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ChatGPT as a Mediating Tool in Education: Enhancing Learning Efficiency, Academic Performance, and Academic Self-Concept In Effort-Talent Focused Environments

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Introduction & Literature Review

The integration of AI in education, especially tools like ChatGPT, has transformed how students learn, offering personalized instructions and targeted feedback and increasing autonomy (Albadarin et al., 2024, Firat, 2023; Lai, 2021).

Students widely use ChatGPT for homework assistance/support, concept generation and clarification,—functions linked to improved learning efficiency and academic performance (Lera et al., 2023).

Learning efficiency is optimized when students receive immediate, tailored feedback and support as they help learners understand content and self-regulate their progress. (Hoffman & Schraw, 2010, Shemshack & Spector, 2020).

Learning Efficiency → Academic Performance → Academic Self-Concept

ChatGPT enhances efficiency by providing step-by-step guidance, structured tutoring, formative feedback, and real-time corrections (Lera et al., 2023; Mollick, 2023).

Academic performance improves with ChatGPT through heightened critical thinking, motivation, and self-efficacy (Parsakia, 2023; Yuan & Liu, 2025).

There are risks of plagiarism, misinformation, fabrication and ethical violations, emphasizing the need for ethical use (Hutson, 2024; Khalaf, 2025).

Learning Efficiency → Academic Performance → Academic Self-Concept

Academic Self-concept is shaped by student evaluations, peer comparison, and parental influence (Kavanagh, 2020; Marsh & Martin, 2011).

Self-evaluation reflects perceived academic competence, shaped by past achievements and influenced by experiences of success or failure (Wu et al., 2021; Preckel et al., 2013).

College-educated parents often instill greater confidence in their children's learning abilities through academic support and involvement (Chevalère et al., 2022; Yeung et al., 2010)

Research Statement

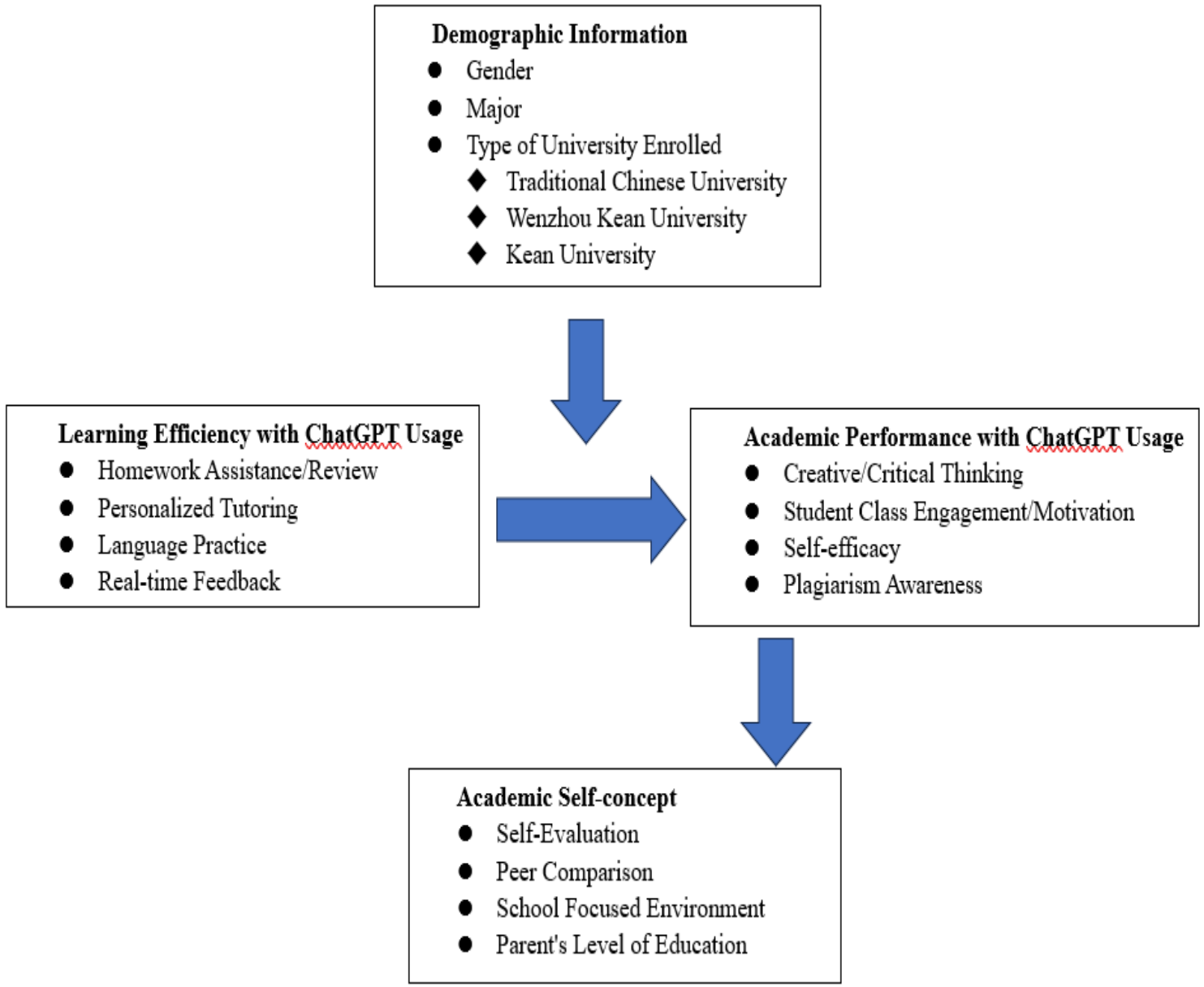
To investigate ChatGPT’s potential role in enhancing learning efficiency, academic performance, and academic self-concept.

