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INFORMATION SYSTEMS EDUCATION JOURNAL

Editors

The Potential and Challenges of Integrating Generative AI in Higher Education as Perceived by Teaching Staff: A Phenomenological Study

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Abstract

Generative Artificial Intelligence (Gen AI) is making its impact on all levels of education. However, these tools must be used with caution, and it is up to instructors to teach their students responsible use of Gen AI. Therefore, there is a need to understand views of teaching staff on how to integrate Gen AI into education to maximize its pedagogical value and mitigate problems associated with the use of these tools. Focusing on higher education (HE) and applying phenomenological enquiry, this study explored possibilities of using Gen AI in teaching and learning as perceived by HE educators. The data was analyzed through the lens of the SAMR (Substitution, Augmentation, Modification, and Redefinition) framework. Although majority of the interviewees are still in the "exploration" phase, some interesting findings came to light on adopting text-based GPTs for simulating workplace interactions and associated challenges. In view of the mainly "trial and error" approaches to adopting Gen AI to teaching, it is crucial to learn from staff who experiment and grow to coordinated adoption of these tools capitalizing on their capabilities. While looking at the opportunities of Gen AI use in HE, this study also emphasizes barriers to integration of these tools as perceived by teaching staff.

Keywords: Generative AI, SAMR framework, technology integration barriers, Higher Education, phenomenology

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The Potential and Challenges of Integrating Generative AI in Higher Education as Perceived by Teaching Staff: A Phenomenological Study

Tanya Linden, Kewei Yuan and Antonette Mendoza

1. INTRODUCTION

Disruptive technologies have had a strong impact on various aspects of our lives altering how industries operate. Generative Artificial Intelligence (Gen AI) is this disruptive innovation that has made a strong impact on various domains. The ability of AI models to consume data, learn from it and generate novel artifacts that look different from the ones processed (Sarker, 2021). The latest models can produce various types of content, including text, images, music and video. In higher education (HE) Gen AI tools provide unparalleled possibilities for teaching, learning, and research (Ziebell & Skeat, 2023). However, integration of Gen AI tools in academic environments has been met with both enthusiasm and reservations (Smolansky et al., 2023). Gen AI capabilities promise to change the future of HE by empowering students and staff, however, research on its full potential is still in its infancy. Gen AI tools are still at the center of controversy. On the one hand they support knowledge acquisition and effective completion of tasks, on the other hand use of these tools raise issues of ethics and academic integrity.

Past research has shown that Gen AI tools can improve students' engagement as well as personalize learning based on the individual student needs (Bahroun et al., 2023; Chan, 2023; Yu & Guo, 2023). Since teaching staff in HE institutions are the creators of the learning environment for students, their opinions and experiences on adopting Gen AI is of high importance. It is an unexplored terrain of how to align Gen AI capabilities with pedagogical approaches while adhering to professional and ethical values. Pedagogical approaches utilizing digital technology to improve learning opportunities for students, helping them achieve learning objectives and develop the relevant skills are defined as pedagogical value (Costa, 2019).

To address this knowledge gap, this study aims to answer the following research question:

What is the pedagogical value of Generative AI capabilities for higher education as perceived by teaching staff in HE?

2. BACKGROUND

Research studies on Generative AI in education recognize a growing potential of these tools for enriching students' learning experience. The availability and capabilities of Gen AI tools have a strong impact on all aspects of teaching and learning. Pit et al. (2024) summarized opportunities presented by the tools like ChatGPT and Copilot to enhance teaching, including use of Gen AI as virtual teaching assistants which in turn improves students' engagement and interaction with the concepts they are learning. They have been used for personalized tutoring (Mahon et al., 2024) for students of all skills and varying abilities, including requiring specialized support for students with disabilities (Zhao et al., 2024). These tools can be used to provide formative feedback to students reducing markers' workload (Dai et al., 2023). Text-based tools have been shown to provide support in improving writing styles and language skills (Pack & Maloney, 2023), learning programming (Mahon et al., 2024), while fostering students' self-regulated learning (Ng et al., 2024).

The impact of these tools in the assessments is undeniable. On the one hand, instructors can use them to generate various types of questions and case studies (Eager & Brunton, 2023). On the other hand, while designing assessments it is now important to consider ease with which students can get solutions by using text-based Gen AI tools.

