Asian Journal of Assessment in Teaching and Learning
*Vol 15, Issue 2, 2025 (43-57) /eISSN **2821-2916***

Student's Attitudes and Motivations Toward Using ChatGPT Feedback for Personalised Learning

Ik-Ying Ngu[1*], Sie-Yon Lau[2], Marcelo Schellini[3]
[1]Faculty of Business, Design and Arts, Swinburne University of Technology, Sarawak Campus, Malaysia
[2]Faculty of Engineering and Science, Curtin University Malaysia, Malaysia
[3]Faculty of Arts and Social Science, Universiti Brunei Darussalam, Brunei

*Corresponding author: iyngu@swinburne.edu.my

Received: 4 August 2025; **Revised**: 10 October 2025;
Accepted: 27 November 2025; **Published**: 19 December 2025

To link to this article: https://doi.org/10.37134/ajatel.vol15.2.3.2025

Abstract

This study investigates students' attitudes and motivations in using ChatGPT-generated feedback to support their learning at the tertiary level. The study discerned the factors that influenced students' feedback usage and compared the way they learned from ChatGPT (Artificial Intelligence mediation) and Educators (skilled individuals) across three key stages of assessment – ideation, execution, and completion. The art of personalised learning is described using Vygotsky's social constructivism, which articulates and explores the dynamic between the three different learning zones and the roles of ChatGPT and educators in personalised learning. Employing a mixed-method research design, the study collected quantitative data through online survey of 102 undergraduate students from across five disciplines (Arts and Communication, Commerce and Business, Information Technology, Engineering and Sciences, and Health and Applied Sciences) - at an Australian offshore campus in Sarawak, Malaysia. Qualitative insights were gathered through semi-structured interviews to explore recurring themes and patterns in participants' perceptions and experiences. Findings revealed generally positive attitudes toward ChatGPT-generated feedback, and students' motivation was influenced by personal learning goals, institutional policies on AI use, and assessment practices. The study provides insights to educators in redesigning effective measures to integrate hybrid human-AI feedback solutions into the course curriculum and assessment based on students' perspectives and characteristics, such as self-regulation, attitude, and motivation.

Keywords: *Artificial Intelligence, Attitude, ChatGPT, Feedback, Motivation*

INTRODUCTION

Since ChatGPT was released in November 2022, the chatbot has gone viral and become debatable in academic settings (Frydenberg et al., 2024) when many higher-degree students adopted it (Wong, 2024). However, the introduction of ChatGPT has posed multiple challenges to education by changing its practices (Krašna & Bratina, 2024) and paradigms (Kayyali, 2024) as well as redefining the originality of students' work that could possibly be framed as academic misconduct and plagiarism (Bhullar et al, 2024; Luo, 2024). When the assessments get more complex, it becomes harder to differentiate the authorship of students' work (Irena et al., 2024) because ChatGPT can paraphrase responses and make them less detectable by existing detection software (AlAfnan et al., 2023). Furthermore, ChatGPT-generated feedback is found to be less effective than human feedback in addressing errors in passive voice and improving syntax in writing (Cao & Zhong, 2023).

The study investigates how students engage with ChatGPT-generated feedback in the context of personalised learning. Drawing on Vygotsky's (1978) social constructivism to explore students' relationships with the more knowledgeable others, this study intends to fill the knowledge gap in Artificial Intelligence (AI) and education literature on how students' attitudes and motivations affect their personalised learning. The findings will help develop new academic applications to address students' needs in a technology-driven landscape. The study aims to address two research questions:

1. What factors influence students' attitudes and motivation toward using ChatGPT-generated feedback in their learning?
2. How do students engage with ChatGPT-generated feedback across different learning zones and stages of their writing assessment process?

LITERATURE REVIEW

1. The Role of AI in Personalised Learning

AI has been increasingly used in several domains, especially in education, where the research in this setting is rapidly increasing (Hinojo-Lucena et al., 2019; Krishnan et al., 2019; McGrew et al., 2018; Song & Wang, 2020). As students start seeking more personalised and interactive learning experiences, there is a need for educational tools that can support them with feedback that provides meaningful insights (Dann et al., 2024), which could be better than human teachers (Dai et al., 2023). Students need feedback that suggests improvements (Schartel, 2012; Lee, 2023) and helps them understand their performance in real-time (Hooda et al., 2022) as well as develop critical and writing skills (Singh et al., 2024; Rad, Alipour & Jafarpour, 2023).

Several studies have highlighted the potential of AI to be used in the context of personalised learning to enhance students' learning outcomes and academic performance (Kaswan et al., 2024; Pratama et al., 2023) as well as their motivation and engagement (Lampropoulos, 2023). AI tools facilitate the learning process through advanced, individualised and automated feedback systems (Bhutoria, 2022; Ogata et al., 2024). Personalised learning is a student-centred approach that optimises the needs of learners (Xie et al., 2019). This method supports adaptive learning approaches by customising learners' learning environments (Soler Costa et al., 2021) based on either the cognitive characteristics or behavioral traits of learners, and their level of knowledge (Nguyen & Nguyen, 2023).

Generative AI tools such as ChatGPT support personalised learning by enhancing student autonomy (Bhullar et al, 2024), providing timely feedback, and alleviating their communication anxiety (Chan & Colloton, 2024). Gen-AI has also been successfully integrated into educational platforms for language processing tasks (Abdelhalim, 2024; AlAfnan et al., 2023; Cao & Zhong, 2023) and empowers students to learn independently based on their proficiency levels (Tam, 2024). There is a potential for AI to be integrated into the curriculum and support special education (Papakostas et al., 2021), but not necessarily more effective than human teachers (Woo et al., 2021). Even though it is less proactive, it evaluates content organisation, analyses language usage, and provides proofreading (Su, Lin & Lai, 2023).

2. Students' Engagement with Feedback – Competency, Attitude and Motivation

Feedback is a learning process where students themselves make meaning of information they get from multiple sources (Boud & Molloy, 2013; Carless, 2015) to improve their academic achievement (Hattie, 2017). Despite the traditional conception of information delivered mainly by educators (Hattie & Timperley, 2007; Price, Handley & Millar, 2011), recent studies have shifted the focus of feedback literacy from feedback providers to receivers (Hattie & Clarke, 2018; Yang, 2021) and explored the centrality of student's role in learning, comprising their understanding, capacities, and dispositions needed to make sense of information and use it to enhance learning strategies (Little et al., 2024). Student feedback literacy comprises the three dimensions of knowing, being, and acting, which refers to the ability of students to interpret information and apply it to improve their learning (Sutton, 2012). Feedback is perceived as a process-oriented approach that includes appreciating feedback, forming

judgments, controlling emotions, and acting (Carless & Boud, 2018). Students are perceived as having their own perceptions and interpretations of feedback that can turn external feedback into learning opportunities (Yang, 2021).

When students compare their current knowledge and competence against existing references, they learn new knowledge, and this is called internal feedback (Nicol, 2021). Most studies suggest that integrating external feedback from educators and peers help students identify knowledge gaps and improve their study (Nicol & McCallum, 2022; Nicol & Selvaretnam, 2022). If students receive feedback on their performance gap and positive reinforcement, their grades are usually higher than those who only receive feedback on their performance gap (Faulconer et al., 2021). Likewise, feedback on strengths and suggestions for improvement helps students to achieve their learning objectives (Kutasi, 2023).

