

Association for Information Systems

AIS Electronic Library (AISeL)

Rising like a Phoenix: Emerging from the
Pandemic and Reshaping Human Endeavors
with Digital Technologies ICIS 2023

Digital Learning and IS Curricula

Dec 11th, 12:00 AM

Navigating the Use of ChatGPT in Classrooms: A Study of Student Experiences

Rio Katavic

University of Manchester, riokatavic@gmail.com

Aseem Pahuja

University of Manchester, aseem.pahuja@manchester.ac.uk

Tahir Abbas Syed

University of Manchester, tahirabbas.syed@manchester.ac.uk

Follow this and additional works at: <https://aisel.aisnet.org/icis2023>

Recommended Citation

Katavic, Rio; Pahuja, Aseem; and Syed, Tahir Abbas, "Navigating the Use of ChatGPT in Classrooms: A Study of Student Experiences" (2023). *Rising like a Phoenix: Emerging from the Pandemic and Reshaping Human Endeavors with Digital Technologies ICIS 2023*. 15.

<https://aisel.aisnet.org/icis2023/learnandiscurrecula/learnandiscurrecula/15>

This material is brought to you by the International Conference on Information Systems (ICIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in Rising like a Phoenix: Emerging from the Pandemic and Reshaping Human Endeavors with Digital Technologies ICIS 2023 by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Navigating the Use of ChatGPT in Classrooms: A Study of Student Experiences

Completed Research Paper

Rio Katavic

University of Manchester
England

rio.katavic@student.manchester.ac.uk

Aseem Pahuja

University of Manchester
England

aseem.pahuja@manchester.ac.uk

Tahir Abbas Syed

University of Manchester
England

tahirabbas.syed@manchester.ac.uk

Abstract

Amidst growing concerns about ChatGPT-facilitated academic misconduct, universities are grappling with laying out clear guidelines, leaving students and academics in a state of confusion. In this milieu, the study delves into students' perspectives to investigate their engagement with ChatGPT thus far, using Grounded Theory Method to analyze their behavior. Our findings reveal that ChatGPT can significantly enhance learning experiences when used appropriately. The tool's conversational abilities allow students to tailor their interactions, fostering personalized learning and promoting inclusivity. However, a multitude of factors, including sociocultural influences, academic context-driven skepticism, and the tool's limitations, shape students' interactions with ChatGPT. Our study highlights the opportunities ChatGPT presents for technology-enhanced learning while acknowledging the challenges it poses to the academic landscape, paving the way for better-informed policies on the use of AI in higher education.

Keywords: LLM, ChatGPT, enhanced learning, academic malpractice, plagiarism

Introduction

When the search engine Google was launched in 1998 it caused a great technological shift that has defined the way we use the web. Early researchers raised questions and even issued warnings against using it as it could 'harm' students' information literacy skills (Krutka et al., 2021). Similarly, Wikipedia was banned from being used by students for essays and academic writing assessments due to its unreliable nature (Mesgari et al., 2015). More strikingly the calculator was met with a significant amount of resistance once it entered mainstream usage with teachers protesting the use of calculators in the 1980s. However, innovative development has always prevailed with these technologies eventually being accepted and adopted into common academic practices. We are now seeing a similar trajectory since the release of ChatGPT into the public domain. Some are fearing that students will use this technology for cheating behaviors, endangering the uphold of academic integrity (Cotton et al., 2023). While research regarding the impact of ChatGPT on education is still scarce, and most of which is centered around academic integrity and concerns, there is a lack of research to uncover how can it be an effective asset to the modern-day student. This paper will gather and analyze qualitative data to gain a better understanding of ChatGPT from a student's perspective and identify areas where it can improve the learning experience, objectively bridging the gap between institutions' reluctance and the eagerness of students.

Kirkwood and Price (2014) have emphasized the importance of determining the goal of enhancement, which can be categorized into three intervention types: replicating existing teaching practices,

supplementing existing teaching practices, and transforming the learning experience. Additionally, desired enhancements can be categorized into operational improvement, quantitative change in learning, and qualitative change in learning (Kirkwood & Price, 2014).

This paper aims to uncover how ChatGPT is being used by students and how these practices are affecting the three phenomena highlighted by Kirkwood and Price (2014) by answering the following research questions:

1. How does ChatGPT enhance student learning?
2. How do students perceive the potentialities and limitations of ChatGPT?
3. What are student concerns and university guidelines on plagiarism and the use of ChatGPT, and how do they impact engagement with the tool?

This study contributes to research by exploring the factors influencing students' cheating behaviors in the context of ChatGPT use, as well as examining how ChatGPT contributes to innovative learning practices and augments existing learning techniques. It also addresses concerns about the negative effects of ChatGPT on learning and the potential to increase negligent academic practices, refuting these claims by demonstrating added value beyond 'laziness'. The findings support the notion that teachers should encourage engagement with new technologies to promote appropriate academic practices and foster innovative, inclusive learning.

The rest of the paper is structured as follows. The next section provides a critical review of the literature on the use of technology in education, including use cases involving AI, ChatGPT and instances of academic misconduct. This is then followed by the description of the research approach and methods used to collect and analyze the data from interview participants. Then, an analysis of the findings from the empirical research is provided while drawing on key ideas and concepts derived from the literature review section. The paper concludes with a summary of the findings, limitations of the study and recommendations for further research.

Literature Review

Technology in Education

The rapid digital transformation of today's world necessitates that most educational institutions adapt and embrace technology to cater to the needs of 'digital natives' or 'digital residents', that is, their students (Bennett et al., 2008; Wright et al., 2014). However, these terms have been challenged given the diverse background of university students (Losh, 2014). Therefore, educational institutions must strike a delicate balance, fostering innovative use of technology while addressing the diverse needs of students with varying levels of access and proficiency in the technology under question (Eynon & Malmberg, 2011; Kennedy et al., 2010).

Studies reveal that students primarily utilize technology for logistical purposes and to handle academic challenges, rather than for innovative learning (Henderson et al., 2017). Moreover, students' technology use is indirectly shaped by their university context and is typically impacted by issues of functionality, responsiveness, and ease of navigating the course (Douglas et al., 2015). Therefore, this paper investigates whether students employ ChatGPT as an innovative learning tool and how their university context influences their behaviors in relation to ChatGPT.

In a related study, students expressed a desire for digital technologies to help visualize concepts and view information differently (Henderson et al., 2015). Students' technology use is influenced by conventional academic models, and universities play a significant role in shaping these behaviors through policies, rules, and leading by example.

The Covid-19 pandemic in 2019 demonstrated the potential for digital technologies, particularly AI, to play a vital role in education (Crick, 2021). Realizing this potential requires not only a technological shift but also a mindset and cultural shift in educational institutions.

Learning with ChatGPT

GPT-3.5 is a third-generation autoregressive language model designed to statistically predict word sequences starting from a prompt (Floridi & Chiriatti, 2020). This iteration uses 175 billion parameters trained on Microsoft's Azure AI supercomputer and has been developed and released by OpenAI (OpenAI, 2022).

ChatGPT does not have access to real-time information unless it is provided. Its knowledge cut-off date is September 2021. However, the tool still can provide users with a wealth of information due to the data it has been trained on. Some have argued that the ability to access a wealth of information almost instantaneously has caused 'closed book' exams to become useless as learning will shift towards framing concepts, creating models, seeking evidence, and validating ontologies (Cope & Mary Kalantzis, 2019). Closed book exams are designed to test a student's ability to recall, analyze and make conclusions, instead of making them obsolete, institutions should design and administer them in a way that challenges students' capabilities to enhance their skills and knowledge.