The way Gen AI tools affect teaching and students' learning means educators need to understand what these tools can do to support pedagogical practices. Several studies used surveys guided by technology acceptance model (TAM) or its later versions UTAUT and UTAUT2 to understand teachers' acceptance and adoption of Gen AI in their teaching practices. For example, Al Darayseh (2023) investigated acceptance of AI technologies and factors affecting this acceptance. The study was limited to science teachers in Abu-Dhabi. Some studies apply these models to participants being pre-service teachers which shows the attitudes of the teachers of the future to Gen AI tools (e.g. Yang & Appleget,

2024; Zhang et al., 2023). These statistical studies investigate attitudes towards technology and associated emotions, such as anxiety and apprehension, however, they have significant limitations, including surveying participants from only one country or even only one institution and these studies lack insights and guidelines on how to maximize benefits by adopting these tools.

Although the number of publications reporting on practical approaches to using Gen AI in teaching and learning is growing, these suggested practices are individual attempts and experiments which are quite limited in their scope, e.g. they were tested within one topic running for up to 8 weeks on one small student cohort (up to 40 students). The experiment was run only once so there is no evidence that the results will be the same if the experiment were to be repeated. Therefore, often their findings cannot be generalized. In addition, the tools are being improved so for example, problems highlighted with GPT 3.5 are less frequent in GPT 4. So there is a pressing need for researchers in this field to keep exploring staff and students' perspectives on using Gen AI, including in what context they find these tools most helpful.

3. METHODOLOGY

This exploratory study aims to investigate the perceived pedagogical value of Gen AI tools in higher education as reflected on by academic staff and explored through the lens of SAMR (Substitution, Augmentation, Modification, and Redefinition) framework (Puentedura, 2006). The framework classifies use of technology into four categories:

- Substitution, i.e. technology is a direct substitute, no functional change.
- Augmentation, where technology is used as a direct substitute with some additional functionality to benefit teaching and learning.
- Modification, i.e. technology is used and allows significant task re-design.
- Redefinition, i.e. technology provides functionality for the creation of new learning experiences, previously inconceivable or too challenging to implement.

Given the exploratory nature of this study, a phenomenological approach was employed to get insights into the experiences and opinions of faculty members about Gen AI tools in their academic practice. This qualitative methodology was chosen for its strength in uncovering rich, detailed insights into complex phenomena, allowing for an in-depth exploration of attitudes, experiences, and concerns related to Gen AI technologies (Creswell & Poth, 2018). Phenomenology involves a 4-step process consisting of époche, the phenomenological reduction, imaginative variation, and synthesis (Moustakas, 1994).

The first stage, called époche which is translated from ancient Greek as "suspension of judgment", requires the researchers to acknowledge their presuppositions and biases in order to be able to control them to ensure the personal biases do not affect data collection and analysis. Since November 2022 Generative AI have been in the center of attention of media, including social media, as well as various organizations and individuals. All these sources impact people's opinions about generative AI and form preconceived beliefs which may impact collection of data and its interpretation.

The next stage is phenomenological reduction where views and opinions are collected with the aim of creating a rich and accurate account of participants' experiences. The most common data collection approach in phenomenological research is in-depth interviews. The interviewer creates an environment of trust and reciprocity, where subjective experiences of interviewees resonate with the interviewer (Høffding & Martiny, 2016). To minimize research bias, interview questions are designed to have broader questions at the beginning so that they are not leading interviewees but rather allow them to share their lived experiences. In this study the interview questions were guided by the SAMR framework, however to allow for rich and non-biased collection of opinions, the interview protocol allowed for additional questions to get clarification on the main questions as well as insights on the interviewers thoughts and concerns which may not fit within the SAMR framework. The core interview questions are presented in Appendix 1. To keep interviewing process consistent, all interviews were conducted by the same team member.

Personal narratives of the lived experiences provide the researchers with insights into the nuances and complexities of the phenomenon during the imaginative variation.

The third stage, imaginative variation, involves getting familiar with the recorded accounts of participants experiences and achieving understanding of the phenomenon from various perspectives (Eddles-Hirsch, 2015). This stage is often performed by applying thematic analysis (Braun & Clarke, 2006). It was important to identify common themes, as well as individual

variations experienced by only one participant.

