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Phenomenological study of Generative AI in Higher Education as Perceived by Academics

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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 maximise 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 analysed through the lens of the SAMR (Substitution, Augmentation, Modification, and Redefinition) framework. Although majority of 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 capitalising on their capabilities.

Keywords: Generative AI, High education, SAMR framework, phenomenology

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 honesty.

Past research has shown that Gen AI tools can improve students' engagement as well as personalise learning based on the individual student needs (Bahroun et al., 2023; Chan, 2023; Yu & Guo, 2023). Since academics (teaching and research 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 academics?

2. BACKGROUND

Research studies on Generative AI in Education recognise 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) summarised 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 personalised tutoring (Mahon et al., 2024) for students of all skills and varying abilities, including requiring specialised 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 maximise 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 are quite limited, 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 generalised. 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 GenAI tools in higher education as reflected on by academic staff. 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 centre of attention of media, including social media, as well as various organisations 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 to create 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 minimise research bias, the 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.

The third stage, imaginative variation, involves getting familiar with the recorded accounts of participants experiences and achieving understanding of the phenomenon from various perspectives. This stage is often performed by applying thematic analysis (Braun & Clarke, 2006). 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.

Participants

Phenomenological studies use criterion sampling. Since the aim of the study was to assess the perceived pedagogical value of GenAI tools the selection criteria for this study required participants to have at least 5 years of teaching experience and to have some experience in using at least one of the available Gen AI tools.

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 saturation was achieved after the nineth interview. 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.

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. Table 1. Participants background details

4. DATA ANALYSIS

This study was guided by phenomenology, so all researchers had a discussion of strategies to minimise bias when conducting interviews and analysing data. One of the adopted strategies is to do separate coding, group codes into themes and then compare the results. Table 2 depicts the final set of codes and themes 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. 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 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). All 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).

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

Table 2: Summary of themes and subthemes

> "*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 concern that use of GenAI 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

Majority commented that we need to *teach 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. Some universities issued a temporary ban for educators until they released the guidelines, other universities provided no formal instructions.

> "*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, experimented with using AI for role-playing. In one of the subjects, 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 was released, a Retrieval-Augmented Generation (RAG) was created so that students could continue a discussion with the AI playing the consultant role. Interestingly, while staff considered the AI-played role as inferior to the communications with the real consultant, anecdotal evidence was 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 subjects. One of such areas is medicine where these personas are "patients" answering questions of students in training to be doctors on experienced symptoms helping them to learn on how to communicate with patients and diagnose medical conditions.

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 new capabilities available through easy access to GPT.

5. DISCUSSION

The views of academics were examined through the lens of the SAMR (Substitution, Augmentation, Modification, and Redefinition) framework (Puentedura, 2006). The framework classifies use of technology into four categories (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 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 chance	Gen AI helps with spelling, grammar, finding answers, 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 MCQ, 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 RAG providing answers to questions trained on the specified knowledge base
Redefinition	Technology allows for 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 context. GenAI can generate feedback, it can do grading if tight criteria are provided. Use GenAI for idea generation (e.g. under the tutor 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 and this tool helps them improve their essays and 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 quite accurate.

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.

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 practising necessary skills, getting feedback on where they are doing well and what knowledge gaps they need to address, and back to learning.

The most interesting approaches to learning and teaching brought by easy access to GPT can be categorised as *Redefinition*. This is about using technology to create new authentic experiences. One of such approaches is 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 expensive to implement. Access to GPT allows to combine a basic Chatbot interface and a GPT wrapper to achieve 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 promise, 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.

6. CONCLUSIONS

The release of Gen AI tools is revolutionising 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 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. 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, including 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 development

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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 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.

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 emphasised 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 academic staff. Only teaching and research staff in universities in Melbourne, Victoria, Australia participated in this study. 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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