Students' digital competencies in using high-quality prompts to generate meaningful feedback from ChatGPT (Su, Lin & Lai, 2023) contribute to the effectiveness of feedback. ChatGPT feedback is usually generated based on vast amounts of text data (Chang et al., 2024) and prompts entered by users (Weber-Wulff et al., 2023). If students know how to create relevant prompts, ChatGPT will be able to generate accurate responses by maximising the contextualisation of content and personalising the interaction (Zamfirescu-Pereira et al., 2023). Other than prompts, students' personal goals, self-regulation strategies, and their ability to leverage ChatGPT's multilingual capability influence the quality of its feedback and the crafting of effective prompts (Tam, 2024). ChatGPT, in turn, caters to students' specific learning needs (Su, 2023) and helps to improve their ability to value ideas through experiential learning methodologies (Somià & Vecchiarini, 2024) and provides visual aids and text summaries that improved students' competencies, nurtured imaginative thinking, and optimized their time management (Iskandar, 2023). Providing choices enhances individuals' intrinsic motivation because it supports the satisfaction of psychological needs for autonomy, competence and relatedness (Ryan & Deci, 2023; Ngu, 2025).

Attitude is an evaluative reaction based on an individual's beliefs and opinions about a specific topic, and it can be considered a component of motivation in language learning (Gardner, 1985). In a broader sense, attitude can be defined based on three components: cognitive, affective, and behavioral (Wenden, 1991). Students' attitude toward learning influences their behaviours and has often been related to achievement (Weinburgh, 1998). If students have a positive attitude toward language, this will enhance their proficiency (Gardner & Lambert, 1972). Besides, students' attitudes and motivations are affected by contexts or environmental, social, and situational factors (Ajjawi et al., 2017). These contexts, including the design of the technology, are crucial in generating effective feedback and tailoring it to the student's specific needs and circumstances (Ajjawi et al., 2017; Hall & Kidman, 2004; Ngu et al., 2025) and encouraging the adoption of AI tools (Wong, 2024).

3. Theoretical Framework

Student engagement with ChatGPT-generated feedback is regularly associated with students' learning outcomes and academic performance, but little is known about how students perceive AI-generated feedback (Nazaretsky et al., 2024). Precisely what motivates them to use ChatGPT and what factors relate to their attitudes towards it remains a topic of debate. Stojanov (2023) suggests that ChatGPT can be used as More Knowledgeable Others (MKOs) for learning. MKOs may include third parties such as parents, peers, educators, and digital tools. Furthermore, Su and Lai (2023) mention the importance of scaffolding and feedback to students when incorporating ChatGPT into writing assessments and Tang et al. (2024) emphasise the need for critical, dialogic engagement for authentic interaction with ChatGPT.

The social constructivist theory is integrated into this study as a conceptual framework to examine how interacting with a more skilled individual (Educator) and suitable mediation (ChatGPT) helps students obtain and internalise their cognitive abilities during learning activities. This theory proposes that learners construct personal knowledge from the learning experience itself and through their social interaction with the environment. By observing students' responses to both sources, we could recognise their attitudes and motivation to develop academic writing skills. This theory assumes that personalised learning happens through social interactions and personal experiences (Xie et al., 2019).

Vygotsky's (1978) social constructivism proposes that individual learning is divided into three zones, which are the zone of Actual Development (ZAD-learners can learn by themselves), the zone of Proximal Development (ZPD-learners learn from skilled individuals), and the zone of Distant Development (ZDD-learners require external mediation and assistance). Aljaafreh and Lantolf (1994, 470-471) suggest a five-level writing mediation model indicating learners achieved writing self-regulation through a tailored and personalised writing mediation. The levels are characterised by intervention, noticing an error, and correcting the error. Level 1 to 3 shows learners dependent on tutors (skilled individuals) and other regulated individuals, while Levels 4 to 5 reveal that learners are able to detect and correct their own mistakes and self-regulate.

By integrating both theory and model into research, Fathi & Rahimi (2024) found that English as a foreign language learners have positive attitudes and perceptions towards AI-enhanced mediation, and the AI platform has substantially contributed to their academic writing skills development. Likewise, this study adopted both theory and models to analyse the data and explore how students from multiple disciplines respond to ChatGPT-generated feedback across their three learning stages: ideation, execution, and completion. The modified Aljaafreh and Lantolf's model (1994) can be described in Figure 1.

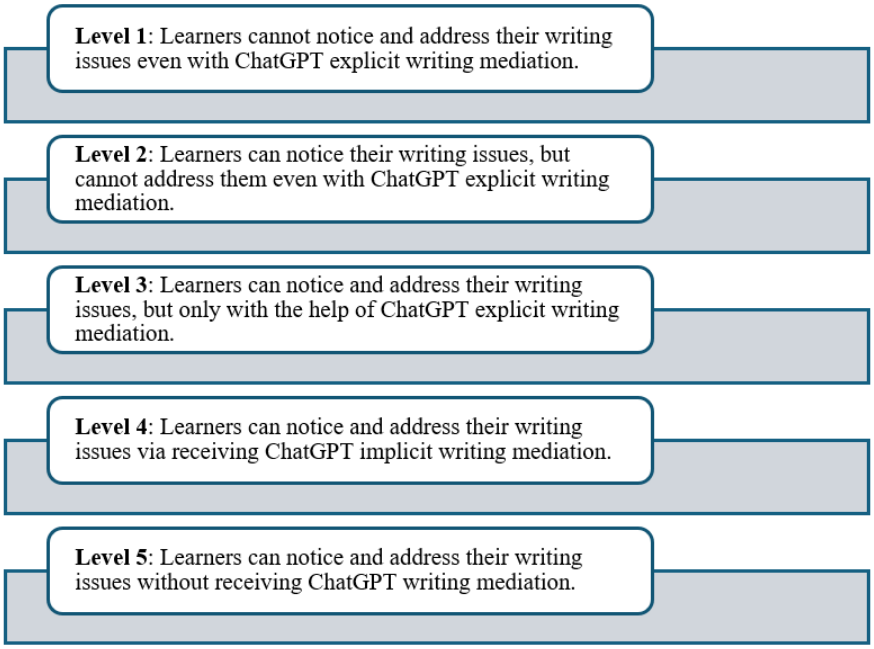

Figure 1 AI writing mediation adapted from Aljaafreh and Lantolf's model

METHODS

This study aims to empirically test the role of ChatGPT in personalising student learning through survey and qualitative data analysis. Furthermore, the study finds it crucial in recognising whether hybrid human-ChatGPT-generated feedback can effectively empower undergraduate students' personalised learning in courses that comprise writing assessments.