Finally, the synthesis stage involves finding commonalities of participants experiences, merging them into a big picture. However, Moustakas (1994) warned about the necessity to stay open-minded and accept that the created synthesis is a snapshot created at a particular time and therefore new perspectives may enrich the understanding of the phenomenon as life goes on. These interviews were conducted in May 2024 and since AI technologies and interfaces to this technology are rapidly developing, it is expected that what we discovered as testing out attempts of using Gen AI in teaching and learning will become and more common stream approaches and more accessible to staff with lower proficiency in technology.

Participants

Phenomenological studies use criterion sampling. Since the aim of the study was to assess the perceived pedagogical value of Gen AI tools, the selection criteria for this study required participants to have at least five years of teaching experience and to have some experience in using at least one of the available Gen AI tools. Although the definition of an "experienced" teacher may vary among educational institutions based on the context, often teachers are considered to be beginners when they have under 5 years of experience (Arkoudis et al., 2023). The focus on teaching experience was due to the findings that educators confident in delivering subject content and their pedagogical approaches are more likely to consider innovative approaches in their teaching (Averill & Major, 2020).

It is recommended that for phenomenological studies the sample size is not predetermined but rather guided by the concept of saturation (Morse, 1994). Saturation is reached when no new information is obtained, and further coding is no longer feasible (Guest et al., 2006). Typically, phenomenological studies achieve saturation with between five to 25 participants (Creswell & Poth, 2018). This range provides flexibility to ensure depth of understanding while acknowledging that saturation will ultimately determine the final number of interviews conducted.

10 academics across four universities in Melbourne, Australia were interviewed (Table 1), although majority of the interviewees showed common views allowing identification of common themes. All interviewees had experience in using ChatGPT; five of them also used Copilot, Dall-E and other Gen AI tools. Seven interviewees teach and research the IT domain including IT education as the research field. Three participants were from non-IT domains.

Initial themes were identified after the first 4 interviews and saturation was achieved after 8 interviews. However, to ensure that we did not miss any interesting insights, we kept interviewing until we did not see any potential in finding additional themes.

4. DATA ANALYSIS

This study was guided by phenomenology, so all researchers had a discussion of strategies to minimize bias when conducting interviews and analyzing data. One of the adopted strategies is to do separate coding, group codes into themes and then compare the results. So initially the coders identified micro-level themes, then they discussed whether the micro level was too fine-grained while adopting the agreed label for the subtheme. The coders also discussed how the codes fit within the dimensions of the SAMR framework. However, at this stage it was decided that some subthemes do not fit within the SAMR framework but rather should be labelled as points of concern as it causes either challenges for which there is no obvious solution or uncertainty where there is a need to wait for university of guidelines or for advice from the Community of Practice.

Participant	Teaching Domain	ChatGPT	Copilot	Dall-E	Other
P1	Engineering Education	✓		✓	✓
P2	Computer Science	✓			
P3	Computer Science	✓	✓		
P4	Computer Science	✓			
P5	Computer Science	✓	✓	✓	
P6	Psychology	✓		✓	
P7	Computer Science	✓			
P8	Early Childhood to School Education	✓			
P9	Chemical Engineering	✓	✓		✓
P10	Information Systems	✓			

Table 1. Participants background details

Some subthemes were considered as potentially matching both the Concern category and a dimension from the SAMR framework or two dimensions from the SAMR framework. The latter applied to cases where AI capabilities could cause concerns and also support tasks modification or even redefinition. Finally, the micro-level themes were grouped into higher level themes.

Table 2 depicts the final themes, subthemes and coding of subthemes using the SAMR framework as resulted from the common understanding. Overall eight high level themes were identified.

Most interviewees referred to text-based Gen AI tools when answering questions, especially ChatGPT. One of the first experiences for everyone was *testing Gen AI capabilities* which was the first standing out theme. The majority wanted to evaluate whether ChatGPT can answer assessment questions evaluating how much they will need to modify assessment tasks. This capability was a reason for concern as well as an encouragement to use a different approach to creating subject activities and students' assessment. Certain capabilities were a concern due to Gen AI providing incorrect answers while students were not experienced enough to judge the quality of the provided responses. Testing of capabilities naturally lead interviewees to discussing how these capabilities could support their own professional activities, e.g. writing case studies, *developing assessment rubrics*, *creating multiple choice questions* (MCQs)..

