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Emerging Frontiers in Learning Spaces, Pedagogies, and Technologies

Investigating instructors' perceived knowledge and attitudes in using generative AI tools for teaching

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This preliminary study surveys university instructors' reported experiences of generative artificial intelligence (GenAI) knowledge and attitudes. The collective perceptual information from this study aims to provide the University with information on the type and level of support needed, from administrators to faculty members, in their teaching. Preliminary findings showed that in terms of knowledge of GenAI tools, most instructors perceived generally high mean scores of their readiness to use GenAI tools except for their low ability to use the GenAI tools. Although the instructors perceived the lowest threat of GenAI tools on their work, there are several teaching related and ethical concerns that were discussed in this paper. In terms of their attitudes towards GenAI tools, they perceived favourably the use of GenAI tools for their teaching.

Keywords: Attitudes, Generative AI, Perception, Job satisfaction

Introduction

In the current generative artificial intelligence (GenAI) landscape, instructors are constantly bombarded with information on GenAI applications and ethics issues related to GenAI applications in university teaching. They are constantly faced with the fast advancement and application of GenAI tools for teaching and learning. Such fast AI development has led to the efficient and effective adoption of AI, such as automation, personalised learning and adaptive learning in institutions and organisation. In contrast to the traditional teaching approaches, GenAI tools have also been deployed to accomplish learning tasks such as translation, solving mathematical problems, generating stories and coding (Stokel-Walker et al, 2023). Building on prior work (Wang et al, 2023), this preliminary study explores the instructors' perceived knowledge in terms of cognition, ability, vision and ethics. After which, the study investigated the instructor's perceived AI threat, AI innovation, and job satisfaction and attitude. Currently, some faculty are at the cross-roads of keeping up with their pedagogical knowledge of GenAI applications, re-designing teaching with AI and innovating teaching practices in the university. However, their lack of comprehensive understanding of the concept GenAI in pedagogy could potentially affect their attitude and motivation in applying GenAI to lesson design, implementation, and evaluation. Thus, the instructors' voices would help to inform the policies and the support needed in this GenAI implementation journey in the university.

This preliminary study is guided by two research questions:

1. What are the instructors' perceived knowledge and attitudes towards using GenAI?
2. What are the instructors' reported experiences in using GenAI for their teaching and learning?

Literature Review

GenAI has brought about significant impact on teaching and learning (Zhu & Luo, 2022). AI models have undergone significant evolution, thereby enhancing their capabilities in areas such as question-answering, programming, and multilingual functionalities. As a result, GenAI can now perform a wide range of tasks including translation, mathematical problem-solving, story generation, and coding.

The pedagogical role of GenAI tools remains a subject of ongoing debate and exploration. The perception and utilization of these tools vary significantly among instructors. Some instructors perceive AI tools to be productivity tools that help to save time and effort because of its speed and efficiency in generating the text or images while others perceive AI tools to be powerful cognitive tools that can partner instructors to design,

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develop and facilitate creative and inquiry-based learning for the active engagement of learners. Instructors of technical courses may explore learner-centred teaching strategies by tapping on ChatGPT (OpenAI, 2023) as an open book for classroom quizzes and discussion forum for participation (Popenici et al, 2017, Zawacki-Richter et al., 2019).

While GenAI tools offer potential benefits, concerns have been raised about their misuse and impact on learning outcomes. Instructors have raised concerns over knowledge transfer when students utilize GPT for assignment completion (Dehouche, 2021). These concerns extend to the design and grading of assignments and questions over ownership of AI-generated work. Lack of clear guidelines leaves instructors navigating an uncertain ethical and academic terrain. Zawacki-Richter et al. (2019) notes that the rapid advancement of AI in education necessitates a corresponding evolution in institutional policies and pedagogical approaches.

Methods

An online survey comprising of a total of 53 items (5-point Likert scale) were administered to the university instructors. This study adapted a survey that comprised 18 AI-readiness items and 13 AI impact items (Mirbabaie et al, 2022; Ragu-Nathan et al,2008; Wang et al, 2023). In this study, 22 attitude items, adapted from Ajlouni et al. (2023), were also administered to the instructors as shown in Table 1. The use of such perceptual measures is to gain an insight into the instructors' interpretation of GenAI tools for their teaching and their attitude towards them.