The study has been submitted for ethics clearance and approved by the university's ethics committee (HRE2024-0399) prior to commencement. All the participants were undergraduates enrolled in an Australian offshore campus in Sarawak, Malaysia, comprising local and international students. A total of 120 students actively enrolled in 2023 were selected, drawn from a population of approximately 2,000 at that time. The purposive sampling frame was constrained by the reduced intake, as many Malaysian universities experienced a significant decline in student enrolment following the COVID-19 pandemic. In addition, postgraduate and exchange students were excluded from the sample due to differences in study duration and learning environments. This is to ensure consistency in exposure to the curriculum and institutional context, which could otherwise introduce variability in learning experience. Students were selected to participate in this study based on three criteria: i) enrolled in any

undergraduate program at the University on a full-time basis, ii) the course that they are currently taking has a graded writing component in their assessments, and iii) they are aware of AI and have used it before. To ensure a balanced and diverse sample, demographic characteristics such as age, gender and ethnicity were also considered to enhance representativeness and capture potential variations in student learning experiences (Issabek et al., 2025). We examined students' experiences with feedback within a semester and their motivations for using ChatGPT in writing assessments. For comparison, purposive sampling comprised 102 undergraduate students from five different disciplines, such as Arts and Communication, Commerce and Business, Information Technology, Engineering and Sciences, and Health and Applied Sciences, and different study years (i.e., first, second, third, and final year). Among the respondents, 42 were males and 60 were females, with ages ranging from 19 to 24 years. These students agreed to participate in the survey by completing the online questionnaire distributed to them. About 18 students who attempted the survey but did not complete it were excluded from the analysis.

To assess the validity and reliability of the qualitative study, our research adapted Lincoln and Guba's (1985) framework of trustworthiness, which comprised criteria such as credibility, transferability, dependability, and confirmability. At the preliminary stage, researchers designed survey questions based on common themes, including students' perceptions of Gen-AI and human feedback, the integration of Gen-AI into academic assessments, and the influence of Gen-AI and human feedback on student learning. Next, the research team gathered to conduct a peer debriefing, providing an internal review of the survey questions that had been designed. After that, the draft questionnaire was sent to the university's Staff Practice Advisor at the Office of Learning and Teaching for review of the questions' clarity, as well as to the project's research assistants, to verify the accuracy of researchers' interpretations before distributing the survey to students. After the survey data were collected, the principal researcher documented the stages of data collection and reviewed the theme-based coding to ensure consistency and continuity between the online survey and the semi-structured interviews.

Researchers collected data at the beginning of the semester by displaying the survey QR code on the notice boards outside of their classes and distributing the link to students through the projection of a PowerPoint slide in one another's classes. They briefed students on the affordances of AI and encouraged them to participate in the survey; the participation was voluntary, and the students were told that if they chose not to participate, it would not affect their grades. The online survey (Table 1) comprised multiple-choice and short reflective questions designed using Qualtrics software, and it took approximately 10 to 15 minutes to complete. Students who participated in the survey were prompted to share their demographic information, such as gender, study year, areas of interest, and personal perceptions and experiences in using feedback for their undergraduate assessments. Although the participants may come from different study years and have varying academic experiences and disciplinary backgrounds, this method does not imply equivalence; instead, it aims to identify patterns and contrasts in AI and human feedback experiences, as well as the students' motivations for using ChatGPT at different stages of their studies and assignments. Their responses were collected before their first writing assessment due in Week 4 of the semester.

When students attempted the survey, each was provided with a link to access the research project information sheet. Then, they were prompted to give their digital informed consent by clicking 'next' to proceed with the survey. Once they had submitted their online responses, they would receive an auto-acknowledgement of completion. Their participation was completely anonymous and no personal details were required throughout the survey. However, for students who want to participate in the follow-up semi-structured interviews, they can leave their names and student emails to express their interest. Ten participants, representing approximately 10 percent of the total study sample, were selected for interviews based on demographic representativeness. Invitation emails were sent to individual selected students at the end of the semester seeking their consent for participation. A disclaimer was clearly stated in the email that they could reject the invitation or stop the interview should they feel pressured or uncomfortable with the interview.

Guided by Vygotsky's (1978) social constructivism, researchers first investigated student engagement with feedback through the survey, where students reflected on their self-learning and interactions with AI and educators and followed by 60-minute semi-structured interviews (Table 2) with 10 selected participants. During the interview, the students were required to critically review their own learning and the extent to which AI mediation affects their writing. Literature suggests different sizes for qualitative research, which could range from a minimum of 12 (Baker & Edwards, 2012) up to 20

for longer projects, or at least 15 (Bertaux, 1981). This study chose a sample of 10 because it is generally sufficient to explain shared perceptions and performances within a semester among a group of students from the same institution. Students were asked to evaluate the role of AI and educators in personalising learning based on criteria such as motivation to learn, productivity of communication in the traditional teacher-student system, convenience, and accessibility of AI. Self-reflection through the survey was regarded as a valid source of data in research (Molenaar, 2021).

Table 1 Online survey with open- and closed-ended questions

No.	Questions
1.	How old are you?
2.	In which year did you commence your undergraduate studies?
3.	What is your study area/course discipline?
4.	What is your gender?
5.	What is your ethnicity?
6.	How do you define feedback?
7.	What does feedback mean to you?
8.	What is the most important attribute of feedback?
9.	What type of feedback do you find most helpful?
10.	How frequently would you like to receive feedback from the lecturer?
11.	What do you think is the most significant role that feedback plays in an assessment?
12.	To what extent do you agree that a lecturer should tailor feedback to individual students?
13.	What makes feedback the least effective?
14.	How can feedback assist in learning and understanding a topic?
15.	Does ChatGPT feedback improve your writing skills?
16.	Does ChatGPT-generated feedback enhance creativity?
17.	Does ChatGPT-generated feedback enhance creativity?
18.	How often do you use ChatGPT-generated feedback?
19.	In which areas could ChatGPT-generated feedback benefit students the most?
20.	What is your current usage of ChatGPT-generated feedback?
21.	Do you prefer human or ChatGPT-generated feedback?
22.	What is the most significant result of ChatGPT-generated feedback on learning?
23.	What is your main concern about ChatGPT-generated feedback?
24.	How does educator/peer feedback help you in understanding your course/unit assessment? Please explain and provide at least one example.
25.	How does ChatGPT-generated feedback contribute to accomplishing your unit assessments? Please explain and provide at least one example.

Table 2 Sample questions of semi-structured interview

1.	Could you please share with us briefly your learning experience from high school to university?
2.	Do you encounter any issues with your current study?
3.	Are there any challenges that you face in assessments?
4.	If yes, how do you deal with those challenges?
5.	Who do you consult for help?
6.	Do you use AI for writing and creative assessments?
7.	What are the AI tools that you usually use?
8.	Do you use ChatGPT to generate ideas?
9.	Do you use ChatGPT-generated feedback in your assessments?
10.	What are the features in ChatGPT that you like?
11.	Do you prefer ChatGPT over educator and peer feedback?
12.	What is your experience in using ChatGPT to complete an assessment?
13.	Does ChatGPT enhance your cognitive and creative skills?
14.	Anything prohibits you from using ChatGPT or other AI tools?

The survey and semi-structured data were collected at two different time points in students' learning process because the study wanted to observe their learning changes at different assessment

stages: ideation, execution, and completion. By collecting contextual data, the research team can analyse students' interactions with learning technology (i.e. ChatGPT), humans (i.e. educators) and learning environment (i.e. university policies). Qualitative data were analysed using thematic coding. The findings offer insights into students' attitudes and motivations to use ChatGPT-generated feedback in their writing assessments and can be used to optimise the university's AI learning system.