Theme	**Subthemes**	**SAMR+ Concern**	**Participants**
Testing capabilities	Summarize a book	M, R	P5
	Paraphrasing	S, A, M	P6, P7, P8
	Write an essay	C, R	P6
	Answer assessment questions	C, M, R	P1, P2, P3, P5, P6, P9
	Writing case studies	A	P3
	Creating multiple choice questions (MCQs)	A	P3
	Developing assessment rubric	A	P2, P8
	Writing programming code	C, M, R	P7
	Generating class activities	A, M	P8
	Counselling service	R	P6
Digital divide	Some students not having access to the latest (better) version of ChatGPT	C	P1, P4
Assessment	Academic integrity	C, M, R	P1. P4, P6, P7, P8, P9
	Keep invigilated exams and hurdles		P4, P6
	Oral presentation		P2, P3, P10
	Grading	M, R	P9
	Generating feedback	M, R	P1, P3, P5
Students' approved use	Idea generation, thinking starter	M, R	P5, P7, P8, P10
	Paraphrasing, polishing English expressions	A	P2, P4
	Translation	S	P5
Impact on student learning	Generation of misinformation and bias	C	P2, P3, P5, P7, P8, P10
	Impediment to developing critical thinking skills	C	P4, P8
Change how we teach	Teach to use Gen AI tools responsibly and as per industry expectations	A, M	P1, P2, P5, P7, P8, P9, P10
	Incorporating use of Gen AI in exercises	A, M, R	P7, P8
	Teach Prompt engineering	M, R	P1, P2, P3, P8, P9, P10
	Use GPT for role-playing	R	P9
	Revamping the whole subject	M, R	P5, P6
	Create an AI tutor	R	P9
	Redesign assessments and assessment metrics	M, R	P1, P3, P4, P8, P9
Social aspect	No attendance – no live communications	C	P4
Need for clear guidelines	Universities to regulate use	C	P3, P6, P8, P10
	Addressing privacy issues	C	P4, P9

Table 2: Summary of themes and subthemes

These three productivity approaches were coded as A "Augmentation" since they supported staff productivity but did not revolutionize teaching and learning. Also academics from different professional domains tested some domain specific capabilities. For example, P6 tested ChatGPT's capabilities to provide counselling advice, whereas P7 was interested in its coding capabilities.

All academics expressed concerns with potential issues related to academic integrity, however they discussed this issue from different angles. Some (P1. P4, P6, P7, P8) stated that misuse needs to be expected, others added ways to mitigate the problem, such as use *oral presentations* to test students' knowledge (P2, P3, P10) or *keep invigilated exams and hurdles* (P4, P6). These two points were not coded using SAMR as these responses focused on concerns regarding academic integrity caused by Gen AI availability and it was discussed in the context of testing students knowledge of important concepts without which they cannot judge the quality of Gen AI generated output.

All participants agreed that there is impact on student learning and that there is productive, useful use of Gen AI tools which is approved use, e.g. *idea generation* or *thinking starter* (P5, P7, P10), *polishing English expressions* (P2, P4), *translation* (P5). These participants incorporate Gen AI in their teaching *augmenting* original tasks and *modifying* them to teach students how to use Gen AI ethically and responsibly.

> "*I would like them <students> to use it, especially during idea generation.*" - P5, IT domain

> "*I create an activity where want students to ideate with generative AI or get feedback from generative AI…*" - P1, Engineering domain

> "*I actually show them in my tutorial how ChatGPT can create a rubric with the various criteria. …use it in this way as it can actually give you some ideas for starting points…*" - P8, Secondary School Education domain

However, there was also a valid concern that use of Gen AI tools could be *impediment to developing critical thinking skills* (P4, P8) and the known issue of *misinformation and bias* (P2, P3, P5, P7, P8, P10) so there is a need to teach students how to use Gen AI and for staff to monitor students' use of these tools.

> "*We created a workshop about how to do prompt engineering… it can give you contradicting information and wrong information… We don't' want to stop them <students> from using it <ChatGPT>… We want them to be able to use it properly and don't over trust it…*" - P2, Machine Learning domain

Many participants commented on the need to change how we teach and assess students' knowledge, from *revamping the whole subjects* (P5, P6) to *redesigning assessments and assessment metrics* (P1, P3, P4, P8).

