <p>Ghimire and Edwards (2024)</p> <p>Al-Zahrani (2024)</p>	<p>19 - 20</p> <p>20</p> <p>20</p>
Technology Acceptance Model	<p>Justifies: <i>Why students use ChatGPT for code generation, debugging, and refactoring.</i></p> <ul style="list-style-type: none"> • Relevance: TAM, proposed by Davis (1989), evaluates how perceived usefulness and ease of use influence technology adoption. • Application: Our research examines if students find ChatGPT helpful and easy to use in coding tasks. This helps explain the increasing usage across year levels. • Connection to Problem Statement: Supports Research Question 1 (how ChatGPT is used across year levels) and Research Question 3 (relationship between usage and dependency). 	(Bandura, 1977)	
Self-Efficacy Theory	<p>Justifies: <i>Why some students are more dependent on ChatGPT than others.</i></p> <ul style="list-style-type: none"> • Relevance: Self-efficacy impacts a student's confidence in completing tasks without assistance. 		

	<ul style="list-style-type: none"> • Application: Students with low coding confidence may use ChatGPT more as a crutch, while high self-efficacy students use it strategically. • Connection to Problem Statement: Directly addresses Research Question 2 (level of dependency) and helps us understand <i>why</i> some students are more dependent. 		
Cognitive Load Theory	<p>Justifies: <i>How ChatGPT affects students' mental effort and learning quality.</i></p> <ul style="list-style-type: none"> • Relevance: CLT states that tools reducing extraneous load can aid learning—but too much assistance may reduce intrinsic cognitive engagement. • Application: ChatGPT may reduce strain in coding (e.g., by generating syntax or solving bugs), but risks limiting problem-solving growth when overused. • Connection to Problem Statement: Supports the rationale for needing a balanced framework (Research Question 4) and explains potential risks of dependency. 		
Dependency on Artificial Intelligence Scale (DAIS)	<p>Justifies: <i>How we measure the level of AI dependency quantitatively.</i></p> <ul style="list-style-type: none"> • Relevance: DAIS provides a validated, reliable scale to assess students' reliance on AI tools like ChatGPT. • Application: Used to gather quantifiable data on dependency 		

	<p>across year levels with strong internal consistency ($\alpha = 0.87$).</p> <ul style="list-style-type: none">• Connection to Problem Statement: Directly supports Research Question 2 and enables us to statistically analyze Research Question 3 (correlation between usage and dependency).		
<p>RQ1: What are the different usage of ChatGPT in coding activities across different year levels among IT students in terms of:</p>	<p>1.1 Code Generation</p> <p>Theoretical Framework Justification:</p> <ul style="list-style-type: none">• Technology Acceptance Model (TAM) explains why students adopt ChatGPT for generating code based on <i>Perceived Usefulness</i> (speed, efficiency) and <i>Ease of Use</i> (natural language interface).• Cognitive Load Theory supports the use of ChatGPT in reducing coding complexity for beginners. <p>RRL Justification:</p> <ul style="list-style-type: none">• Wollowski (2023) found that students use ChatGPT to generate working code in programming tasks.• Scholl & Kiesler (2024) observed that novice coders often use ChatGPT for generating full blocks of code instead of solving logic on their own. <p>Implication: Understanding code generation patterns informs the extent to which ChatGPT assists or replaces students' coding process.</p>		

1.2 Debugging

Theoretical Framework Justification:

- **Self-Efficacy Theory** suggests students with low confidence in their debugging skills may rely heavily on ChatGPT to resolve errors.
- **Cognitive Load Theory** supports this use when it helps manage overwhelming error messages.

RRL Justification:

- **Silva et al. (2023)** and **Abdulla et al. (2024)** show that ChatGPT is frequently used for real-time debugging, providing immediate feedback and error corrections.

Implication: This insight helps assess whether students are using ChatGPT to learn or just bypass cognitive effort.

1.3 Code Refactoring

Theoretical Framework Justification:

- **TAM** applies as students consider the benefits of cleaner, more optimized code through AI assistance.
- **Cognitive Load Theory** helps explain how AI can ease the refactoring process, but may also reduce deeper understanding if overused.

RRL Justification:

- **Sun et al. (2024)** noted that upper-year students primarily use ChatGPT to

	<p>enhance readability and efficiency of existing code.</p> <p>Implication: Determines if refactoring use evolves with coding maturity or adds to long-term dependency.</p>		
<p>RQ2: What is the IT students' dependency level on ChatGPT when performing coding activities?</p>	<p>Theoretical Framework Justification:</p> <ul style="list-style-type: none"> • Self-Efficacy Theory connects directly—those with low confidence in their skills are more likely to form strong dependencies on AI tools. • DAIS (Dependency on AI Scale) offers a validated instrument to measure this dependency. <p>RRL Justification:</p> <ul style="list-style-type: none"> • Ghimire & Edwards (2024) showed students frequently copied AI-generated code without analyzing it, indicating rising dependency. • Morales-García et al. (2024) created the DAIS tool used in your research, emphasizing the measurable cognitive and behavioral aspects of AI reliance. <p>Implication: Supports the need for assessing the extent and risk of ChatGPT dependency to preserve student learning integrity.</p>		
<p>RQ3: What is the relationship between IT students' ChatGPT usage per year level and their level of dependency?</p>	<p>Theoretical Framework Justification:</p> <ul style="list-style-type: none"> • TAM + Self-Efficacy + DAIS combined help show how perceptions of AI usefulness and coding confidence influence dependency over time. • Theories together explain that as 		