RESULT AND DISCUSSION

Findings showed that multidisciplinary students' attitudes towards ChatGPT feedback were positive, but their motivation to use it for writing assessment was inconsistent throughout the learning process. The engagement is high at the ideation stage but relatively low in the completion stage of the learning process. After reviewing and interpreting the collected data, researchers identified patterns and manually grouped recurring ideas and quotes, including "I use AI for ideas", "Consult lecturer on assignment", "I learn by myself", and "My work was detected for plagiarism" into three main categories. Hence, three final themes emerged: (a) Learners striving for personal goals, (b) Educator-oriented course grading system, and (c) the University's policies against AI use.

1. Learners Striving for Personal Goals with Feedback

All the students who participated in the survey agreed that feedback was essential in improving their grades. There were three stages in developing writing assessments: ideation, execution, and completion. Most students (75.79%) felt that ChatGPT was the most useful at the ideation stage (Figure 2), where they initiate ideas and do the planning, because it has a rich database and could provide them with a great pool of ideas with a single prompt.

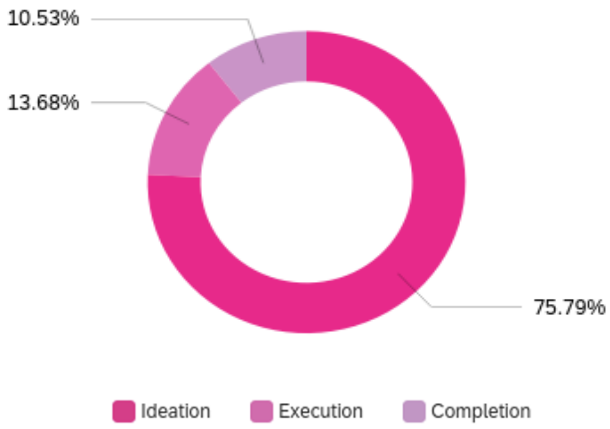

Figure 2 Stages where undergraduate students find ChatGPT-generated feedback is the most helpful in developing writing assessments

In addition, ChatGPT is highly responsive and offers instant feedback, which allows timely self-correction and provides plenty of opportunities for students to practice and eventually improve. One student stated:

> *"ChatGPT gives me feedback almost instantly, and it is easily accessible. It also helps me analyse the questions given by the lecturers, offering new angles that I may not have previously thought before."*

Students' personal goals have a significant impact on their attitude towards ChatGPT. Motivated by their aspirations to score higher marks, half of the students were driven to engage with ChatGPT and actively sought feedback and clarification for academic and non-academic enquiries. However, some were skeptical about using ChatGPT due to a lack of digital competencies, overwhelming data, and the university's prohibition of AI-generated content for writing assessments. Less techno-motivated students would keep their AI use to a minimum by engaging ChatGPT for

proofreading. They tended to rely more on the educators' feedback on the content because they believed that educators were the primary source and preferred the personal touch. Compared to their peers who are more independent and techno-savvy, students who are less confident in technology tend to be less intentional and strategic in applying ChatGPT in their assessments.

2. Educator-oriented Course Grading System

Despite having positive attitudes toward ChatGPT feedback, eighty-seven students perceived feedback as human-centered, focusing mainly on the educators' information (71.58%). They felt that the most important feedback attribute was evaluative (46.88%); educators know the students personally and are thus able to tailor feedback to the individual. Among the types of feedback received, students felt that written feedback with relevant examples helped them understand the assessments better (Figure 3), and they preferred the educators to suggest future improvements rather than merely pointing out past mistakes or making superficial compliments. A subsequent conversation with the students revealed that technical competence did not always equate to a strong understanding of assessment requirements. Students were able to complete their writing assessment on time with AI assistance, but without a full grasp of the marking rubrics, they would end up scoring lower grades.

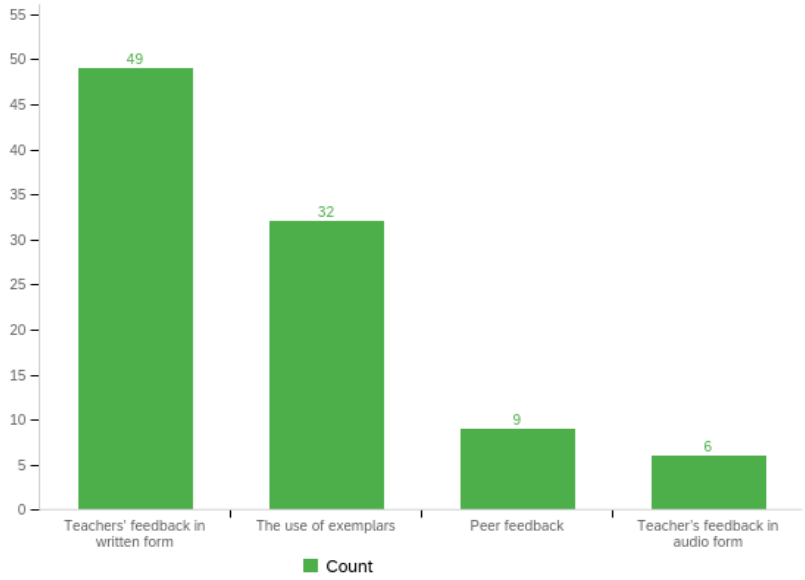

Figure 3 Stages where undergraduate students find ChatGPT-generated feedback is the most helpful in developing writing assessments

One student pointed out that educators' feedback was authoritative because it was aligned more accurately with the course rubric. In contrast, ChatGPT might be clueless about specific assessment requirements and, hence, could not spot their mistakes and differentiate the weaknesses in their assessments.

> *"It gives me a clear overview of what is expected of me as a student from a figure of authority…I don't achieve stellar marks in my academic writing because I am not fully aware of what academic obligations or expectations [are] required in my submissions."*

3. University's Policies Against AI Use

Students' comprehension of the university's policies against AI use has directly impacted their motivation to use ChatGPT feedback in their writing assessments and the confidence level in strategising the application. Twenty students (Table 4) expressed that the prohibition against AI-generated content implemented by the university was a major concern; the fear of being reported for plagiarism and receiving penalties in the form of mark deductions, failing the course, or delayed graduation had prevented them from overly relying on ChatGPT. Despite growing technical competence, students expressed varied levels of trust in AI, particularly in the ethical boundaries.

Table 4 Student's usage of ChatGPT-generated feedback content

#	Usage	Percentage (%)
1	I am confident in using it	48.42%
2	ChatGPT is good, but I do not know how to use it	14.74%
3	I find it overwhelming	15.79%
4	My university prohibits ChatGPT-generated feedback content	21.05%
	Total	**100%**

Furthermore, authorship and plagiarism are two major issues that are worth attention. Using ChatGPT in writing assessments raised ethical issues about the originality of work, which could be framed as academic misconduct. One student said:

> *"I don't use ChatGPT or AI much as I am afraid of plagiarism. Therefore, I use it mainly before starting an assignment to get idea contribution before I start my assignment."*

DISCUSSION

This study makes several suggestions for improving feedback literacy, focusing on using ChatGPT on the writing assessments. First, based on Vygotsky's (1978) social constructivism, individual learners have three different zones in which they can learn by themselves, from skilled individuals (educators) to the mediation of tools. To Vygotsky, it is unlikely to separate cognitive from social interactions because learners first develop knowledge from social interactions and then internalize it. This study expands Vygotsky's view by proposing technology as a new social context where learners develop knowledge through prompts and then internalise it. This eventually forms intrinsic motivation that encourages them to learn new knowledge by coming up with prompts. Second, we adapt Aljaafreh and Lantolf's (1994) mediation levels into the AI context to examine whether students are independent or dependent in their learning, either other-regulated (educators) or self-regulated when dealing with feedback.