> "*… change the assessment task in such a way that there is more critical thinking happening from the students.*" - P8, Education Studies (Secondary School) domain

Although we could not find examples of such drastic approaches, which would align with Redefinition in SAMR, some staff looked into what aligns with the Modification dimension of SAMR. Majority of participants commented that we need to *teach how to use Gen AI tools responsibly and as per industry expectations*, including teaching AI literacy and specifically prompt engineering. Many participants (P2, P3, P5, P7, P8, P10) also raised concerns that a lot of students accept Gen AI output as correct information, without critically evaluating it.

> "*Because companies, industry is using that <Gen AI tools>, we can't expect students not to know anything… we need to teach them how to use AI in different fields… they need to see different AI tools used in industry*" - P5, IT domain

> "*You have to have a sense of whether the answer is right or wrong.*" – P4, Computer Science domain

Some participants (P3, P6, P8, P10) pointed out challenges for educators due to lack of common views between educators and lack of guidelines from universities. This discrepancy between universities and their leadership in terms of guiding their staff was flagged as a Concern. Some universities issued a temporary ban for educators until they released the guidelines, other universities provided no formal instructions at the time of interviews.

"*The institution that I work for has a policy on the use of Generative AI, where they allow the chief examiners or the unit convenors to choose the extent to which students could use Generative AI … and currently the guideline for the one specific unit I am talking about is not to use Generative AI*." – P10, IT Research Methods subject

"*I don't know if there are any guidelines at my university*." – P8, Education Studies (Secondary School) domain

Only one of the participants, P9, actually implemented GPT in their teaching at the SAMR Redefinition level. This staff member experimented with using AI for role-playing. In one of the subjects coordinated by P9, students need to discuss their project with an industry consultant. Since time with the real consultant is costly, students get only 30 mins for this discussion. However, when GPT became available, this subject coordinator collaborated with a programmer and they created a Retrieval-Augmented Generation (RAG) so that students could continue a discussion with the GPT based tool playing the consultant role. Interestingly, while staff considered the AI-played role as inferior to the communications with the real consultant, anecdotal evidence suggested that some students preferred communicating with an AI-based consultant due to their anxiety when communicating with industry professionals.

"… *we found this subset of students who expressed a preference for using the AI consultant over the human consultant. That was weird, like what's going on there, I wasn't expecting that. … They're meeting with the consultant and 3 other students, and some students have an anxiety around being asked a question that they don't know the answer to, or looking dumb in front of the consultant, who is a very senior engineer. … So there was this minority of students who expressed a preference for discussing with the AI consultant…*" – P9, Chemical Engineering domain

These experiments using AI-based personas for role playing has a lot of potential in many learning areas (both in educational institutions and in industry) where there is a need to develop specific communication skills for dealing with customers, patients, clients and peers. This area of learning design aligns with the Redefinition dimension of SAMR. However, at this stage this advanced approach cannot be easily implemented as it requires some advanced technical knowledge so mainly teaching staff with computer science background or teaching enthusiasts collaborating with programmers manage to implement it.

While many participants discussed Gen AI abilities to write answers to questions or write an essay or a report as a threat to students' academic integrity, P9 pointed out that ghost writers have existed for many years, however GPT made these services more accessible. So this participant added an assessment task to the assignment to test student's understanding of their own submitted report to mitigate any AI writing.

"*After they've submitted the report, they'll go into a close book, prompted environment, and they'll answer 10 short questions about their own report. And the point of the questionnaire is not for them to answer the questions correctly, it's for them to answer the questions the same as their report. So we're gonna use that questionnaire as a way of assessing students understanding of their written report, and then we'll give them a mark for their written report, and then we'll score the question, 1 or 0, and that will be like 1, yes, you understand your own report. 0, no, you could not, we ask you basic questions about what's in the content of your report, and you were not able to answer those questions*." – P9, Chemical Engineering domain

Unlike all other interviewees, P9 is actively trying different approaches to take advantage of the capabilities of Gen AI and RAGs.

However, P9 was the only interviewee who was very creative about using AI (specifically GPT) providing students with authentic learning. All other interviewees were much more cautious having reservations related to the negative aspects that are being brought in by using Gen AI (marked in the SAMR+C column in Table 2). Most of concerns were discussed by P4, who focused on these negative aspects brought about by Gen AI, including

- social aspect explaining that students replace communications with humans by communications with Gen AI:

"*Students don't want to come to campus… It's not that you don't need to*

come, it's that you don't need any friends".