As an NLP, ChatGPT has the potential to provide learning through question dialogue. This technique of learning has a long history and was established in 1976 as the 'conversation theory' (Pask, 1976). Further research on this topic, specific to Software Development, has defined three key attributes for asking questions that lead to learning: appropriability, evocativeness, and integration (Harel & Papert, 1990). ChatGPT can influence each of these categories. For appropriability, the system can provide students with the opportunity to formulate their own sequence of questions, ask follow-ups, and clarify terms all of which enable the personalization of their learning experiences. The conversational capability of ChatGPT can lead students to deeper personal reflection and develop their ability to think for themselves by challenging the output, both of which encompass the evocativeness and the integration aspect of the theory (Harel & Papert, 1990). While ChatGPT certainly displays the potential to increase learning through conversation, it is important to note that no technology can replace human interaction which is, after all, the primary basis for the 'conversation theory'.

Previous literature has defined Personal Learning Environments (PLE) as a learner-centered strategy where it is attempted to create an environment by connecting various tools, services, and relationships to increase learning outcomes (Attwell, 2007). This research has been centered around social software and demonstrates the advantages these technologies can offer in creating PLE (Schaffert & Hilzensauer, 2008). While PLE as defined above highlight the importance of catering to the needs, preferences, and abilities of individual learners it also poses challenges in terms of balancing a standardized curriculum and learning objectives, representing somewhat of a paradox. Leadbeater (2005) argues that the provision of choices in the academic setting is a means to improve the engagement and motivation of students. Personalized learning definitions and approaches still represent widespread uncertainty (Sebba et al., 2007), and strategies to adopt such approaches are complex. The concept raises the question of whether students can simply be guided in this direction to accommodate their own needs rather than implementing a widespread strategy where it is difficult to encompass all students. Emerging technologies, such as ChatGPT, have the potential to bring this to fruition.

Similar to the 'conversation-theory' previous literature has defined inquiry-based learning as a form of learning where students adopt techniques and procedures akin to those employed by expert scientists, enabling them to build their own understanding (Keselman, 2003). Pedaste et al. (2012) conducted a systemic literature review to provide a synthesized framework that describes an inquiry cycle in 5 phases: orientation, conceptualization, investigation, conclusion, and discussion. In the same paper, the authors claim that technological developments will significantly improve its success supported by electronic learning environments. In a review of learning and teaching programming languages, Robins et al. (2003) discuss the different strategies incorporated and used to teach programming languages. The authors distinguish between several different aspects when attempting to learn a programming language, much of which is centered around the comprehension of the logic behind the code. Programming is notoriously logical and requires both knowledge of a particular programming language and comprehension of how this logic transpires through the code (Brooks, 1983). It is also important to discuss critical thinking which plays a vital role in the learning process, and while extant literature has discussed this concept at length, in a literature review studying this concept it has been suggested that critical thinking includes "the component skills of analyzing arguments, making inferences by using inductive or deductive reasoning, judging or

evaluating, and making decisions or solving problems.” (Lai, 2011, p. 42). Minner et al. (2010) evaluated the effectiveness of inquiry-based science instruction. They found that information gathering plays a crucial role in inquiry-based learning. This involves students actively seeking, evaluating, and synthesizing information to construct their understanding of scientific concepts. This research synthesis highlights the importance of information gathering in promoting better learning outcomes, critical thinking, and problem-solving skills in science education.

More specific examples that have been discussed in literature of where ChatGPT can be used in education include using it as a library referencing service (Chen, 2023), conducting literature reviews (Haman & Školník, 2023), using AI to grade essays (Attali & Burstein, 2006; Burstein, 2003), and/or writing abstracts or introductions sections (Bouschery et al., 2023; Gao et al., 2022). But the findings in these studies raise further questions about the accuracy of the output and ethical implications of incorporating such use cases into academic practice.

Academic Misconduct

The seemingly infinite capabilities of the internet and new emerging technologies have placed a greater emphasis on detecting academic misconduct, levels of offending and how to punish such behavior. Campbell (2006) has credited this focus on detection to the ‘plagiarism plague’ whereas others have stated the internet has provided “a rich resource for researchers and journalists looking for headline stories” (Perry, 2010, p. 97) and that the internet is “exacerbating the long-standing problem of student plagiarism” (Scanlon & Neumann, 2002, p. 374). Furthermore, studies have found that the university environment directly contributes to students’ attitudes towards teaching, specifically the state of ethics in their academic communities (Gerdeman, 2000). In some cases, even the level of ‘connectedness’ to their institution plays a role in these behaviors (Simon et al., 2004). Previous research has differentiated situational and individual factors influencing students’ cheating behaviors (Molnar & Kletke, 2012) and many have found that the situational and contextual environment have a greater impact overall (McCabe & Trevino, 1997), that the most powerful influence among these factors being the perception of their peers’ behaviors (McCabe et al., 2001). According to Burrus et al. (2007) faculty members and institutions have a more extensive definition of ‘cheating’ than students. It is therefore important to recognize that ‘cheating’ can be complex and multifaceted depending on definitions and opinions making it crucial for faculty members, institutions, and students to engage in an open and transparent conversation about these issues to prevent such behavior.

The emergence and release of ChatGPT into the public domain has created a great amount of concern surrounding academic integrity (Cotton et al., 2023). At the same time, ChatGPT has raised questions on authorship, attribution, and ownership (Thorp, 2023). Assertions made by Hosseini et al. (2023) support the notion that full accountability for the generated text should be assigned to the author who prompted the text generation, given that NLPs do not proactively generate content and the author retains the ability to juxtapose the text. A plausible argument as it relates to academia.

In addition, many are questioning the impact the tool will have on the student learning experience and the potential to negatively affect “critical thinking, problem-solving, and creativity” (O'Connor, 2022), paired with low attention span (Trinidad, 2020) and the reduction in reading (O'Connor, 2021) may push students into ‘lethargic mode’. But these concerns can be applied to any technology that provides easy access to information. Some have suggested that using ChatGPT as a sole information provider runs the risk of placing users and students into a ‘filter bubble’, this refers to the risks of showing only certain information putting users in a “bubble” without showing other and diverse viewpoints (Pariser, 2011). But can these issues further highlight how critical thinking, self-reflection, and the ability of students to think for themselves can be amplified and improved by using ChatGPT and challenging its output?

Is Using ChatGPT Plagiarism?

It is important to understand why the academic community is seemingly resistant to the adoption of ChatGPT, and once the issues have been highlighted it is clear the guidelines surrounding academic integrity need to be upheld. Dwivedi et al. (2023) found that a lot of online sentiment associated with ChatGPT is negative, indicating a high level of user resistance, with keywords associated with education and academic misconduct. Other factors potentially influencing this resistance have been driven by the

changes that new IT introduces to individuals' work systems (Laumer et al., 2016) and the daunting task of incorporating these modern technologies and devices into teaching (Cavas et al., 2009; Vakaliuk et al., 2021). New tools and processes are always met with a certain degree of resistance, determining if these concerns are valid and what they entail is just as important as encouraging development. One of the overarching concerns with students using ChatGPT is concerns around the importance of academic writing. Writing has long been considered the foundation of academic success to clearly communicate findings from research, some argue that generative AI technologies make this practice obsolete (Dwivedi et al., 2023). The shift in thinking required to accept this fact is monumental and a completely reasonable explanation of said resistance. This shift also highlights the importance of asking thought-provoking questions and conducting research to find answers as the new foundational criteria of academia (Dwivedi et al., 2023). These findings reaffirm the need to find a way to improve critical thinking skills to add value beyond AI.