The use of ChatGPT supported students at the ideation stage by encouraging an instant dialogic process between students and machines to foster a sense of tailored learning pace and make students' voices heard (Wongvorachan et al., 2022). ChatGPT functions as a digital More Knowledgeable Other that offers immediate feedback and cognitive support within their zone of proximal (ZPD) development (Samanta & Mudi, 2024) and facilitate scaffolding by providing students timely, adaptive support that helps them with analytical thinking (Rigopouli et al., 2025). Findings show that most students are motivated to engage with ChatGPT because the machine can provide them with instant feedback and new ideas beyond their knowledge, which shows that the tools operate within their ZPD and students can actively construct knowledge through meaningful engagement. However, none of the students fell under Level 5 of AI writing mediation (Aljaafreh & Lantolf, 1994), where they could notice and address their writing issues without receiving ChatGPT writing mediation. Even if they were aware of the mistakes, they continued to depend on the auto-recommendation in their writing and could not resist the convenience of getting it all corrected with just a click. Many took the mediation to a higher level by keying in prompts to allow ChatGPT to suggest references and content for their essays. Concurrently, they also learn through AI mediation that transforms vast amounts of data into meaningful insights (Dann et al., 2024). This process connects to Vygotsky's (1978) social constructivism, which states that students can self-regulate and develop writing skills through the assistance of suitable mediation. It also reflects the ability of ChatGPT in facilitating student-centred personalised learning through advanced, individualised and automated feedback systems (Bhutoria, 2022; Ogata et al., 2024) based on the cognitive characteristics of learners and their level of knowledge (Nguyen & Nguyen, 2023).

There was a twist in the story when the dependence on ChatGPT mediation gradually reduced when students started executing their plans and completing their writing assessments, such as essays or technical reports. Initially, students engage with ChatGPT as curators who respond to data integration rather than creators who develop original ideas (Lee et al., 2025). Their confidence mediates this shift where those with lower confidence tend to offload ideation to AI while those with higher confidence will engage more critically with AI outputs. ChatGPT's response is tailored to individual needs and

allows them to personalise their learning based on their readiness and interests (Wibowo, et al., 2025). Toward the end of the learning process, students turned to educators and expected feedback that could align with the marking rubric and eventually help them score higher grades. Suggestions by ChatGPT seem less relevant to them at the completion stage; they could notice their writing issues but did not address them according to ChatGPT's explicit mediation (Level 2 of AI writing mediation). The intentional disregard is due to them prioritising the educator's advice, which contradicts ChatGPT, but they felt that it was more relevant to the assessment context. The motivation behind the change is due to their cognitive ability to synthesise and critically assess the material and compare different sources based on the teacher-oriented grading system and the university's prohibition of AI-generated content. ChatGPT provides students with initial ideas but the final submission is evaluated based on course requirement and institutional policies.

From ChatGPT to the educator, students show a consistent inconsistency in the way they engage with feedback. Initially, they depend on ChatGPT's feedback to generate ideas and eventually become self-regulated and able to synthesise the ideas into their assessments. The mediation levels could be different for individual students, but throughout the process of shifting from one feedback source to another, it is apparent that there is obvious negotiation of feedback between the two parties. Throughout their personalised learning, students are gaining more autonomy and becoming self-regulated in choosing the source of feedback they want, all these are indicators of intrinsic motivation and proves that ChatGPT has enhanced their learning motivation (Hmoud et al., 2024; Kim et al., 2025). Students tend to be other regulated when they are confused about which source is more reliable and this dilemma could be due to a lack of knowledge in AI literacy and awareness of institutional policies on AI use in assessments.

1. Theoretical and Practical Implications

In line with existing literature, this study postulates that students' attitudes toward ChatGPT are influenced by their intrinsic and extrinsic motivations that are closely tied to their personal goals (Tam, 2024; Bhullar et al, 2024), the university's policies against AI use (Luo, 2024; Irena et al., 2024), and the way educators grade their performance (Nicol & McCallum, 2022: Nicol & Selvaretnam, 2022). This study mapped Vygotsky's (1978) three zones of learning and Aljaafreh and Lantolf's (1994) mediation levels with students' feedback engagement. It contributes new knowledge by adding a new dimension to feedback literacy through scoping the engagement in three stages of assessment: ideation, execution, and completion. This close examination helps to trace a deeper picture of the factors that may motivate or hinder the use of ChatGPT feedback at each stage. However, it remains uncertain whether ChatGPT can stimulate learners' internal feedback. Therefore, a real-time analysis was recommended as it can help learners to capture their latest process and help them understand their current learning status and problems, which eventually improve their learning outcomes. Digital competencies may play a crucial role in influencing the prompts that students keyed in at the ideation stage, but the ability to evaluate AI and understand the ethical implications gradually gained significance at the completion stage. In the long run, it is necessary to call for AI literacy education and include it as a core competency through pedagogies (Ng et al., 2021). This includes comparing the pros and cons of human and AI-generated feedback in the learning outcome (Leite & Blanco, 2020; Dai et al., 2023) as well as how students perceive the effectiveness and the intersection of creativity and Gen-AI in their educational experiences (Marrone et al., 2022).

For the practical implications, this study suggests recommendations to improve the utilisation of ChatGPT or other AI tools. Educators should provide advice to students and guide them on academic misconduct and plagiarism (Bhullar et al, 2024; Luo, 2024). For example, they can introduce the students in a step-by-step manner on how to use content generated by ChatGPT without copying and prevent plagiarism, especially at the assessment execution and completion stages. Educators should encourage students to experiment with AI learning and not prohibit it due to the fear of failure. The university management should consider developing policies (Bakhadirov et al., 2024) on data usage and integrating AI use in the curriculum. These measures have to be clearly communicated to students through AI training and interventions for academic misconduct.

CONCLUSION

There are some limitations in the study. First, the sample of students participating in this study is limited to one institution, despite multiple disciplines, which may limit the interpretation of the findings and generalization to the students' usage in other institutions. Therefore, this study could serve as a pilot project for a larger-scale study, probably on the whole country, in the next phase. Second, the time frame is quite limited, as data was collected within a semester, even though it does capture the process of learning from ideation to completion. Third, the study focuses on students' perspectives and does not include input from the educators and management. Although a single perspective sounds one-sided, it provides nuanced views on the issue directly from the users themselves. It also prioritizes rich, contextualized understanding over statistical generalization provided by the institution.

This study provides an overview of students' perspectives on ChatGPT feedback and how they engage with the tool in different stages of their learning. It emphasizes the role of the educator and the importance of institutional policy to students' engagement with ChatGPT feedback in writing assessments. It is undeniable that students' digital competency has influenced their engagement with feedback and the quality of feedback that they receive. However, their dependency on AI and human feedback has shifted during the assessment stages, from other-regulated to self-regulated and vice versa. Therefore, this study concludes that educating students about AI literacy will mature their digital competency and lead to more active adoption of AI in writing assessments. This further encourages students to adopt a positive attitude and motivation towards ChatGPT feedback in academic assessment.