Table 1
Description of the Survey Items

Instrument	Variables (Items)	Description	Sample items	Sources
AI-readiness (18 items)	Cognition (5)	Mental processes of acquiring knowledge and understanding	(CO1) I clearly understand the new role of students in the era of AI.	Karaca et al. (2021)
	Ability (6)	Capacity to perform tasks	(AB1) I can effectively integrate Generative AI technologies into my learning routines.	
	Vision (3)	Ability to visualize the future possibility	(VI1) I understand the strengths and limitations of Generative AI technologies.	
	Ethics (4)	Concepts of right or wrong in decision-making	(ET1) I understand the digital ethics that students should possess in the era of AI.	
AI impact (13 items)	Perceived threats (5)	Uncertain situations that pose dangers	(PT1) I feel that Generative AI technologies could weaken the importance of students in learning.	Mirbabaie et al. (2022)
	AI-enhanced innovation (3)	New or improved ways of designing and implementing tasks with AI	(INN1) Generative AI technologies enable me to accomplish tasks that were previously difficult to do without them.	Popenici and Kerr (2017)
	Job satisfaction(5)	Satisfaction derived from performing tasks in the workplace	(JS1) In most ways, my learning experience is close to my ideal.	Ragu-Nathan et al. (2008)
Attitude (22 items)		Tendency to respond to the situations	(AT1) I like learning about Generative AI technologies.	Ajlouni et al. (2023)

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Findings and discussion

The survey was administered to 33 invited full-time faculty (21 female and 11 Male) in March 2024 in Singapore after the university's IRB ethics was granted. All participation was voluntary. Their age distribution showed that they come from 41-60 (60.6%) followed by above 60 years old (21.2%) and 31-40 (18.2%). Their teaching years ranged from 15 years and above (57.6%), 10-15 years (18.2%) and 6-10 years (15.2%). When asked about their knowledge of GenAI tools, 60.6% of the instructors reported that their knowledge came from self-exploration (Figure 1). In terms of their confidence in utilizing GenAI tools, only 21.2% of the instructors felt confident in their ability to use these tools, but the majority (63.6%) indicated that had some or little confidence (Figure 2). Regarding their experience in using generative AI tools, 54.6% of instructors considered themselves to be novices. About 54.6% of instructors were integrating these technologies into their coursework.