Susarla et al. (2023) examine ChatGPT's mixed impact on academia, praising its aid in research and writing while cautioning against data biases and reliability issues. They advocate for guidelines rooted in human primacy and responsible reporting. Meanwhile, Van Dis et al. (2023) call for a shift from detecting AI-written content to transparently utilizing Large Language Models, highlighting research priorities like accountability and human verification.

If one was to look for more positive reasons why ChatGPT can be instrumental in transforming the education system, some have argued that chatbots and NLPs can create inclusive learning environments for impaired students, with diverse living environments and with diverse learning styles (Gupta & Chen, 2022). Some researchers have suggested teachers invite students to interact with these technologies to demystify and understand how they can be used in a learning environment (Williamson et al., 2023), but this entails that teachers must be open to this and first educate themselves. Ultimately, it's not about the tool itself, but how we use it that determines its value.

Methodology

Research Design

This paper is a qualitative research study using the Grounded Theory Method (GTM) approach. Grounded theory is a general methodology for developing theory that is grounded in data systematically gathered and analyzed (Strauss et al., 1994). A qualitative approach helps to capture contextual factors and their impact on the learning experience (Patton, 2014). Due to the nature of this study, the aim is to explore and develop new theories grounded in empirical data collected through semi-structured interviews using open-ended questions. Creswell and Creswell (2018) have argued how the use of open-ended questions allows participants to share their views, experiences, and opinions to provide an inductive process to qualitative research. The GTM approach is suitable for this study to gain an in-depth understanding of how students are using ChatGPT and how that affects their learning experience during their studies. GTM ensures that theories are developed inductively to promote innovation (Urquhart & Fernández, 2013), so that this study can provide insights from which universities can decide how best to tackle ChatGPTs integration into teaching practices. Charmaz (1990) argues that the constructivist approach is more efficient in exploratory studies and offers this study the opportunity to uncover theories emerging from the participants' discussions about their interaction with the tool. This study is therefore an exploratory one looking to uncover new phenomena in the context of ChatGPT as a learning tool among students.

Participant Selection

The participant selection of this study was derived from the purposeful sampling approach. Charmaz (1990) has previously highlighted how GTM investigates experiences which create theory within a purposely selected sample. Johnson and Christensen (2019) discussed how participant selection relies heavily on the judgement of the researcher, therefore careful consideration went into defining the scope of the participant selection and how it fits into this study.

Patton (1990) suggested that the importance of purposeful sampling lies in selecting information-rich cases for in-depth study. In this paper, the sampling focuses specifically on IT undergraduate students, making it purposeful sampling and minimizing differences for a conscious sampling (Glaser et al., 1967). As ChatGPT is still a new tool and unfamiliar to some, IT students are most likely to have had experience and would be

more comfortable using the tool due to their background. Similarly, given their background students enrolled on IT courses are more likely to fit into what Bennett et al. (2008) coined as 'digital natives'. This assumes that IT students are more inclined to be aware of new technologies and are therefore more inclined to test them. This decision was made as an assumption and confirmed via theoretical sampling by discussing ChatGPT with students enrolled on different courses. While many knew about ChatGPT, those that were on an IT-related course were more active users and expressed wider knowledge of the tool. More importantly, IT students had previous knowledge on the topic of AI and how it works and would therefore be able to offer a deeper insight into the technology and its implications. Additionally, a better understanding of the technology behind ChatGPT enables them to be more critical of the output and consider the wider implications of using advanced generative AI. This prior knowledge is what makes this an information-rich case to sample from.

Therefore, the selection criteria for the participant selection are as follows: an undergraduate student enrolled on an IT-related course who has used or is using ChatGPT for their academic work. In this study, 15 interviews were conducted. The number of interviews led to theoretical saturation of the conceptual categories identified during the analysis, with no additional dimensions emerging. All participants have signed a consent form and no personal data has been collected, maintaining anonymity and confidentiality throughout the data collection process.

Analysis

As highlighted by (Glaser, 1992) this paper will follow the emerging design of GTM, allowing for theory to develop from the interview data. The rich data that this approach produces has provided sufficient substantial evidence to generate reliable theory. Charmaz (1990) developed the constructivist GTM which takes a more inductive approach, focusing on the significance of the meanings that participants give to the study's focal point, which was also taken into consideration during the analysis. Therefore, this study does not start with pre-existing theory, rather it allows for theory to emerge from the participant's own experiences and opinions.

While participant selection was purposeful sampling, the topics discussed in the interviews are the product of theoretical sampling that led to the saturation of the emerging categories. The flexibility of GTM enables the study to modify inquiries accordingly (Creswell & Poth, 2016). The iterative process has led to the identification of emergent themes and theoretical constructs. Subsequently, this process has allowed for the formulation of additional inquiry questions through theoretical sampling, aimed at further elaborating and contextualizing the potential theories. The goal is to reach the theoretical saturation of each category.

Open codes in the initial stages of the analysis aim to examine the thoughts, feelings, and motivations of the participants as they have engaged with ChatGPT. Open codes serve as an initial impression from discussions in the interview, while some were aimed to be more analytic to uncover a deeper meaning and intent, others remained descriptive. A participant remarked "*For example, for an essay. I think about what I should write about in this stage, I need to search for information for a kind of literature review and background for reading*", so they use ChatGPT to provide academic papers on the topic, this user interaction was what formed the *information gathering* open code. Similarly, another participant said "... *it provokes a thought that I might have not thought of or check ideas that I might have had and expand them.*", and this user interaction formed both the *reframing perspectives* and *idea generation* open code. During the second phase of analysis where the selective codes were created, *information gathering* was placed into the *seek assistance* selective code and *reframing perspectives* and *idea generation* were placed into the *reciprocal prompting* selective code. Selective codes serve to group the open codes that relate to one another in the behaviors of the participants and the relationship between the codes provides an abstraction to theorize about the theoretical codes that find their way into the findings. The constant comparison of interviews was present throughout the analysis, causing open codes to change, both in their nature and their categorical affiliation.

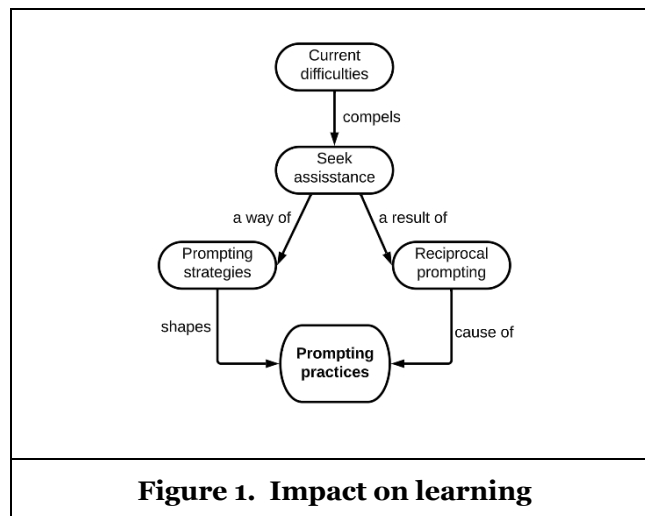
Findings

Impact on Learning explains the direct impact the tool has had on the participants' learning process, placing concepts in the context of the three categories of desired learning enhancements as defined by Kirkwood

and Price (2014). Factors influencing engagement explain external forces that shape students' behaviors when engaging with the tool.