- the trustworthiness of AI output, emphasizing that students need to have sufficient subject knowledge to check the output quality which can be gained by doing the tasks yourself:

"*I teach programming… And that is something that you learn by doing it yourself, by practicing*."

"*You have to have a sense of whether the answer is right or wrong*."

"*I wouldn't want the AI writing my life support software*."

- digital divide aspects reflecting on some students paying for the latest version of Gen AI or for frequency of access

"*…if some students use them and some students don't, then we will have some kind of disadvantage for students who don't when Gen AI is really powerful and help students' learning…*"

- privacy issues, including the fact that OpenAI and other Gen AI providers collect our data, but we do not know how it is stored, where it is stored and how secure it is:

"*I think OpenAI is going to be blackmailing every student on the planet in 5 years or 10 years, when they become CEOs of companies, or when they become prime ministers*."

5. DISCUSSION

Gen AI as a disruptive technology has had a significant impact on Education and therefore the views of academics as creators of learning environments need to be examined to understand what inspires them to integrate new capabilities into the teaching and learning processes and what causes concerns. The SAMR framework (Puentedura, 2006) was deemed as suitable for analysis of education transformation using new technologies. The summary of results is depicted in Table 3. The simplest one is *Substitution*, where users replace manual activities or one technology with another without any functional changes achieving the same results but often more effectively. From this point of view, the participants discussed using Gen AI Chatbots to help with grammar and spelling, simple translation tasks (replacing translation tools), such as individual words and expressions, finding answers to questions replacing Google search.

Substitution	Technology is a direct substitute, no functional change	Gen AI helps with spelling, grammar, findings synonyms to help paraphrasing, finding answers to questions, basic translation
Augmentation	Technology is a direct substitute, plus additional functionality	Gen AI helps with spelling, grammar, plus paraphrasing or even generating sections of essays; grade not only MCQs, but long text answers.
Modification	Technology allows significant task re-design	Gen AI provides answers to questions, humans need to evaluate quality of the output (e.g. writing essays, writing programming code). Providing starting point for a topic, e.g. idea generation RAG providing answers to questions trained on the specified knowledge base.
Redefinition	Technology allows for the creation of new learning experiences, previously inconceivable or too challenging to implement	Conversational agent, role-playing, virtual tutor within the limited expertise domain and managing hallucinations by answering "I don't know" if the question is beyond the scope of the domain. Gen AI can generate feedback; it can do grading if tight criteria are provided. Use Gen AI for idea generation (e.g. under the tutor's guidance.

Table 3: SAMR- Technology and Transformation framework (Puentedura 2006)

Augmentation encompasses new functionality in addition to being a direct substitute. The participants provided insights that students use AI for paraphrasing, where the task expands on basic synonym search. These capabilities make a long-term impact as using Gen AI tools help students improve their essays, as well as writing skills. Educators have used technology to mark multiple choice and fill-in-the-gaps questions, however now these new tools can generate formative feedback and if provided with a rigid grading rubric, the summative feedback will also be somewhat useful.

Modification means using technology for significant tasks enrichment. If in the past students in programming subjects searched for code or searched for explanation on how to write a function to perform a programming task, now they can ask a text-based tool to pinpoint mistakes in the code or write code for them. Gen AI tools place detailed comments within the generated code which helps with understanding of the code. Staff needs to consider these capabilities to incorporate them in the handouts to support students' learning, to teach students how to evaluate the quality of Gen AI generated output and how to build upon this output.

When running assessments, it has been shown that formative feedback is crucial for student learning. However, after the mark for an assessment is published teaching staff don't know whether students are learning from the provided feedback because they are not allowed to resubmit an improved version of their work. Although there were studies reporting on teaching approaches that allowed assessment resubmissions (Linden, 2018), the mainstream teaching cannot adopt such learning strategies because it is too time-consuming and therefore too costly to mark multiple submissions of the same assessment. However, if we employ AI-based markers, the cost will be significantly reduced whereas learning value for students will be enormous, because they will participate in cycles of continuous learning and practicing necessary skills, getting feedback on where they are doing well and what knowledge gaps they need to address. In certain aspects there may be a blurry border between Modification and Redefinition. An existing assignment can be updated with some new approaches using GenAI which could be classified as Modification, however, the changes may not be feasible in the past which could classify the change as Redefinition, i.e. using technology to create new authentic experiences.