Sub-objectives

1. To describe the use of AI in college students' study.
2. To explore college students' perceptions on the influence of ChatGPT on their learning efficiency, and academic performance
3. To determine correlations of learning efficiency, academic performance and academic self-concept.

Conceptual Framework

By analyzing responses from 563 students at Kean University, Wenzhou-Kean University and traditional University, it aims to provide insights into the educational value and practical application of ChatGPT in higher education.



Methodology

Design & Approach

- Descriptive and correlational study using a quantitative survey
- Online surveys via Sojump and Qualtrics.

Ethical Consideration

- IRB approval
- Informed consent
- Declaration of AI Generative

Instrument & Reliability

Self Constructed Survey using five point Likert Scale

- Learning Efficiency with ChatGPT Usage ($\alpha = 0.925$)
- Academic Performance with ChatGPT Usage ($\alpha = 0.710$)
- Academic Self-concept ($\alpha = 0.828$).

Legend: Strong (4.51-5.00); Good (3.51-4.50); Average (2.51-3.50); Somewhat low (1.51-2.50); Low (1.00-1.50).

Analysis

SPSS

- Descriptive Stats: Mean, SD, frequency distribution, percentiles
- Inferential Stats: Pearson coefficient correlation ($p < 0.05$)

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Discussions & Implications

Purpose of ChatGPT Use

Homework Review:

- Get hints on key points of a question
- Find explanations of academic concepts
- Get step-by-step instructions for complex Tasks

Personalized Tutoring:

- Seek clarification of complex concepts
- Program or solve technical problems
- Tailor a structured study plan

Construct	Options		P(%)
Homework Review	Get hints on key points of a question.	343	75.1
	Get step-by-step instructions for complex tasks	315	68.9
	Find explanations of academic concepts	327	71.6
	Brainstorm for ideas for answers to assignments	[illegible]	53.6
Personalized Tutoring	Seeking clarification of complex academic concepts	322	87.7
	Tailor a structured study plan	155	42.2
	Programming or solving technical problems	167	45.5
	Completing assignments including writing papers	128	34.9
	Others, please specify	22	6.0

Purpose of ChatGPT Usage

Language Practice:

- Translation and vocabulary assistance
- Interactive conversation exercises
- Correction of grammar, vocabulary and pronunciation

Real-time Feedback (academic writing):

- Text structure
- Grammar
- Spelling

Language Practice	Interactive conversation exercises simulating everyday communication situations	102	67.1
	Correction of grammar, vocabulary and pronunciation	[illegible]	62.5
	Translation and vocabulary assistance	107	70.4
	I think ChatGPT has improved my language learning efficiency.	4	2.6
Real-time Feedback	Grammar	180	57.5
	Spelling	[illegible]	44.4
	Text structure	212	67.7
	Academic language	160	51.1