Impact on Learning

During interview discussions, participants expressed resorting to ChatGPT when confronted with challenges or difficulties. Participants have described their lack of skills, time-consuming tasks, and general struggles that contribute to these difficulties. These occurring difficulties have compelled students to 'seek assistance', which is a category that describes how students have used the tool to seek help. Ways in which students addressed these challenges have been coded into the 'prompting strategies' category and depict users' behaviors aimed at arriving at meaningful results from the tool. Some have described using the tool as a way of summarizing information, structuring essays, and ideas, causing what has been coded as 'reciprocal prompting' which is a result of students using the tool. In this section, the theory of how 'prompting practices' has an impact on learning will be explored. This analysis will be based on insights from the interview statements and the relationships of the selective codes that are encompassed within this category (see Figure 1).



ChatGPT for Writing Code

Initial interviews revealed that participants referred to using the tool simply when they are 'struggling' without any indication of what this struggle is. Theoretical sampling led to further questioning around this topic to understand the context. The responses point to difficulties in 3 areas: lack of skills/knowledge, information gathering and idea generation. The 'lack of skills' relates explicitly to programming, as described by the participants. From the interviews, it is clear students find intrinsic value in using ChatGPT for their technical coursework where they have been asked to use a programming language. This is confirmed when participants were asked in which subjects the tool is most helpful and almost all participants exquisitely mentioned programming.

It was just to get a fast answer. So, normally I would go through other sources and Git repositories... to try to figure out the code... I will have to spend a lot of time on that, but with ChatGPT it was more specific. It gave me the answer to the question I was asking and if that wasn't correct, I could go and tell it what my errors were, and it would correct itself and I could repeat this until I get the correct answer. And things like that. Like, it was amazing.

A participant expressed that the efficiency of the tool to produce a piece of code is a significant advantage of ChatGPT. They discussed other tools and sources of information that they would usually use, implying that it is a very time-consuming process. The user also highlights the ability to reiterate until the correct

code is given which signals that a certain degree of knowledge is required to guide the tool to reach the correct output. From this, it is concluded that ChatGPT is used in conjunction with existing knowledge to complement the student's learning process. By iteratively adjusting the input along with analyzing the output ChatGPT is used as a vessel to better understand concepts. A prevalent concern when using ChatGPT for technical coursework is that students might simply acquire the code, thereby bypassing the learning process and thus failing to meet the comprehension requirements of learning programming languages as outlined by Brooks (1983).

Learning from ChatGPT

Participants in this study have expressed the desire to learn rather than simply completing their coursework the best that they can.

Yes, when I was doing coursework for more technical coursework. I used it to specifically assist me with the coding part. So, I was specifically asking it for the task that I was supposed to do, ChatGPT gave me the code and how it did, ... And I asked it to explain the process so I could understand it because I think the main problem was, I didn't understand how to do it and why to do it that way. So, it helped me to understand the code also.

In this instance, a participant had directly asked ChatGPT to explain the code while also recognizing that the core of the problem is that they lack the necessary skills. By asking for an explanation of the code and the process through which ChatGPT generated the code students can directly learn from the tool as if another person was explaining. This contributes to the improvement of understanding, helping students to gain a comprehension of the code and ultimately the programming language they are using which subsequently leads to an improved learning experience according to Brooks (1983).

Sometimes, I have to go back and kind of look at it, especially because I use it the majority of the time from a coding aspect. A lot of it is like, the tool needs to go in and check the logic of solving a problem is correct. And I almost just get it to translate the logic into the code that I need.

Several key insights can be drawn from the following statement. The participant suggests that understanding the logic of programming is important to effectively solve problems. They mention the need for the tool to check the logic of solving a problem is correct. The participant mentions translating logic into code, once again suggesting a degree of problem-solving while interacting with the tool. This concept was particularly interesting and raised the question of whether interacting with ChatGPT can provide a form of learning by encouraging critical thinking through reflection of their own prompts. Many have noted this as a common occurrence when using the tool and spend some time on thinking of how to phrase and rephrase their prompts.

The Conversational Ability of ChatGPT

The iterative approach when engaging with ChatGPT can be viewed as a conversation between the user and tool, as ChatGPT retains the ability to revisit previous prompts and outputs to better predict the following prompts subject to the context window constraint. Pask (1976) defined the 'conversation theory' and many of its elements can be directly applied to users interacting with ChatGPT. To gain a deeper understanding of this potential theory, participants were questioned on this topic. When asked their opinion of the conversational aspect of the tool one participant said the following:

... you need to iterate on your questions and answers and having that conversation has the ability to correct what you're asking and tailor it ...

The importance of being able to iterate and reiterate prompts based on the output has been largely discussed. This feature of the tool allows users to give further thought about what they are prompting and causes them to spend time thinking about 'how to phrase a question'. This type of interaction mirrors what literature has coined as 'inquiry-based learning' (Keselman, 2003).

It provides me with a different point of view. It expands my view in terms of, for example, I might have missed something important. And it helps me with improving my writing language.

Some have defined inquiry-based learning as a process of discovering causal relationships where the learner formulates hypotheses and tests them to create knowledge (Pedaste et al., 2012). Participants have noted that ChatGPT has caused them to view the information from a different perspective, helping them understand and create knowledge around new concepts.

Prompting Strategies

There is no one size fits all approach when using ChatGPT. When asked about a generalized process of how they would use ChatGPT, many have stated that it depends on the nature of the subject at hand.

It depends if we're talking technical or more theoretical coursework, ... But then if it's more theoretical, ... I'm not using it for writing at all because obviously it can be detected and I'm using it to ask ... can you describe this theory for qualitative research? I asked: What's the difference between thematic analysis and another approach and which one I should use for my paper; it wrote a bit about the differences which really helped me understand how to put it into practice. So, I use it a lot for understanding different concepts which aren't easy to understand and ChatGPT makes it easier, at least for me, than just to go on Google.

Participants described a way of asking or phrasing a question for ChatGPT to provide an answer. By asking for the differences between the two theories they can gain a deeper insight into each of the theories, this is especially helpful in some subjects where concepts are very similar. More importantly, the participant mentions how phrasing a question in this way allows them to apply this theory to their work. During the analysis of the interviews, this type of interaction was coded as a 'prompting strategy' and other participants were questioned on this line of interaction with the tool. Other instances of these 'prompting strategies' include phrasing questions or prompts in the form of 'explain the difference between...', 'what are the similarities between...', 'what is the impact on...', 'break down', 'give me a detailed overview of...'. Prompting strategies directly impact the learning process, and students can use prompts that will direct the tool to present information in a way that is easier for them to understand. Henderson et al. (2015) found that students desire the use of digital technologies to 'visualize' concepts and 'view information in a different way', from the interviews it is concluded that ChatGPT does exactly that, but in a much more personalized way that traditional teaching methods sometimes fail to offer. Some argue the crucial advantages that personalized learning has to offer (Attwell, 2007; Leadbeater, 2005), but these approaches pose a challenge in standardization. As ChatGPT is a tool meant for individual use this challenge is diminished as students tailor only their own experiences.

Once again, through these methods of interacting with the tool, students are demonstrating a level of critical thinking in combination with existing knowledge. ChatGPT provides students with a given output, or an argument, which students analyze and then make inferences. As discussed by Lai (2011), inferences can be made using inductive and deductive reasoning, by using the 'prompting strategies' students are using inductive reasoning to clarify and learn concepts, while their deductive reasoning is tested by applying pre-existing knowledge to the answers provided by the tool.