The most interesting advances in learning and teaching processes brought by easy access to GPT can be categorized as *Redefinition*. Such approaches are useful for creating authentic learning by simulating industry situations where students can practice necessary skills in the security of the simulated environment (e.g. practicing chemical reactions without the risk of poisoning or an explosion, practicing clinical psychology with simulated patients without the danger of causing severe consequences to the patient's mental state). In the past simulations required programming complex environments (e.g. Cybulski & Nguyen, 2012; Guadagno & Powell, 2012) so it was too challenging and often expensive to implement. Access to GPT allows us to combine a basic Chatbot interface and a GPT wrapper to implement the necessary simulation. Taking into consideration the speed of AI technologies development, "talking" AI chatbots are under development and they will make simulations even closer to real life experiences. These role-playing scenarios have a lot of potential, however, there is no easy access to developing the relevant personas for academics who don't know programming or have access to funding for such developments and maintenance.

The views of teaching staff showed the dichotomy between their understanding of Gen AI potential for students learning and barriers to technology integration in higher education. Ertmer (1999) suggested a framework classifying technology integration barriers as external (or first-order) and internal (or second-order). Organizational support, including ineffective leadership and guidance is classified as a first-order barrier and it has a strong impact on success of adopting new technologies (Gkrimpizi et al., 2023). As shown in our data analysis, some interviewees flagged their institutions support as an issue. Some did not know whether their institutions have a policy on using Gen AI, others feel the policy is vague, so they prefer to be on the side of the caution and wait to see how the situation develops. Another reason for the universities to provide the policy on integration of modern technologies in the education process are privacy concerns (Emezirinwune et al., 2024), since it is not clear how Gen AI uses and stores data uploaded to these tools. Although Ertmer's framework (Ertmer, 1999) does not include privacy among technology integration barriers, this aspect is an important concern in the 21st century and some of our interviewees referred to it as an explanation why they are relying on their university guidelines.

Second-order barriers are typically rooted in beliefs and attitudes towards teaching and use of technology in teaching (Ertmer, 1999). Some of our interviewees expressed resistance to this new technology citing all negative consequences that could happen and actually happen due to its ease of access. One of the concerns is that students use Gen AI as an instrument to cheat in their assessments, so the participants emphasized the need to continue with invigilated closed-book exams and mid-semester tests, as well to consider oral assessments.

Another important concern cited by teaching staff is that Gen AI can be an impediment to developing critical thinking skills as well as students' lack of skills in recognizing misinformation. Although there were suggestions to mitigate these issues by teaching students prompt engineering and emphasizing the need for skills to evaluate output generated by these tools, our interviewees have not integrated relevant tasks into their teaching. At this point in time only a very small number of teaching staff treat Gen AI as an opportunity, rather than a problem.

6. CONCLUSIONS

The release of Gen AI tools is revolutionizing education. The fast developments of this technology create growing opportunities in enriching student learning experience, so it is crucial for academics to move with times. Although some academics try to resist the changes and only see Gen AI as a threat to academic integrity, others embraced the evolving capabilities and explore the options of applying these tools in their teaching.

This study used phenomenological enquiry to get insights into the current views and attitudes of academics towards Gen AI, including what value they are getting or hope to get for their teaching and for students' learning. Although the majority of respondents are still trying out Gen AI capabilities, they all understand that Gen AI tools, especially text-based tools, need to be harnessed so that they affect students' learning in a positive way and possibilities are very wide.

Examining uses of Gen AI through the lens of the SAMR framework demonstrates that at this stage most frequent uses of Gen AI are at the Substitution and Augmentation levels. However, a plethora of opportunities that will seriously enrich the learning process under the guidance of academics are to be found at the Modification and Redefinition levels. However, our analysis of participants' views uncovered a multitude of concerns, which is a dimension that needs to be added to the SAMR framework. Use of technologies for teaching and learning needs to be examined from the perspective of potential they can bring to education but also negative effects that they may introduce which need to be controlled and mitigated.