ChatGPT： Learning Smarter and Faster

Homework Review	Using ChatGPT makes it easier for me to complete assignments.
Personalized Tutoring	I feel that my study learning efficiency has improved by using ChatGPT to assist with homework.
	Personalized tutoring with ChatGPT is well adapted to my learning pace, helping me grasp difficult concepts more easily.
	ChatGPT helps me identify my weaknesses, allowing me to focus on the areas where I need to improve.
	The personalized learning experience provided by ChatGPT has improved my overall learning efficiency.

Overall, findings indicate that ChatGPT use enhance learning efficiency:

- **makes study task easier**
- **helps clarify difficult concepts**
- **improves academic writing quality.**

Homework Review and Personalized Tutoring

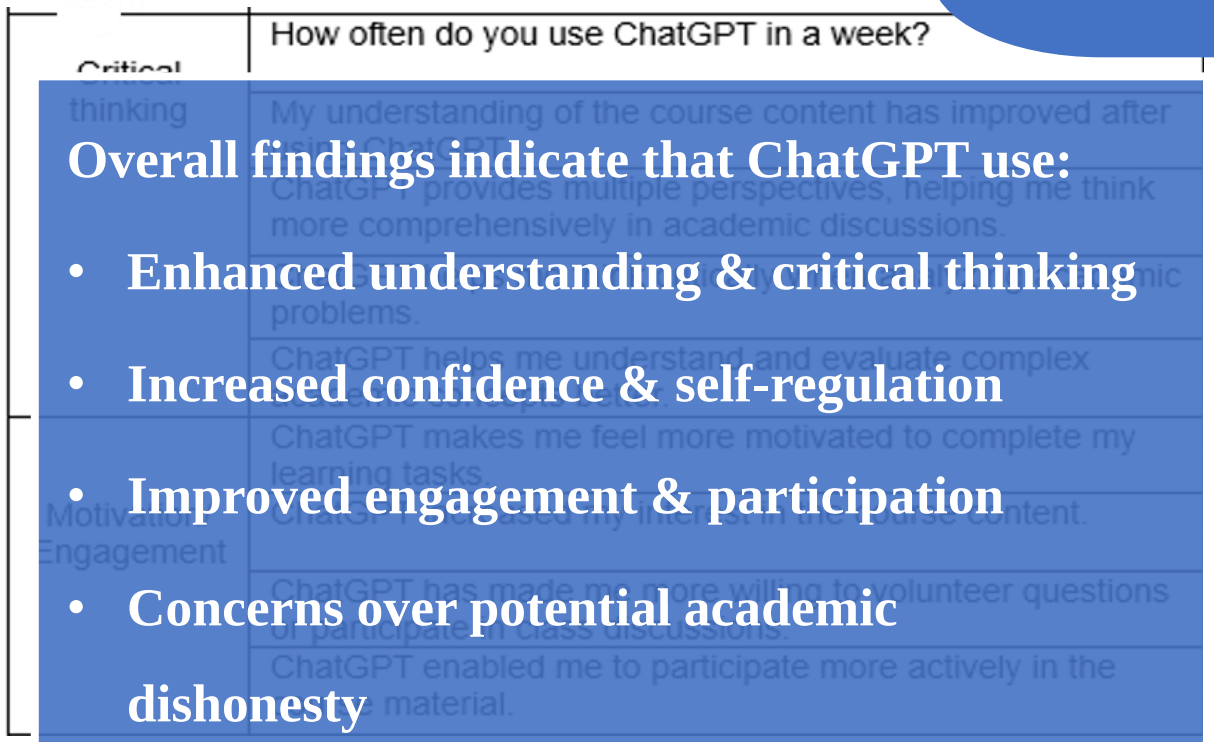
Students rated Homework Review (M=4.22) and Personalized Tutoring (M=4.07) as "Agree," indicating ChatGPT use significantly simplifies study tasks, aids in grasping complex concepts, and targets areas needing improvement.