This study could be further improved with several recommendations. Future researchers could conduct studies across universities, especially Australian campuses in Malaysia, and compare the differences in student responses. A comparison between AI mediation and traditional methods could be conducted over a longer period of time. Input from the educators and university policymakers will further enhance the validity and reliability of the study, as this would enable a more comprehensive analysis of student responses and evidence related to their writing skills. To sum up, this study provides insights to educators in redesigning assessment and integrating AI-related pedagogies based on students' perspectives.

ACKNOWLEDGEMENT

The authors would like to thank the Office of Learning and Teaching at Curtin University Malaysia for providing support and facilities for the research project. This project was led by Ngu, who designed the theoretical framework, analysed the data, and wrote the manuscript. Lau and Marcello assisted in the data collection and supported the design of the methodology and literature review, respectively.

FUNDING

This work was funded by the Curtin Malaysia Teaching Innovation Project titled "Unpacking AI-assisted feedback: Exploring students' perceptions and interpretations (CMTIP-2023).

DATA AVAILABILITY STATEMENT

Data will be made available on request from the corresponding author.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

DECLARATION OF GENERATIVE AI

During the preparation of this work, the author used M365 Co-pilot and ChatGPT to perform language editing. After using this tool/service, the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

REFERENCES

Abdelhalim, S. M. (2024). Using ChatGPT to promote research competency: English as a foreign language undergraduates' perceptions and practices across varied metacognitive awareness levels. *Journal of Computer Assisted Learning, 40*(3), 1261-1275. https://doi.org/10.1111/jcal.12948.

Ajjawi, R., Molloy, E., Bearman, M., & Rees, C. E. (2017). Contextual influences on feedback practices: An ecological perspective. In Carless, D., Bridges, S., Chan, C., Glofcheski, R. (eds). *Scaling up assessment for learning in higher education. The enabling power of assessment,* 5 (pp.129-143). Springer: Singapore. https://doi.org/10.1007/978-981-10-3045-1_9

AlAfnan, M. A., Dishari, S., Jovic, M., & Lomidze, K. (2023). ChatGPT as an educational tool: Opportunities, challenges, and recommendations for communication, business writing, and composition courses. *Journal of Artificial Intelligence and Technology, 3*(2), 60-68. https://doi.org/10.37965/jait.2023.0184.

Aljaafreh, A., & Lantolf, P. (1994). Negative feedback as regulation and second language learning in the zone of proximal development. *Modern Language Journal*, *78*(4), 465-483. https://doi.org/10.1111/j.1540-4781.1994.tb02064.x

Baker, S.E. & Edwards, R. (2012). "*How many qualitative interviews is enough?*" *National Centre for Research Methods Review Paper*, pp. 1-42. https://doi.org/10.1177/1525822X05279903.

Barra, E., López-Pernas, S., Alonso, Á., Sánchez-Rada, J. F., Gordillo, A., & Quemada, J. (2020). Automated assessment in programming courses: A case study during the COVID-19 era. *Sustainability*, *12*(18), 7451.

Bakhadirov, M., Alasgarova, R. & Rzayev, J. (2024). Factors influencing teachers' use of artificial intelligence for instructional purposes. *IAFOR Journal of Education, 12*(2), 9-32. https://doi.org/10.22492/ije.12.2.01

Bhullar, P.S., Joshi, M. & Chugh, R. (2024). ChatGPT in higher education - a synthesis of the literature and a future research agenda. *Education and Information Technologies, 29,* 21501-21522. https://doi.org/10.1007/s10639-024-12723-x

Bhutoria, A. (2022). Personalized education and artificial intelligence in the United States, China, and India: A systematic review using a Human-In-The-Loop model. *Computers and Education: Artificial Intelligence, 3*, 100068. https://doi.org/10.1016/j.caeai.2022.100068

Bertaux, D. (1981). From the life-history approach to the transformation of sociological practice. In Bertaux D. (ed.) *Biography and Society*, pp.29-45. Beverly Hills: Sage.

Cao, S., & Zhong, L. (2023). Exploring the effectiveness of ChatGPT-based feedback compared with teacher feedback and self-feedback: Evidence from Chinese to English translation. https://arxiv.org/ftp/arxiv/papers/2309/2309.01645.pdf.

Carless, D. (2015). *Excellence in university assessment: Learning from award-winning Practice*. London: Routledge.

Carless, D., & Boud, D. (2018). The development of student feedback literacy: Enabling uptake of feedback. *Assessment & Evaluation in Higher Education, 43*(8), 1315-1325. https://doi.org/10.1080/02602938.2018.1463354

Chang, Y., Wang, X., Wang, J., Wu, Y., Yang, L., Zhu, K., ... & Xie, X. (2024). A survey on evaluation of large language models. *ACM Transactions on Intelligent Systems and Technology*, *15*(3), 1-45.

Chan, K. Y. C., & Colloton, T. (2024). *Generative AI in higher education: The ChatGPT effect*. New York, Routledge: Taylor & Francis Group.

Dai, W., Lin, J., Jin, H., Li, T., Tsai, Y. S., Gašević, D., & Chen, G. (2023, July). Can large language models provide feedback to students? A case study on ChatGPT. *IEEE International Conference on Advanced Learning Technologies (ICALT)* (pp. 323-325). Orem, UT, USA. http://doi.org/10.1109/ICALT58122.2023.00100

Dann, C., Redmond, P., Fanshawe, M., Brown, A., Getenet, S., Shaik, T., Tao, X., Galligan, L., & Li, Y. (2024). Making sense of student feedback and engagement using artificial intelligence. *Australasian Journal of Educational Technology*, *40*(3), 58–76. https://doi.org/10.14742/ajet.8903

Faulconer, E., Griffith, J. & Gruss, A. (2021). "The impact of positive feedback on student outcomes and perceptions." *Assessment & Evaluation in Higher Education*, *47*(2), 1-10. https://doi.org/10.1080/02602938.2021.1910140.

Fathi, J., & Rahimi, M. (2024). Utilising artificial intelligence-enhanced writing mediation to develop academic writing skills in EFL learners: a qualitative study. *Computer Assisted Language Learning*, 1-40. https://doi.org/10.1080/09588221.2024.2374772

Frydenberg, M., Mentzer, K., Dudley, M. A., & Patterson, A. (2024). The rapid rise of generative AI adoption among college students. In *Proceedings of the ISCAP Conference*, *2473*, 4901.

Gardner, C. (1985). *Social psychology and second language learning: The role of attitudes and motivation*. Edward Arnold.

Gardner, C. R., & Lambert, E. W. (1972). *Attitudes and motivation in second language learning*. Newbury House Publishers.

Getie, A. S. (2020). Factors affecting the attitudes of students towards learning English as a foreign language. *Cogent Education*, *7*(1). https://doi.org/10.1080/2331186X.2020.1738184

Hall, C., & Kidman, J. (2004). Teaching and learning: Mapping the contextual influences. *International Education Journal*, *5*(3), 331-343.

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research, 77*(1), 81-112

Hattie, J. (2017). *Backup of Hattie's Ranking list of 256 influences and effect sizes related to student achievement. Visible Learning*. https://visible-learning.org/backup-hattie-ranking-256-effects-2017/

Hattie, J., & Clarke, S. (2018). *Visible learning: Feedback.* Routledge.