In terms of potential AI brings to education, there have been experiments in using AI bots as conversational agents, improving students' speaking skills when learning foreign languages (Duong & Suppasetseree, 2024; Tai & Chen, 2024). However, there are many opportunities including creating interactive environments that simulate in-workplace interactions. Unfortunately, there are some serious barriers for such developments. As classified by the technology integration framework (Ertmer, 1999), first-order barriers are mostly beyond teaching staff control. They include lack of funding, restrictions from universities on access to GPTs, lack of technical skills to implement ideas using APIs and on-going costs. There is a need for staff to have access to developmental environments with user-friendly interfaces that do not require advanced programming skills, preferably through a learning managements system plug-in. Future research needs to examine the application of such Gen AI simulations in different study domains, its benefits and challenges, as well as staff and students' perspectives on such pedagogical approaches.

Students often use Gen AI tools to get answers to assignment and test questions. However, it has been proven that learning by examining a provided solution is passive and less effective (Dolan et al., 2002). It is important to develop problem-solving skills which happens when students tackle different approaches to solve a problem. So, the goal is to train Gen AI to guide students towards finding the solution as opposed to providing the solution to the problem. Training AI models in a specific domain, e.g. on subject materials, creating detailed prompts to provide important context for the model and guidelines not to provide solutions but to use scaffolding, which in this context will be a special approach to prompt engineering. Teaching staff need to learn these skills before they can confidently start developing AI tutors. They also need technical and educational support, as well as funding. As staff flagged the need for institutional support, it is not only policies and guidelines they need.

They also need technical and financial resources as well as a supportive environment to test use of AI tutor for students' learning.

In terms of concerns, one of the issues is the issue of privacy that is positioned between first and second-order technology adoption barriers. This issue was not discussed in the Ertmer's framework as it was not a pressing issue in the previous century; however, it needs to be considered in the modern day and age. On the one hand we do not know how data collected by Gen AI is stored and who has (or will have) access to it which places privacy in the category of first order barriers. However, people have different attitudes towards privacy in IT with some having strong concerns and others ignoring the risks for rewards (Fui-Hoon Nah et al., 2023; Gerber et al., 2018). Some teaching staff express privacy-related concerns citing their own negative expectations on how private data may be misused, others refer to privacy as part of the university policy on use of Gen AI. So, privacy cannot be clearly categorized as a first or second-order barrier but must be considered when deciding on how to incorporate Gen AI tools in education.

We know that different versions of GPT have different costs associated with them and produce different quality outputs with GPT3.5 being prone to "hallucinations" and GPT 4 using advanced algorithms to decrease bias. So as emphasized by the participant P9, there is a need not to just evaluate the quality of output of each version, but also check whether users notice the difference.

This study is limited to examining views of teaching staff in universities in Melbourne, Victoria, Australia. Also, as a qualitative study, the researchers interviewed only a small number of academics (until saturation was achieved). However, potentially involving teaching staff from other countries would enrich the findings. Also, the study focused on use of Gen AI for teaching and learning only, however, some of these tools capabilities could enrich other types of activities in HE institutions. However, this was beyond the scope of this study.

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APPENDIX 1. CORE INTERVIEW QUESTIONS

No.	Question	SAMR
0	Are you using any GenAI tools, if yes, which ones? If no, why not?	NA
1	Can you begin by describing your initial experience or experiments with integrating Generative AI into your teaching or curriculum?	Substitution
2	What motivated you to start using Generative AI in your educational practices?	NA
3	How does Generative AI fit into your current teaching methods and learning objectives?	Augmentation
4	In what ways have you noticed Generative AI enhancing the learning experience or outcomes for your students?	Augmentation
5	Can you share any challenges you've encountered in using Generative AI for teaching and how you've addressed them?	Modification
6	Have there been opportunities to redesign traditional tasks or introduce new learning activities with Generative AI? If so, could you provide examples?	Modification Redefinition
7	What are the observable outcomes or impacts of integrating Generative AI into your curriculum on both teaching and student engagement?	Redefinition
8	How do you navigate the ethical considerations and academic integrity issues that come with using Generative AI in education?	NA
9	Looking to the future, how do you envisage the role of Generative AI evolving in higher education?	Redefinition
10	What support or resources do you think educators need to effectively integrate Generative AI into their teaching practices?	SAMR as a whole