Language Practice & Real-time Feedback (Academic Writing)

Students rated language practice (M = 4.05) and academic writing (M = 3.79) as "Agree," indicating that ChatGPT use significantly contribute to their target language skill development and improved academic writing quality.

Language Practice	I think using ChatGPT-generated conversational materials is appropriate for my language level.
	I think ChatGPT has improved my language learning efficiency.
Real-time Feedback	I think ChatGPT's real-time feedback accurately guides me to improve my academic writing.
	Compared with traditional methods such as peer review or instructor feedback, real-time feedback from ChatGPT has increased my learning engagement.
	I feel that using ChatGPT for real-time feedback improves my overall learning efficiency.

ChatGPT: Benefits and Risks in Academic Performance



Overall findings indicate that ChatGPT use:

- **Enhanced understanding & critical thinking**
- **Increased confidence & self-regulation**
- **Improved engagement & participation**
- **Concerns over potential academic dishonesty**

Critical Thinking and Motivation/Engagement

Students rated critical thinking (M=3.78) as "Agree," and motivation/ engagement (M=3.49) as "Average" indicating ChatGPT use significantly improved their understanding of complex academic problems, enhanced analytical thinking, and motivated more active class participation.

Self-efficacy and Plagiarism awareness

Students rated self-efficacy (M=3.75) as "Agree," indicating ChatGPT use significantly improved their confidence, help self-regulating learning and reduce anxiety. While plagiarism awareness (M= 3.59) rated as "Agree," indicates students' recognition of ChatGPT's usefulness for concept clarification and independent work, while noting concerns about potential academic dishonesty.

Self-efficacy	ChatGPT makes me feel more confident and less anxious when completing academic tasks.
	ChatGPT helps me feel more able to self-monitor when I am learning.
	ChatGPT's feedback has increased my confidence in overcoming learning challenges when completing assignments or projects.
	ChatGPT boosts my confidence in tackling learning challenges and understanding complex course concepts.
	ChatGPT's usefulness in academic learning gives me confidence in improving my academic performance.
Plagiarism Awareness	ChatGPT makes it easier to complete assignments without personal effort, raising concerns about plagiarism and its potential negative impact on my academic performance.
	I recognize that "patchwriting", which involves making minor modification to an original passage of text—even when cited— is a violation of academic integrity and could negatively affect my academic performance.

Students' Academic Self-Concept Levels

Parent's level of education	My perception of my own academic potential is shaped by the level of education my parents have achieved.
	My parents' reading habits strengthened my reading concept.
	My parents take me to cultural activities, such as viewing exhibitions, visiting museums, and attending
	The extent my parents communicate coursework with me increases my confidence in mastering the learning materials.
Self-evaluation	My ability to take well-organized notes strengthens my
	Feeling that most exams are easy for me enhances
	Having a clear sense of my academic goals boosts
	Being good at scheduling my study time contributes to my positive academic self-concept.

Overall, findings indicate :

- **Moderately positive self-concept**
- **Strongest in school-focused environment and self-evaluation**
- **Supportive school climate and personal effort strengthen self-belief**

Parents' educational level & Peer Comparison

Students rated parents' educational level (M = 3.09) and peer comparison (M = 3.39); both recorded lower means as "Average" suggesting that students' academic self-concept is more neutral when influenced by familial background and social comparison.

Self-Evaluation & School-Focused Environment

Students rated self-evaluation and school-focused environment "Agree" (M = 3.73) and (M = 3.79); indicating that students tend to view their academic abilities more positively when shaped by personal effort and supportive school environments.

Peer-comparison	I believe I perform academically better than the average level of my peers.
	I find it easier to learn new things in my studies than my classmates do.
School-focused environment	The effort-focused feedback (such as"Well done, you're working hard") received from the teacher made me feel confident in my learning ability.
	The more the school values hardworking students, the more confident I am in my academic performance.
	The talent-focused feedback (such as"Well done, you're smart") received from the teacher makes me feel confident in my learning ability..
	The more the school emphasizes inherent intelligence and talent, the more confident I feel in my academic performance.