	<p>students find AI easier and more helpful, dependency increases with academic year.</p> <p>RRL Justification:</p> <ul style="list-style-type: none"> • Pan et al. (2024) found that perceived ease, trust, and low self-confidence predicted both higher usage and higher dependency. • Ododo et al. (2023) showed that senior students with high AI exposure developed strong reliance, particularly in large projects. <p>Implication: Validates your hypothesis that higher academic levels correlate with stronger AI dependency.</p>		
<p>RQ4: What framework can be developed to help students effectively balance the use of ChatGPT in coding activities?</p>	<p>Theoretical Framework Justification:</p> <p>Cognitive Load Theory provides principles for designing interventions that reduce overload without encouraging overdependence.</p> <p>TAM and Self-Efficacy Theory help tailor the framework to improve students' motivation and acceptance for guided, responsible use.</p> <p>RRL Justification:</p> <ul style="list-style-type: none"> ○ Holmes et al. (2020) proposed a Balanced AI Pedagogy Framework that promotes guided AI use rather than unregulated reliance. ○ Selwyn (2021) warns 		

	<p>against “automation bias” and supports the inclusion of critical engagement practices within AI use.</p> <p>Implication: A framework ensures AI supports student learning without replacing essential skills—helping IT students become independent.</p>		
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CHAPTER 3

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What research design did you use and why?	Quantitative Research Design Descriptive-correlational approach <ul style="list-style-type: none"> To assess both the extent of ChatGPT usage and the dependency levels among IT students. To examine the relationship between these variables. The <u>descriptive part allowed us to quantify usage patterns</u>, while the <u>correlational part tested if usage significantly relates to dependency</u> 		42																								
What is your source of data?	Data was gathered from BSIT students at PUP Quezon City from all four year levels . We used <u>Google Forms to distribute the questionnaire online</u> and ensured proportional representation of each year level.		42																								
How did you determine your sample size?	With an estimated student population of 389 , <u>Yamane's formula</u> was applied with a 5% margin of error, resulting in a sample of approximately 198 students. Stratified Sampling was then used to ensure the diverse representation of all year levels.	<p style="text-align: center;">Table 1. Sample Size (BSIT Students per year level)</p> <table border="1"> <thead> <tr> <th>YEAR</th><th>NO. OF STUDENTS</th><th>PERCENT</th><th>SAMPLE SIZE</th></tr> </thead> <tbody> <tr> <td>First Year</td><td>113</td><td>28.79%</td><td>57</td></tr> <tr> <td>Second Year</td><td>104</td><td>26.77%</td><td>53</td></tr> <tr> <td>Third Year</td><td>90</td><td>23.23%</td><td>46</td></tr> <tr> <td>Fourth Year</td><td>82</td><td>21.21%</td><td>42</td></tr> <tr> <td>TOTAL</td><td>389</td><td>100%</td><td>198</td></tr> </tbody> </table>	YEAR	NO. OF STUDENTS	PERCENT	SAMPLE SIZE	First Year	113	28.79%	57	Second Year	104	26.77%	53	Third Year	90	23.23%	46	Fourth Year	82	21.21%	42	TOTAL	389	100%	198	42
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What is Yamane?	<p>Yamane's formula is a simplified statistical method developed by Taro Yamane (1967) for determining an appropriate sample size from a known population.</p> <p>It is used when the population size is known.</p> <p>In this study, Yamane is used to</p> <ul style="list-style-type: none"> Determine valid sample size Ensure that the data collected is a representation of the entire population. Maintain a reliable margin of error. Allocate respondents proportionally across year levels, 																										
What research instrument did you use?	Structured survey questionnaire which has 4 parts <ul style="list-style-type: none"> ChatGPT Usage in Coding Activities 																										

	<ul style="list-style-type: none"> IT students' level of dependency in AI based on Dependency on Artificial Intelligence Scale (DAIS) developed by Morales-García et al. (2024). Relationship between IT students' dependency and year level Strategies to balance dependency 		
How did you validate your questionnaire?	<p>The questions were properly validated by a statistician through Cronbach's Alpha.</p> <p>Cronbach's Alpha evaluates whether the items in each part of your questionnaire reliably measure the same concept</p>		Appendix 5: pg 122
What ethical considerations did you observe?	<p>The ethical consideration observed here are:</p> <p>We secured ethical clearance, obtained informed consent, ensured anonymity, and emphasized voluntary participation. Participants were informed of their right to withdraw at any time.</p>		45
How did you gather your data?	Data were collected through Google Forms , which were shared with BSIT students via group chats		45
What statistical tools did you use?	<p>Weighted mean was used to interpret levels of ChatGPT usage and dependency.</p> <p>Spearman's Rho was used to analyze correlations between usage and dependency per year level.</p>		47

CHAPTER 4

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