Reciprocal Prompting

Another emerging theme from the interview data is that the conversational aspect of the tool and the ability to "prompt" the tool to generate a certain output can be viewed as a reciprocal relationship and a mutual exchange of ideas, along with providing "comfort" as stated by some interviewees. This can be seen in the selective code 'reciprocal prompting' and represents the transfer of knowledge between user and ChatGPT. Upon deeper analysis of the interviews some of the students are unknowingly solving problems with the tool by utilizing 'prompting strategies' to view information in a different way, conversationally engaging with the tool and reflecting on both prompts and the output.

I kind of use it more of just like an idea, I don't use it to write stuff. It's just like, it provokes a thought that I might have not thought of or check ideas that I might have had and expand them. Yeah, so it's more just like a, it's like Google, but more interactive.

While ChatGPT can provide a different perspective on certain concepts that the user has asked for, it is the prerogative of the student to critique and analyze the output to cause the generation of new ideas. All participants expressed a greater inclination towards building upon the output, rather than taking the raw output, which requires aspects of previous knowledge, creativity, and critical thinking to be involved in the process to reach an outcome that is satisfactory to the student. This finding refutes the notion that ChatGPT has a negative impact on critical thinking, problem-solving and creativity (O'Connor, 2022). Judging whether an output meets their requirements is driven by wanting to produce high-quality work and receiving high marks. Regardless of the approach chosen, the tool serves as a catalyst for students to bring novelty into their work. According to Hosseini et al. (2023), the ownership, authorship, and accountability of the tool's output can be attributed to the individual who formulated the initial prompt. Thus, the reciprocal process of co-creating the desired output provides evidence of its novelty.

Comparison with Conventional Technology

Participants have expressed how information gathering is a very time-consuming process and ChatGPT is enabling them to complete this task more efficiently. There has been a constant comparison of ChatGPT to Google highlighting the similarities and differences each tool possesses.

So, the process would be, I gather the requirements. For example, for an essay. I think about what I should write about in this stage, I need to search for information for a kind of literature review and background for reading. And this is the process, I can first ask ChatGPT to recommend some academic papers within this area. And ask some questions for my knowledge. I don't know for example, for a model, what is it? Can you explain it to me and what are its strengths and weakness? How can it be used, and stuff like this?

Participants in this study have commonly referred to ChatGPT as a tool to conduct literature reviews by asking for recommendations for academic papers. The statement above demonstrates a process of how a student approaches writing an essay and ties in what was previously discussed as 'prompting strategies'. The retrieval of information via ChatGPT and the subsequent explanation of foreign concepts have demonstrated the connectedness of these two activities and how they complement each other in some instances. It can be concluded that information gathering and prompting strategies used in conjunction with one another provide a more seamless learning experience. Similarly, utilizing ChatGPT for information gathering, participants have described how it gives them context to what they are searching, which leads to a better understanding of the topic they are discussing.

If I had no knowledge, I would think about it as like a search engine. So, I look at it as another form of Google but more concise and one specific answer, so I would go to ChatGPT with a new, foreign topic.

Some participants have said that ChatGPT is used when the user has no existing knowledge of a concept, comparing the tool to Google with the added ability to be more directive to the answer they are looking for. Along with information gathering participants have highlighted the ability of ChatGPT to summarize information, whether that be from an output it has generated or summarizing input provided by the user. ChatGPT provides a more concise summary of information students require to complete their coursework. Using the tool in this way means students don't have to "sift through loads of sites" to find what they are looking for and are effectively saving time, and reducing the cognitive load, which some have highlighted as a significant disadvantage of traditional information gathering processes. However, the directive nature of the tool, as highlighted by the students, can limit the scope of exploration which is an important part of learning and researching.

Discussion

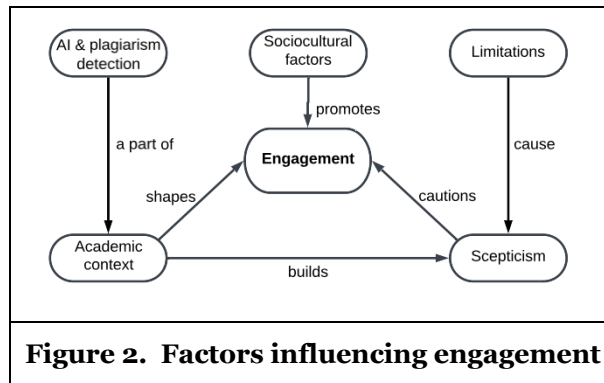
From the interview discussions and subsequent analysis, it is evident that ChatGPT provides different dimensions of problem-solving, critical thinking and idea generation. The nature of the prompt is decided by the goal of the students to achieve a desired output, which they then apply to their coursework. ChatGPT offers an efficient way of achieving results and, to those that ask, an explanation of foreign concepts promoting a process of personalized learning. To achieve this, students must first recognize the different ways in which they can learn, and which way suits them best. Once this has been decided students begin their own learning process which involves generating ideas and information gathering. However, the underlying factor that decides the qualitative change in learning lies in the prerogative of the student and the ‘prompting strategies’ they choose to employ. This paper contributes to research by demonstrating in which ways ChatGPT contributes to enhanced learning (see Table 1) and while the tool can offer many benefits it is important to remember that some processes play a vital role in learning and using ChatGPT simply “to save time” may have a negative effect on the quality of what is being learned.

Desired learning enhancement	User interaction with ChatGPT
Operational improvement	Efficiency Information gathering Essay structuring Programming languages Improve writing Summarise information
Quantitative change in learning	Reframing perspectives Iterative approach Reflection Idea generation
Qualitative change in learning	Asking for explanations Inquiry-based learning Question dialogue (conversation theory) Iterative approach Reflection Idea generation
Table 1. Enhanced learning using ChatGPT	

Factors Influencing Engagement with ChatGPT

Factors influencing engagement with ChatGPT encompass a wide scope of categories, often intertwining with one another (see Figure 2). One of the key emerging themes is how these factors influence the ways students engage with the tool. This includes ChatGPTs limitations, users’ skepticism, peers, lecturers, and their academic context with respect to open codes.

The academic context involves plagiarism, including AI & plagiarism detection software which makes students skeptical about using ChatGPT in their studies. There is also previous skepticism due to the predictive nature of the tool and the perceived limitations. The sociocultural factors include peer behavior, the competitive nature of education and personal background and experiences.



Defining Plagiarism

When discussing the boundaries of plagiarism where ChatGPT fits into this, one participant summarized the sentiment of others like this:

It depends on how you use it. Because if you copy and paste, whatever ChatGPT tells you to, then yeah, I think it is [plagiarism]. But for example, if you're trying to build something like an app and use the commands that ChatGPT gives you, I don't think it is plagiarism. You would do that on YouTube.

The most significant factor influencing engagement with the tool is the academic context. Students expressed concerns about cheating, acknowledging that the perception of cheating is subjective and how the tool “blurs” the lines of what constitutes plagiarism. They also discussed the importance of academic integrity and the varying contexts in which plagiarism is defined. Students in this study displayed a limited awareness of their universities' policies on plagiarism but felt it was the institutions' duty to inform them of any policies that include ChatGPT.

I don't feel like it's something that's been defined yet. I'm on the fence and I understand why it is [plagiarism]. And I can also understand why it isn't [plagiarism]. Because in my opinion, you're technically copying someone. And I would love to know if actually it can be used to plagiarise. I have tools that check your writing and rewrite sentences for you. Is that not the same thing?