Hinojo-Lucena, F.-J., Aznar-Díaz, I., Cáceres-Reche, M.-P., & Romero-Rodríguez, J.-M. (2019). Artificial intelligence in higher education: A bibliometric study on its impact in the scientific literature. *Education Sciences*, *9*(1), 51. https://doi.org/10.3390/educsci9010051

Hmoud, M., Swaity, H., Hamad, N., Karram, O., & Daher, W. (2024). Higher education students' task motivation in the generative artificial intelligence context: The case of ChatGPT. *Information, 15*(1), 33. https://doi.org/10.3390/info15010033

Hooda, M., Rana, C., Dahiya, O., Rizwan, A., & Hossain, M. S. (2022). Artificial intelligence for assessment and feedback to enhance student success in higher education. *Mathematical Problems in Engineering, 1*, 5215722.

Irena, M. K., Kolega, M. & Jurcec, L. (2024). *IAFOR Journal of Education: Technology in Education, 12*(2), 33-60. https://doi.org/10.22492/ije.12.2

Iskender, A. (2023). Holy or Unholy? Interview with Open AI's ChatGPT. *European Journal of Tourism Research*, *34*, 3414. https://doi.org/10.54055/ejtr.v34i.3169.

Issabek, A., Oliveira, W., Hamari, J. & Bogdanchikov, A. (2025). The effects of demographic factors on learners' flow experience in gamified educational quizzes. *Smart Learning Environments, 12***(**25). https://doi.org/10.1186/s40561-025-00378-1

Kaswan, K. S., Dhatterwal, J. S., & Ojha, R. P. (2024). *AI in personalized learning. In Advances in technological innovations in higher education* (pp. 103-117). CRC Press.

Kayyali, M. (2024). Future possibilities and challenges of AI in education. In *Transforming education with generative AI: Prompt engineering and synthetic content creation* (pp. 118-137). IGI Global.

Kim, M., Kim, J., Knotts, T. L., & Albers, N. D. (2025). AI for academic success: Investigating the role of usability, enjoyment, and responsiveness in ChatGPT adoption. *Education and Information Technologies*, *30*, 14393-14414. https://doi.org/10.1007/s10639-025-13398-8

Kutasi, R. (2023). Feedback: Unveiling its impact and enhancing its effectiveness in education. *Journal of Pedagogy - Revista de Pedagogie*, *2*, 7-32. https://doi.org/10.26755/RevPed/2023.2/7.

Krašna, M., & Bratina, T. (2024, June). The use of AI and student population: The change is inevitable. In *2024 13th Mediterranean Conference on Embedded Computing (MECO)* (pp. 1-5). IEEE.

Krishnan, J., Yim, S., Wolters, A., & Cusimano, A. (2019). Supporting online synchronous collaborative writing in the secondary classroom. *Journal of Adolescent & Adult Literacy, 63*(2), 135-145. https://doi.org/10.1002/jaal.969

Lampropoulos, G. (2023). Augmented reality and artificial intelligence in education: Toward immersive intelligent tutoring systems. In Augmented reality and artificial intelligence (pp. 137-146). https://doi.org/10.10072F978-3-031-27166-3_8.

Lampropoulos, G., Papadakis, S. (2025). The Educational Value of Artificial Intelligence and Social Robots. In Lampropoulos, G., Papadakis, S. (eds) *Social Robots in Education. Studies in Computational Intelligence, 1194*. Springer, Cham. https://doi.org/10.1007/978-3-031-82915-4_1

Lee, A. V. Y. (2023). Supporting students' generation of feedback in large-scale online course with artificial intelligence-enabled evaluation. *Studies in Educational Evaluation*, *77*, 101250.

Lee, H. P., Sarkar, A., Tankelevitch, L., Drosos, I., Rintel, S., Banks, R., & Wilson, N. (2025). The impact of generative AI on critical thinking: Self-reported reductions in cognitive effort and confidence effects from a survey of knowledge workers. In CHI Conference on Human Factors in Computing Systems (CHI '25) (pp. 1-22). ACM. https://doi.org/10.1145/3706598.3713778

Leite, A., & Blanco, S. A. (2020, February). Effects of human vs. automatic feedback on students' understanding of AI concepts and programming style. In *Proceedings of the 51st ACM Technical Symposium on Computer Science Education* (pp. 44-50).

Lincoln, Y., & Guba, E.G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage.

Little, T., Dawson, P., Boud, D., & Tai, J. (2024). Can students' feedback literacy be improved? A scoping review of interventions. *Assessment & Evaluation in Higher Education*, *49*(1), 39–52.

Luo (Jess), J. (2024). A critical review of GenAI policies in higher education assessment: a call to reconsider the "originality" of students' work. *Assessment & Evaluation in Higher Education, 49*(5), 651-664. https://doi.org/10.1080/02602938.2024.2309963

Marrone, R., Taddeo, V., & Hill, G. (2022). Creativity and artificial intelligence: A student perspective. *Journal of Intelligence, 10*(3), 65.

McGrew, S., Breakstone, J., Ortega, T., Smith, M., & Wineburg, S. (2018). Can students evaluate online sources? Learning from assessments of civic online reasoning. *Theory and Research in Social Education*, *46*(2), 165-193. https://doi.org/10.1080/00933104.2017.1416320

Molenaar, I. (2021). Personalisation of learning: Towards hybrid human-AI learning technologies. *Blockchain and Robots*, 57-77.

Nazaretsky, T., Mejia-Domenzain, P., Swamy, V., Frej, J., & Käser, T. (2024, September). AI or human? Evaluating student feedback perceptions in higher education. In *European Conference on Technology Enhanced Learning* (pp. 284-298). Cham: Springer Nature Switzerland.

Ng, D.T.K., Leung, J.K.L., Chu, S.K.W. 7 Qiao, M.S. (2021). Conceptualising AI literacy: An exploratory review. *Computers and Education: Artificial Intelligence, 2*, 100041. https://doi.org/10.1016/j.caeai.2021.100041

Ngu I.Y., Schellini M., & Lau J.S.Y. (2025). Contextual influences on student engagement with AI-assisted Feedback. Proceedings at the *Southeast Asian Conference on Education* 2025 (pp. 313-323) https://doi.org/10.22492/issn.2435-5240.2025.28

Ngu, I. Y. (2025). Social Media intervention to improve university students' well-being: A self-determination approach. *Journal of Contemporary Issues in Media & Communication*, *5*(1), 64-81. https://ejournal.usm.my/jcimc/article/view/5127

Nguyen, H.-H., and Nguyen, V. A. (2023). Personalised learning in the online learning from 2011 to 2021: A bibliometric analysis. *International Journal of Information and Education Technology, 13*, 1261-1272. https://doi.org/10.18178/ijiet.2023.13.8.1928

Nicol, D. (2021). The power of internal feedback: Exploiting natural comparison processes. *Assessment & Evaluation in Higher Education, 46*(5), 756-778. https://doi.org/10.1080/02602938.2020.1823314.

Nicol, D. & Selvaretnam, G. (2022). Making internal feedback explicit: Harnessing the comparisons students make during two-stage exams. *Assessment & Evaluation in Higher Education, 47*(4), 507-522. https://doi.org/10.1080/02602938.2021.1934653.