Learning Efficiency → Academic Performance → Academic Self-Concept

Table 5: Correlations between Variables

Variables	1	2	3
Learning Efficiency	—		
Academic Performance	.778**	—	
Academic Self-Concept	.258**	.432**	—

**. Correlation is significant at the level of .01 level (2-tailed)

Results revealed there was a ***strong positive correlation*** between learning efficiency and academic performance, r (506) = .78, $p < .01$.

While results showed **a *moderate positive correlation*** between academic performance and academic self-concept, r (523) = .43, $p < .01$.

Learning Efficiency ⟺ Academic Performance

Constructs	Learning Efficiency				
	Variables	Homework Review	Personalized Tutoring	Language Practice	Real-Time Feedback
Academic Performance	Critical Thinking	.70**	.75**	.66**	.81**
	Motivation/Engagement	.42**	.56**	.74**	.74**
	Self-Efficacy	.61**	.72**	.77*	.79**
	Plagiarism Awareness	.07	.11**	.01	.29**

**. Correlation is significant at the level of .01 level (2-tailed)

Analysis:

- Strong correlations with critical thinking(r = .81; r= .75), motivation/engagement (r = .74) and self-efficacy (r = .79).
- Real-time feedback (e.g., ChatGPT) and personalized tutoring strongly enhances learning efficiency and academic performance.
- Efficient learning processes boost students' confidence.

Is there a significant relationship between learning efficiency and academic performance?

Implications:

- Integrate AI-driven feedback (e.g., ChatGPT) and customized learning to target deeper understanding and analytical thinking.
- Integrating AI feedback can foster self-regulating learning and student confidence.
- Personalized, timely support feedback enhance both cognitive skills and self-beliefs.
- Balance AI use with **ethical safeguards** to mitigate over-reliance risks.

Academic Performance ⟷ Academic Self-Concept

Constructs	Academic Self-Concept				
	Variables	Parents' Educational Level	Self-Evaluation	Peer Comparison	School Focused Environment
Academic Performance	Critical Thinking	.18**	.20**	.23**	.28**
	Motivation/Engagement	.33**	.21**	.28**	.28**
	Self-Efficacy	.28**	.27**	.29**	.33**
	Plagiarism Awareness	.25**	.23**	.18**	.23**
**. Correlation is significant at the level of .01 level (2-tailed)					

Analysis:

•Positive correlation with parents' educational level and school focused environment($r = .33$, $p < .01$) fostering a **reciprocal loop.**

•ChatGPT use enhances self-efficacy, → triggering teacher recognition/reinforcement (e.g., praise for effort) and further boosting self-concept → higher grades.

•Parental cultural enrichment (e.g., museums, educational events) and educational background ↑ motivation, focus, and self-perception as capable learners.

Is there a significant relationship between Academic Performance and Academic Self-Concept?

Implications:

- AI tools like ChatGPT support a positive feedback loop: higher self-efficacy → teacher affirmation → stronger self-concept → improved academic performance.
- Cultural enrichment activities complement AI-enhanced learning by fostering confidence and sustained academic engagement.
- Holistic support (AI, teachers, family) amplifies learning outcomes →strengthen academic self-concept.

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Conclusion, Limitations & Recommendations