Participants have strongly expressed a lack of communication from lecturers and the university regarding utilizing the tool in their studies and many have noted how this has made them weary of using the tool.

Plagiarism is defined as “the action or practice of taking someone else's work, idea, etc., and passing it off as one's own; literary theft”. (Oxford English Dictionary 2000). This definition brings into question what participants themselves are unsure of, ChatGPT is not a person therefore using text generated by an AI model cannot be seen as plagiarism. All participants have stated that they do not use the tool to write any academic work. This is due to plagiarism detection software companies, such as Turnitin, having announced that they have released AI writing detectors (Caren, 2023). And while the provider claims a 98% accuracy rate and very low false positives return there have already been instances where innocent students have been accused of cheating (Fowler, 2023). These announcements paired with unclear guidelines of what using ChatGPT may entail have made students extremely cautious when using the tool. If faculty members and institutions have a more extensive definition of ‘cheating’ than students (Burrus et al., 2007), and this has an impact on students cheating behaviors it is crucial to have clear guidelines and concise communication. At the time of writing this paper, most universities have not disclosed policies regarding the use of ChatGPT and students are forced to come to their own conclusions and use the tool in ways they perceive to be in line with their institutions' academic malpractice policies.

Perceived Peer Behaviours and Perceived Limitations

I don't think using it is plagiarism, but I also feel like it is. But I don't feel bad because I feel that everyone is using it that if you don't use it, you are the only one who isn't and that places you at a disadvantage.

Factors such as peer pressure and the competitive nature of education are also important and are categorized as sociocultural factors (see Figure 3). A powerful influence found to impact students' cheating behaviors was the perception of their peers' behaviors (McCabe et al., 2001), this is mirrored in this study where ChatGPT is widely discussed among students. Discussions with peers have left them feeling they will be at a disadvantage should they not utilize ChatGPT and are pushing students to use the tool due to these worries. Discussions amongst their peers have also elicited a growing feeling of unreliability as students have shared their experiences using the tool with many noting the limitations in its capabilities.

I find that sometimes, it has a tendency to sometimes generate nonsense, especially if you're asking it more reasoning and more complex questions. Second, I find that sometimes it has a tendency to repeat itself when generating texts and that repetition can actually create more confusion It still helps more than it harms, adding value.

The perceived limitations in ChatGPT's capabilities have raised questions among participants about how safe it is to use for their studies. Many students found the tool's subjective and nuanced responses to be inadequate or lacking in-depth analysis or factually inaccurate. These incorrect responses are commonly referred to as "hallucinations" or "statistical inventions". These hallucinations, such as incorrect definitions, have led to a decline in trust and perceived reliability of the tool. Many have brought into question the legitimacy of the information provided by the tool, as ChatGPT does not offer anything that resembles referencing or attribution, and students are turning to other sources of information to verify what they have been provided. It is important to note that the limitations of ChatGPT don't directly affect engagement as students have found ways around these limitations however, they have amplified students' skepticism.

Discussion

The findings reveal that limitations of the tool, users' skepticism, peer influence, lecturers, and academic environment shape the ways students choose to utilize ChatGPT. Concerns surrounding plagiarism and the lack of clear institutional guidelines on the use of AI-generated content have prompted students to approach the tool with caution. Students' determination to use the tool despite their skepticism shows that students acknowledge the potential benefits ChatGPT has to offer. Additionally, the competitive nature of education and the perceived peer behavior further contribute to engagement. The definition of plagiarism and the new detection of AI-generated content capabilities have added to students' concerns, underscoring the need for clear guidelines and explicit communication from institutions regarding AI tools in academic settings. Furthermore, the perceived limitations of ChatGPT and its impact on students' trust in the tool emphasize the need for critical thinking and source evaluation when using AI-generated material. These findings illuminate the varied nature of student engagement with ChatGPT, reveal the impact of external influences on decision-making and highlight the important role institutions in guiding student behavior.

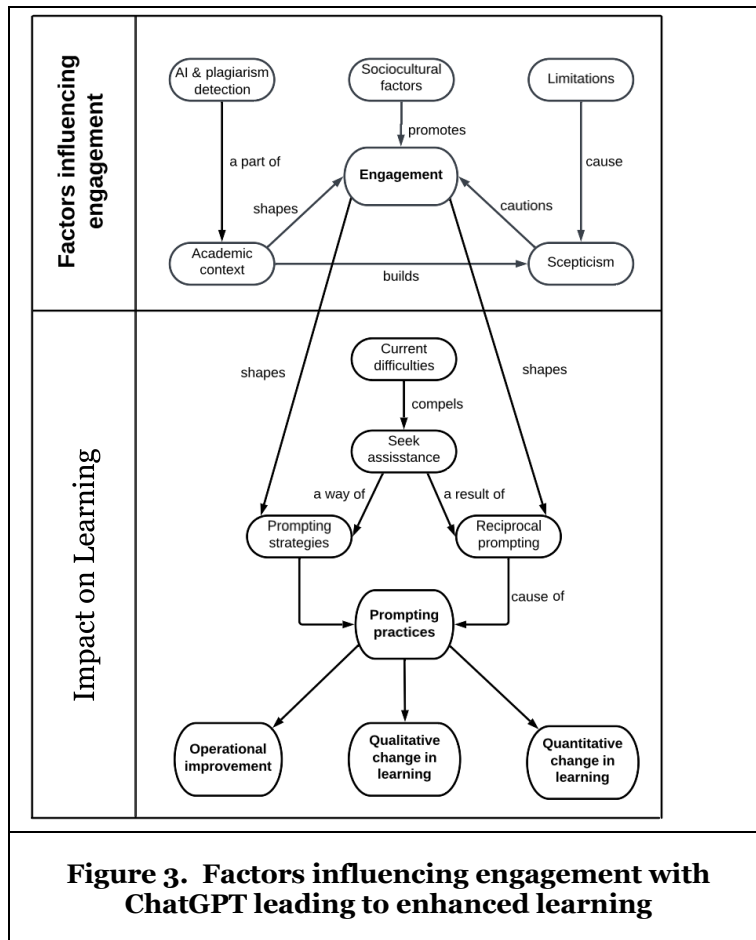
The factors influencing engagement shape the prompting strategies and reciprocal prompting activities which constitute the prompting practices. These prompting practices contribute to operational improvement, qualitative change in learning and/or quantitative change in learning, which ultimately results in enhanced learning (see Figure 3).

Conclusion and Limitations

This study aimed to investigate the influence of ChatGPT on the learning experience. Participants found notable value in utilizing ChatGPT for learning enhancement. The empirical findings uncover factors influencing how this value is achieved and determines they are dependent on the subject, goal, and academic setting in which the students are situated. The ways in which the participants of this study have used ChatGPT elicited the potential to promote personalized learning, which can foster an inclusive learning environment suitable to diverse learning styles. Lecturers and institutions play a crucial role where

they have the power to influence in which ways the students engage with the tool, this includes setting out clear guidelines and policies that foster ethically appropriate engagement with the tool.

Ways in which ChatGPT can be used to learn are seemingly infinite and throughout this study, several new concepts have come to light. Pertinent to the research questions, a key insight was that students' engagement methods with ChatGPT significantly influence both the depth and breadth of learning outcomes. Students experience enhanced learning due to the prompting practices they adopt when using ChatGPT and the tools potentialities. However, the responsibility of effectively using ChatGPT as a learning tool lies in the hands of the students. ChatGPT can play a crucial role in fostering inclusion and equality in the university environment. This paper argues that institutions should guide students so that value can be added given the level of personalization and benefits ChatGPT has to offer and therefore urges institutions to educate students on how best to engage with the tool to increase learning outcomes.