Ogata, H., Flanagan, B., Takami, K., Dai, Y., Nakamoto, R., & Takii, K. (2024). EXAIT: Educational eXplainable artificial intelligent tools for personalized learning. *Research and Practice in Technology Enhanced Learning, 19*, 019. https://doi.org/10.58459/rptel.2024.19019

Papakostas, G. A., Sidiropoulos, G. K., Papadopoulou, C. I., Vrochidou, E., Kaburlasos, V. G., Papadopoulou, M. T., Holeva, V., Nikopoulou, V.-A., & Dalivigkas, N. (2021). Social robots in special education: A systematic review. *Electronics, 10*(12), 1398. https://doi.org/10.3390/ele ctronics10121398

Pratama, M. P., Sampelolo, R., & Lura, H. (2023). Revolutionizing education: Harnessing the power of artificial intelligence for personalized learning. *Klasikal: Journal of Education, Language Teaching and Science, 5*(2), 350-357.

Price, M., K. Handley, & Millar, J. (2011). Feedback: Focusing attention on engagement. *Studies in Higher Education, 36*(8), 879-896.

Rad, H. S., Alipour, R., & Jafarpour, A. (2023). Using artificial intelligence to foster students' writing feedback literacy, engagement, and outcome: a case of Wordtune application. *Interactive Learning Environments*, *32*(9), 5020-5040. https://doi.org/10.1080/10494820.2023.2208170

Ramsden, P. (1988). Context and strategy: Situational influences on learning. In *Learning strategies and learning styles* (pp. 159-184). Boston, MA: Springer US.

Raptopoulou, A. (2025). ChatGPT in higher education: Supporting academic literacy through ChatGPT-based activities. *European Journal of Education*. https://onlinelibrary.wiley.com/doi/pdf/10.1111/ejed.70131

Rigopouli, K., Kotsifakos, D., & Psaromiligkos, Y. (2025). Vygotsky's creativity options and ideas in 21st-Century technology-enhanced learning design. *Education Sciences*, *15*(2), 257. https://doi.org/10.3390/educsci15020257

Samanta, T. K., & Mudi, S. (2024). Applying Vygotsky's Zone of Proximal Development in modern classroom settings: A call for social learning in the digital age. *International Journal of Fundamental and Multidisciplinary Research, 6*(4), 1-12. https://www.ijfmr.com/papers/2024/4/24233.pdf

Schartel, S. A. (2012). Giving feedback: An integral part of education. *Best Practice & Research Clinical Anaesthesiology*, *26*(1), 77-87.

Singh, A., Brooks, C., Wang, X., Li, W., Kim, J., & Wilson, D. (2024, March). Bridging learner sourcing and AI: Exploring the dynamics of student-AI Collaborative feedback generation. In *Proceedings of the 14th Learning Analytics and Knowledge Conference* (pp. 742-748).

Soler Costa, R., Tan, Q., Pivot, F., Zhang, X., & Wang, H. (2021). Personalised and adaptive learning: Educational practice and technological impact. *Texto Livre*, *14*(3), e33445. https://doi.org/10.35699/1983-3652.2021.33445

Song, P., & Wang, X. (2020). A bibliometric analysis of worldwide educational artificial intelligence research development in recent twenty years. *Asia Pacific Education Review*, *21*(3), 473-486. https://doi.org/10.1007/s12564-020-09640-2

Stojanov, A. (2023). Learning with ChatGPT 3.5 as a more knowledgeable other: an autoethnographic study. *International Journal of Educational Technology in Higher Education*, *20*(35). https://doi.org/10.1186/s41239-023-00404-7

Sutton, P. (2012). Conceptualizing feedback literacy: Knowing, being, and acting. *Innovations in Education and Teaching International*, *49*(1), 31-40. https://doi.org/10.1080/14703297.2012.647781

Su, J., & Yang, W. (2023). Unlocking the power of ChatGPT: A framework for applying generative AI in education. *ECNU Review of Education*, *6*(3), 355-366.

Su, Y., Lin, Y., & Lai, C. (2023). Collaborating with ChatGPT in argumentative writing classrooms. *Assessing Writing*, *57*, 100752. https://doi.org/10.1016/j.asw.2023.100752

Tam, A. C. F. (2024). Interacting with ChatGPT for internal feedback and factors affecting feedback quality. *Assessment & Evaluation in Higher Education*, 1-17. https://doi.org/10.1080/02602938.2024.2374485

Tang, K. S., Cooper, G., Rappa, N., Cooper, M., Sims, C., & Nonis, K. (2024). A dialogic approach to transform teaching, learning & assessment with generative AI in secondary education: A proof of concept. *Pedagogies:An International Journal*, *19*(3), 493-503. https://doi.org/10.1080/1554480X.2024.2379774

Vorobyeva, K. I., Belous, S., Savchenko, N. V., Smirnova, L. M., Nikitina, S. A., & Zhdanov, S. P. (2025). Personalised learning through AI: Pedagogical approaches and critical insights. *Contemporary Educational Technology*, *17*(2), ep574. https://doi.org/10.30935/cedtech/16108

Vygotsky, L. (1978). *Mind in society*. London: Harvard University Press.

Weber-Wulff, D., Anohina-Naumeca, A., Bjelobaba, S., Foltýnek, T., Guerrero-Dib, J., Popoola, O., ... & Waddington, L. (2023). Testing of detection tools for AI-generated text. *International Journal for Educational Integrity*, *19*(1), 26.

Weinburgh, M. H. (1998). Gender, ethnicity, and grade level as predictor of middle school students' attitudes toward science. https://eric.ed.gov/?id=ED442662

Wenden, A. (1991). *Learner strategies for learner autonomy*. Prentice Hall. Wibowo, S., Wangid, M. N., & Firdaus, F. M. (2025). The relevance of Vygotsky's constructivism learning theory with the differentiated learning primary schools. *Journal of Education and Learning (EduLearn)*, *19*(1), 431-440. https://doi.org/10.11591/edulearn.v19i1.21197

Wong, W. K. O. (2024). The sudden disruptive rise of generative artificial intelligence? An evaluation of their impact on higher education and the global workplace. *Journal of Open Innovation: Technology, Market, and Complexity*, *10*(2). https://doi.org/10.1016/j.joitmc.2024.100278

Wongvorachan, T., Lai, K. W., Bulut, O., Tsai, Y. S., & Chen, G. (2022). Artificial intelligence: Transforming the future of feedback in education. *Journal of Applied Testing Technology*, *23*(1), 1-22.

Woo, H., LeTendre, G. K., Pham-Shouse, T., & Xiong, Y. (2021). The use of social robots in classrooms: A review of field-based studies. *Educational Research Review*, *33*, 100388. https:// doi.org/10.1016/j.edurev.2021.100388

Xie, H., Chu, H. C., Hwang, G. J., & Wang, C. C. (2019). Trends and development in technology-enhanced adaptive/personalised learning: A systematic review of journal publications from 2007 to 2017. *Computers and Education*, *140*(103599), 1-16. https://doi.org/10.1016/j.compedu.2019.103599

Yang, L. (2021). The role of feedback orientation in converting external feedback to learning opportunities for implementing assessment-as-learning in the context of feedback. In Z. Yan & L. Yang (Eds.), *Assessment as learning: Maximising opportunities for student learning and achievement* (pp. 53-75). Routledge.

Zamfirescu-Pereira, J. D., Wong, R. Y., Hartmann, B., & Yang, Q. (2023, April). Why Johnny can't prompt: How non-AI experts try (and fail) to design LLM prompts. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (pp. 1-21).