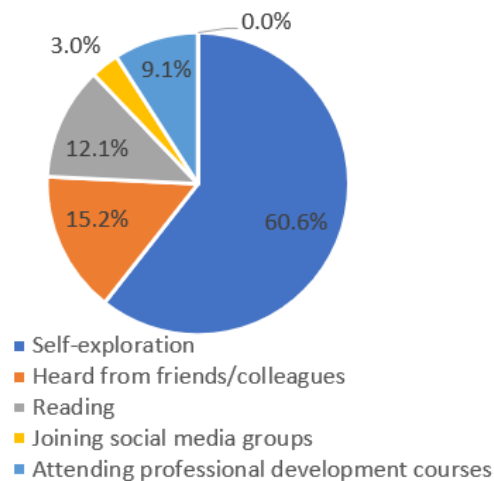


Figure 1. Instructors' knowledge of GenAI tools

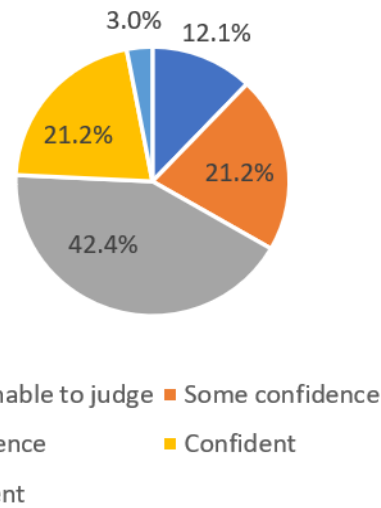


Figure 2. Instructors' confidence in using GenAI tools

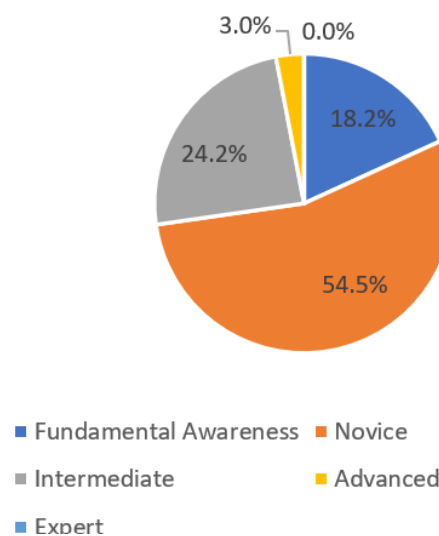


Figure 3. Instructors' Experience of using GenAI tools

Descriptive statistics were performed on the 33 instructors' survey responses. Of the four variables of

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instructors' perceived readiness, Ethics showed the highest mean score (M: 3.50, SD:0.91), followed by Vision (M: 3.45, SD: 0.83), and Cognition (M: 3.24, SD:0.80) while their perceived ability had the lowest mean score (M: 2.67, SD: 0.99). The instructors' lower ability score has practical implications for university administrators in that their perceived ability to use GenAI in teaching and learning would have to be boosted. Addressing this implication from the perspective of professional development initiatives, targeted and relevant sessions for the purpose of expanding the lecturers' repertoire of effective GenAI use would be key. Of the 19 instructors who responded to the open-ended question at the end of the Likert scale for ability, three said they were "not too familiar" with using AI tools or did not use AI tools for their teaching very well. One of the three added that his use was 'just limited to generating ideas and content.' Two other instructors also touched on the extent of GenAI usage and exploration. One of them said she was 'not sure I have used [AI tools] sufficiently. The other believed that "I have not quite explored their full potential.'

Among the three variables of instructors' perceived AI impact, job satisfaction showed the highest mean score (M: 4.00, SD:0.70), followed by AI-enhanced innovation (M: 3.04, SD: 0.86) and perceived threat was found to have the lowest mean score (M: 2.96, SD: 0.86). The instructors' lower mean score does not imply no cause for concern, but these perceived threats exist and pose concerns in their teaching and learning context. Of the 18 instructors' responses, two expressed that human teachers could be replaced by AI. Two of them expressed that 'When generative AI becomes more and more powerful, it may reduce the role of human teachers.' In the future. One of the instructors also expressed their concerns and threats from GenAI use, particularly the issues of dependency and reduced critical thinking skills. They also feared that GenAI could cause students to lose respect for their instructors who took the resources from the GenAI tools.

Another instructor expressed that 'Students may become too reliant on GAI and use information from GAI without checking the credibility of information thoroughly, reducing students' independent or critical thinking skills.'. In terms of job satisfaction, out of the 17 responses, five instructors commented that the use of AI could contribute to their saving of time and workload which are the potential advantages to their work performance. One instructor highlighted the advantage of using GenAI tools because 'It helps to reduce some workload' that is directly related to lesson planning and designing of lesson resources.'

Instructors' responses to the five-point Likert scale of 22 attitude items showed fairly favorable responses towards AI (M: 3.06, SD: 0.69). They highlighted two main concerns in the open-ended section of the survey. Firstly, they felt that there is an overwhelming amount of information. Secondly, they recognized the need to learn how to use different GenAI tools effectively. One of the instructors also reported that 'the use of AI tools is unavoidable in teaching, learning, and assessment. However, I need to learn more about the tools by reading and attending workshops in order to think of how to make effective use of them in teaching and learning.'

This study's participants were recruited only from one university, which may limit the applicability of the findings to other educational levels. Future studies are suggested to validate the study's findings by including instructors from different educational settings and universities. Furthermore, it should be noted that this study did not explore the potential relationship between the AI-readiness and attitude scales; as a result, our understanding of the relationship between these two remains limited.

Conclusion

This study provides some insights from the instructors' perceived attitude and knowledge in terms of AI-readiness and AI impact. The results indicate that instructors scored relatively low on AI-readiness and attitude scales. This finding is crucial for understanding the current difficulties that educational institutions might encounter when integrating AI in education. Additionally, it can also help guide the development of AI-related professional education programs and curricular resources for instructors to better integrate AI tools into their teaching and learning processes in higher education. Future research should consider including such analyses to investigate the relationship between AI readiness and attitudes.

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