To maximize educational benefits while preserving academic integrity, immediate action is crucial. Institutions such as the Russell Group (Russell Group, 2023) have already issued principles for ethical AI use in educational contexts. It is incumbent upon individual instructors to keep pace by establishing course-specific policies, thereby mitigating the risk of academic misconduct. By aligning institutional guidelines with faculty initiatives, we can harness AI's potential effectively and responsibly.

Non-native English speakers among the interview participants noted improvements in their written English through ChatGPT interaction. Although tangential to the main research questions, this observation suggests an avenue for future scholarly investigation. More interestingly one of the participants in this study revealed that they have dyslexia (a learning difficulty), mentioning that the reading aspect of academia poses a significant challenge and how ChatGPT has helped them. Further research can aim to explore the

potential ChatGPT has to alleviate this difficulty, including those of other learning difficulties and disabilities. Other recommendations for future research include broadening the scope of this study and investigating students enrolled on different courses, understanding ChatGPT from an academic's perception, exploring the advantages of ChatGPT for improving English writing, and how to foster an inclusive learning environment using ChatGPT.

The study's generalizability is constrained by the sample comprising students enrolled in IT courses, who contributed insights primarily concerning the domain of coding or programming. Nonetheless, the derived concepts and theories may be applicable to other domains requiring extensive logical reasoning. The use of Grounded Theory Methodology (GTM) inherently limits the sample size owing to its labor-intensive nature, a known drawback of this approach. Furthermore, GTM does not facilitate direct causal inference, making it challenging to prescribe specific institutional practices beyond the scope of participants' subjective experiences.

References

- Attali, Y., & Burstein, J. (2006). Automated essay scoring with e-rater® V.2 [Review]. *Journal of Technology, Learning, and Assessment*, 4(3), 1-29.
- Attwell, G. (2007). Personal Learning Environments-the future of eLearning. *Elearning papers*, 2(1), 1-8.
- Bennett, S., Maton, K., & Kervin, L. (2008). The 'digital natives' debate: A critical review of the evidence. *British journal of educational technology*, 39(5), 775-786.
- Bouschery, S. G., Blazeovic, V., & Piller, F. T. (2023). Augmenting human innovation teams with artificial intelligence: Exploring transformer-based language models. *Journal of Product Innovation Management*, 40(2), 139-153.
- Brooks, R. (1983). Towards a theory of the comprehension of computer programs. *International journal of man-machine studies*, 18(6), 543-554.
- Burrus, R. T., McGoldrick, K., & Schuhmann, P. W. (2007). Self-Reports of Student Cheating: Does a Definition of Cheating Matter? *The Journal of Economic Education*, 38(1), 3-16. <https://doi.org/10.3200/JECE.38.1.3-17>
- Burstein, J. (2003). The E-rater® scoring engine: Automated essay scoring with natural language processing.
- Campbell, D. (2006). The plagiarism plague. *National Crosstalk*, 14(1), 1.
- Caren, C. (2023). *The launch of Turnitin's AI writing detector and the road ahead*. Turnitin. <https://www.turnitin.com/blog/the-launch-of-turnitins-ai-writing-detector-and-the-road-ahead>
- Cavas, B., Cavas, P., Karaoglan, B., & Kisla, T. (2009). A Study on Science Teachers' Attitudes Toward Information and Communications Technologies in Education. *Online Submission*, 8(2).
- Charmaz, K. (1990). 'Discovering' chronic illness: Using grounded theory. *Social Science & Medicine*, 30(11), 1161-1172. [https://doi.org/https://doi.org/10.1016/0277-9536\(90\)90256-R](https://doi.org/10.1016/0277-9536(90)90256-R)
- Chen, X. (2023). ChatGPT and Its Possible Impact on Library Reference Services. *Internet Reference Services Quarterly*, 1-9. <https://doi.org/10.1080/10875301.2023.2181262>
- Cope, & Mary Kalantzis, B. (2019). Education 2.0: Artificial Intelligence and the End of the Test. *Beijing International Review of Education*, 1(2-3), 528-543.
- Cotton, D. R., Cotton, P. A., & Shipway, J. R. (2023). Chatting and Cheating. Ensuring academic integrity in the era of ChatGPT.
- Creswell, J. W., & Creswell, J. D. (2018). *Research design : qualitative, quantitative, and mixed methods approaches* (Fifth edition. ed.). Sage publications.
- Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.
- Crick, T. (2021). Covid-19 and digital education: A catalyst for change? *Itnow*, 63(1), 16-17.
- Douglas, J. A., Douglas, A., McClelland, R. J., & Davies, J. (2015). Understanding student satisfaction and dissatisfaction: an interpretive study in the UK higher education context. *Studies in Higher Education*, 40(2), 329-349. <https://doi.org/10.1080/03075079.2013.842217>
- Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., Baabdullah, A. M., Koohang, A., Raghavan, V., Ahuja, M., Albanna, H., Albashrawi, M. A., Al-Busaidi, A. S., Balakrishnan, J., Barlette, Y., Basu, S., Bose, I., Brooks, L., Buhalis, D., . . . Wright, R. (2023). "So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative