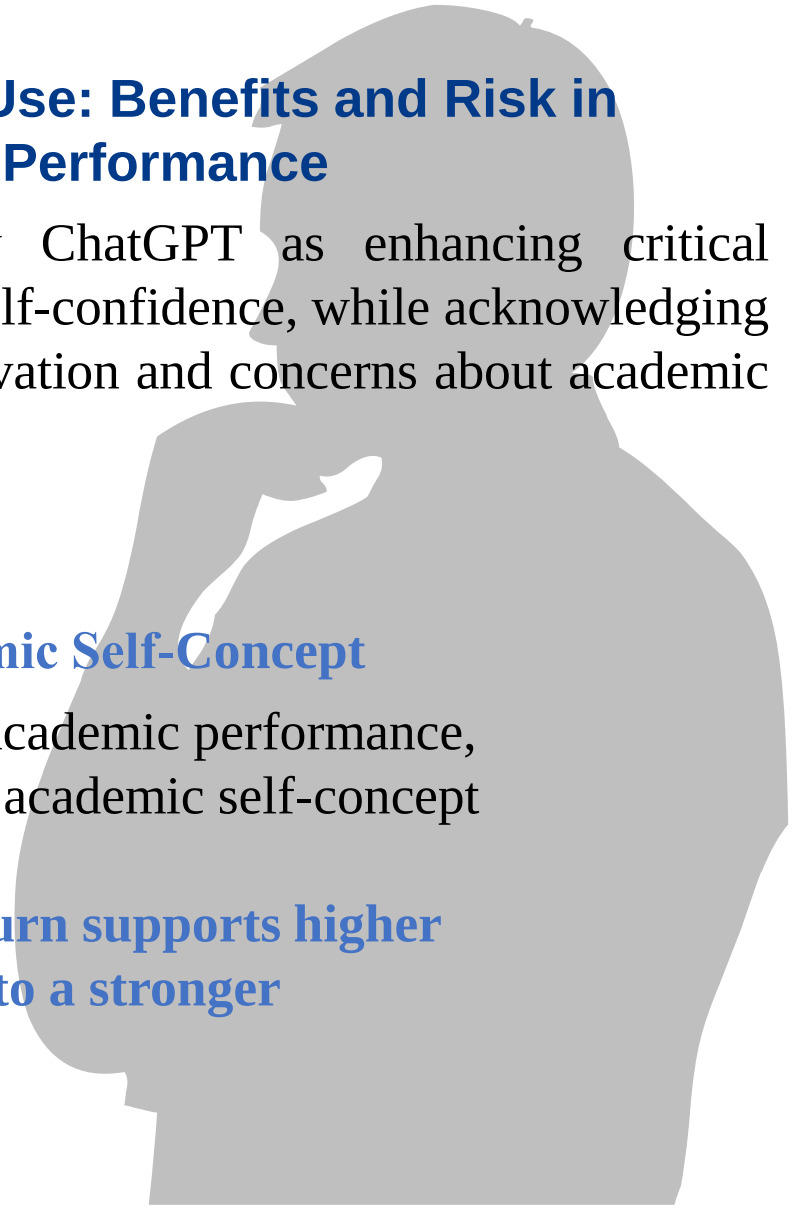
Conclusion

- **ChatGPT Use: Learning Smarter and Faster**

Students perceived ChatGPT as enhancing learning efficiency, particularly through homework review and personalized tutoring, by simplifying study tasks and clarifying complex concepts.

- **ChatGPT Use: Benefits and Risk in Academic Performance**

Students view ChatGPT as enhancing critical thinking and self-confidence, while acknowledging moderate motivation and concerns about academic integrity.



- **Learning Efficiency → Academic Performance →Academic Self-Concept**

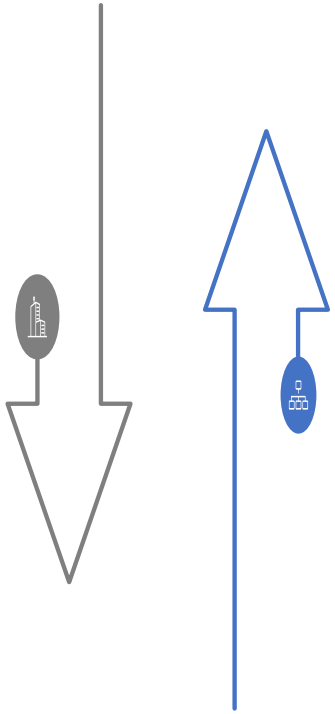
Learning efficiency showed a strong positive association with academic performance, whereas academic performance was only moderately related to academic self-concept

“ChatGPT, may enhance learning efficiency, which in turn supports higher achievement and, to a lesser degree, contributes to a stronger academic self-concept.”

Limitations & Recommendations

Study Limitations

- Correlational design; no causal conclusions
- Outcomes may reflect pre-existing factors (e.g., motivation, parental support)
- Risk of skill erosion with excessive AI reliance
- Accuracy and ethical concerns (plagiarism, feedback validity)



Recommendations

• Integrate AI tools that offer immediate, personalize and constructive feedback.

•Design scaffolded tasks to promote critical thinking & integrity

•Use effort-based praise to build self-concept

•Encourage parents to facilitate culturally enriching activities

•Expand research to under-resourced settings

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