- conversational AI for research, practice and policy. *International Journal of Information Management*, 71, 102642.
- Eynon, R., & Malmberg, L.-E. (2011). A typology of young people's Internet use: Implications for education. *Computers & Education*, 56(3), 585-595.
- Floridi, L., & Chiriatti, M. (2020). GPT-3: Its Nature, Scope, Limits, and Consequences. *Minds and Machines*, 30(4), 681-694. <https://doi.org/10.1007/s11023-020-09548-1>
- Fowler, G. A. (2023). *We tested a new ChatGPT-detector for teachers. It flagged an innocent student.* Washington Post. <https://www.washingtonpost.com/technology/2023/04/01/chatgpt-cheating-detection-turnitin/>
- Gao, C. A., Howard, F. M., Markov, N. S., Dyer, E. C., Ramesh, S., Luo, Y., & Pearson, A. T. (2022). Comparing scientific abstracts generated by ChatGPT to original abstracts using an artificial intelligence output detector, plagiarism detector, and blinded human reviewers. *bioRxiv*, 2022.2012.2023.521610.
- Gerdeman, R. D. (2000). Academic Dishonesty and the Community College. ERIC Digest.
- Glaser, B. G. (1992). Basics of grounded theory analysis: Emergence vs forcing. *Sociology Press*.
- Glaser, B. G., Strauss, A. L., & Strauss, A. L. (1967). *The discovery of grounded theory : strategies for qualitative research*. Aldine de Gruyter.
- Gupta, S., & Chen, Y. (2022). Supporting inclusive learning using chatbots? A chatbot-led interview study. *Journal of Information Systems Education*, 33(1), 98-108.
- Haman, M., & Školník, M. (2023). Using ChatGPT to conduct a literature review. *Accountability in Research*, 1-3. <https://doi.org/10.1080/08989621.2023.2185514>
- Harel, I., & Papert, S. (1990). Software Design as a Learning Environment. *Interactive Learning Environments*, 1(1), 1-32. <https://doi.org/10.1080/1049482900010102>
- Henderson, M., Selwyn, N., & Aston, R. (2017). What works and why? Student perceptions of 'useful' digital technology in university teaching and learning. *Studies in Higher Education*, 42(8), 1567-1579.
- Henderson, M., Selwyn, N., Finger, G., & Aston, R. (2015). Students' everyday engagement with digital technology in university: exploring patterns of use and 'usefulness'. *Journal of Higher Education Policy and Management*, 37(3), 308-319. <https://doi.org/10.1080/1360080X.2015.1034424>
- Hosseini, M., Rasmussen, L. M., & Resnik, D. B. (2023). Using AI to write scholarly publications. *Accountability in Research*, 1-9. <https://doi.org/10.1080/08989621.2023.2168535>
- Johnson, R. B., & Christensen, L. (2019). Educational research: Quantitative, qualitative, and mixed approaches. Sage publications.
- Kennedy, G., Judd, T., Dalgarno, B., & Waycott, J. (2010). Beyond natives and immigrants: exploring types of net generation students. *Journal of Computer Assisted Learning*, 26(5), 332-343.
- Keselman, A. (2003). Supporting inquiry learning by promoting normative understanding of multivariable causality. *Journal of Research in Science Teaching*, 40(9), 898-921.
- Kirkwood, A., & Price, L. (2014). Technology-enhanced learning and teaching in higher education: what is 'enhanced' and how do we know? A critical literature review. *Learning, Media and Technology*, 39(1), 6-36. <https://doi.org/10.1080/17439884.2013.770404>
- Krutka, D. G., Smits, R. M., & Wilhelm, T. A. (2021). Don't Be Evil: Should We Use Google in Schools? *TechTrends*, 65(4), 421-431. <https://doi.org/10.1007/s11528-021-00599-4>
- Lai, E. R. (2011). Critical thinking: A literature review. *Pearson's Research Reports*, 6(1), 40-41.
- Laumer, S., Maier, C., Eckhardt, A., & Weitzel, T. (2016). Work routines as an object of resistance during information systems implementations: Theoretical foundation and empirical evidence. *European Journal of Information Systems*, 25, 317-343.
- Leadbeater, C. (2005). The shape of things to come: Personalised learning through collaboration. DfES Publications.
- Losh, E. (2014). The war on learning: Gaining ground in the digital university. MIT Press.
- McCabe, D. L., & Trevino, L. K. (1997). Individual and contextual influences on academic dishonesty: A multicampus investigation. *Research in higher education*, 38, 379-396.
- McCabe, D. L., Trevino, L. K., & Butterfield, K. D. (2001). Dishonesty in academic environments: The influence of peer reporting requirements. *The Journal of Higher Education*, 72(1), 29-45.
- Mesgari, M., Okoli, C., Mehdi, M., Nielsen, F. Å., & Lanamäki, A. (2015). "The sum of all human knowledge": A systematic review of scholarly research on the content of Wikipedia. *Journal of the Association for Information Science and Technology*, 66(2), 219-245.

- Minner, D. D., Levy, A. J., & Century, J. (2010). Inquiry-based science instruction—what is it and does it matter? Results from a research synthesis years 1984 to 2002. *Journal of Research in Science Teaching*, 47(4), 474-496.
- Molnar, K. K., & Kletke, M. G. (2012). Does the Type of Cheating Influence Undergraduate Students' Perceptions of Cheating? *Journal of Academic Ethics*, 10(3), 201-212.
- O'Connor, A. (2021). Reading people. *The Lancet Child & Adolescent Health*, 5(11), 779.
- O'Connor, S. (2022). Open artificial intelligence platforms in nursing education: Tools for academic progress or abuse? *Nurse Education in Practice*, 66, 103537-103537.
- OpenAI. (2022). *Introducing ChatGPT*. OpenAI. Retrieved 26 April from <https://openai.com/blog/chatgpt>
- Oxford English Dictionary. (2000). In *Oxford English Dictionary : the definitive record of the English language*. Oxford, England: Oxford University Press.
- Pariser, E. (2011). The filter bubble: What the Internet is hiding from you. penguin UK.
- Pask, G. (1976). Conversation theory. Applications in Education and Epistemology.
- Patton, M. Q. (1990). *Qualitative evaluation and research methods*. SAGE Publications, inc.
- Patton, M. Q. (2014). *Qualitative research & evaluation methods: Integrating theory and practice*. Sage publications.
- Pedaste, M., Mäeots, M., Leijen, Ä., & Sarapuu, T. (2012). Improving students' inquiry skills through reflection and self-regulation scaffolds. *Technology, Instruction, Cognition and Learning*, 9(1-2), 81-95.
- Perry, B. (2010). Exploring academic misconduct: Some insights into student behaviour. *Active Learning in Higher Education*, 11(2), 97-108.
- Robins, A., Rountree, J., & Rountree, N. (2003). Learning and Teaching Programming: A Review and Discussion. *Computer Science Education*, 13(2), 137-172.
- Russell Group principles on the use of generative AI tools in education. (2023). https://russellgroup.ac.uk/media/6137/rg_ai_principles-final.pdf
- Scanlon, P. M., & Neumann, D. R. (2002). Internet plagiarism among college students. *Journal of College Student Development*, 43(3), 374-385.
- Schaffert, S., & Hilzensauer, W. (2008). On the way towards Personal Learning Environments: Seven crucial aspects. *Elearning papers*, 9(2), 1-11.
- Sebba, J., Brown, N., Steward, S., Galton, M., & James, M. (2007). An investigation of personalised learning approaches used by schools. *Nottingham: DfES Publications*.
- Simon*, C. A., Carr, J. R., McCullough, S. M., Morgan, S. J., Oleson, T., & Ressel, M. (2004). Gender, student perceptions, institutional commitments and academic dishonesty: Who reports in academic dishonesty cases? *Assessment & Evaluation in Higher Education*, 29(1), 75-90.
- Strauss, A., & Corbin, J. (1994). *Grounded theory methodology: An overview*.
- Susarla, A., Gopal, R., Thatcher, J. B., & Sarker, S. (2023). The Janus Effect of Generative AI: Charting the Path for Responsible Conduct of Scholarly Activities in Information Systems. *Information Systems Research*.
- Thorp, H. H. (2023). ChatGPT is fun, but not an author. In (Vol. 379, pp. 313-313): American Association for the Advancement of Science.
- Trinidad, J. E. (2020). Understanding student-centred learning in higher education: students' and teachers' perceptions, challenges, and cognitive gaps. *JFHE*, 44(8), 1013-1023.
- Urquhart, C., & Fernández, W. (2013). Using grounded theory method in information systems: The researcher as blank slate and other myths. *Journal of Information Technology*, 28(3), 224-236.
- Vakaliuk, T. A., Spirin, O. M., Lobanchykova, N. M., Martseva, L. A., Novitska, I. V., & Kontsedailo, V. V. (2021, March). Features of distance learning of cloud technologies for the organization educational process in quarantine. In *Journal of physics: Conference series* (Vol. 1840, No. 1, p. 012051). IOP Publishing.
- Van Dis, E. A., Bollen, J., Zuidema, W., van Rooij, R., & Bockting, C. L. (2023). ChatGPT: five priorities for research. *Nature*, 614(7947), 224-226.
- Williamson, B., Macgilchrist, F., & Potter, J. (2023). Re-examining AI, automation and datafication in education. *Learning, Media and Technology*, 48(1), 1-5.
- Wright, F., White, D., Hirst, T., & Cann, A. (2014). Visitors and Residents: mapping student attitudes to academic use of social networks. *Learning, Media and Technology*, 39(1), 126-141.