

# Is it the new Google: Impact of ChatGPT on Students' Information Search Habits

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**Abstract:** The traditional subject of information search and retrieval (IR) paradigm shifted to an entirely new era since artificial intelligence (AI) techniques were introduced into the field. Browser-based IR solutions powered by AI for personalised recommendations-based information retrieval, such as the Google search engine, were one of the early examples. The IR field has advanced to its next level with the newest conversational applications based on large language model (LLM) techniques. It is becoming clear that Generative Pretrained Transformer (GPT) applications such as ChatGPT will significantly impact information retrieval behaviour in the education sector. Though this application has become widespread in acclaim, no previous study has shown its impact on information seeking and retrieval. However, based on the observation of the fast penetration of this technology and the growth of public interest, a pre-assumption was built that it is essential to investigate if students may also be showing a similar interest in this new tool. Hence, this study is set up to systematically and empirically explore how ChatGPT influences the IR behaviour of students in HEIs. A survey approach is utilised to collect the perceived IR behaviour through a questionnaire administered to 60 students in HEIs. The findings reveal that the tool is already widely known among HEI students. They also perceived the use of the tool in the context of information retrieval and proclaimed its usefulness, acknowledging its efficiency (reduced time) in finding information. Furthermore, the technology has considerably affected the typical use of other conventional information retrieval and search engine tools. On the contrary, 10% of the respondents are less likely to use ChatGPT during information seeking for various reasons, from credibility and relevance to technology infrastructure issues such as connectivity. Although a deeper analysis is required to establish a general conclusion on how and in which ways GPT-based models will override contemporary IR practices, the study outcome provides evidence for a possible behavioural change among HEI students in their IR habits in the future.

**Keywords:** Information Retrieval, Artificial Intelligence, ChatGPT, Higher Education, Student behaviour

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## 1. Introduction

Technology advancements challenge the traditional ways and practices of society, and it demands a change in the mindset of the people to benefit from it. Information seeking has been a significant preoccupation of humans since aeon and a high-level cognitive process of learning or problem-solving (Tubachi, 2018). As people constantly need ways to resolve their information problems relatively quickly, information retrieval (IR) has always been a topic in cutting-edge research (Kadir et al., 2018). For information seekers, improvements in the field over time have made the possibility of finding information efficiently, due to the development of various IR mechanisms that ensure information is easily found or obtained (Sambe, 2017). Currently, the traditional way of IR is severely impacted due to technological disruptions. From AI's offshoot, several tech-offspring have emerged, paving the way for a conversational interface for the IR field (CRLT, 2023). Particularly machine learning (ML) together with Natural Language Processing (NLP) has established conversational agents such as Google Assistant, Alexa, ManyChat, ChatGPT, and so on that can simulate human behaviour by adding emotions, sentiments, and affect to the context through a conversational interface (Kulkarni et al., 2019). ChatGPT, an AI-based solution for large language models (LLMs), rather abruptly the technology and linguistics markets recently, shaking the current practices in many domains (ChatGPT, 2022). A recent study reported that nearly a third of 1000 US College students who participated in a study had used ChatGPT to complete written homework assignments, and close to 60% use it on more than half of their work (GT, 2023). Despite the ChatGPT's acclaim for a speedy response to query search in a smooth conversational style and pointing out the challenges it has raised about misinformation and unethical use of it by early adopters, particularly students (CRLT, 2023), no previous study has vividly hinted on the need to investigate how ChatGPT has affected information users' behaviour, particularly students in HEIs. Based on the observation of the fast penetration of this technology and the growth of public interest, a pre-assumption was built that it is essential to investigate if students may also be showing a similar interest in this new tool. In this light, it is essential to investigate the influence of this newest advancement, ChatGPT, on students' information-seeking behaviour. Focusing on the general users' perspectives and other application areas where studies have provided insights on the use and benefits of conversational tools, this study rather examines the behaviours these study subjects exhibit while trying to solve their information problem through an information aid tool like ChatGPT. Hence, this research systematically and

empirically explores how ChatGPT influences the IR behaviour of students in HEIs. The choice of the scope of HE is based on the growing interest and wider popularity among higher education students, who are typically early adopters of technology. The study focus is hence on the students of bachelor, master and PhD levels. While the study recognises the existence of other conversational AI applications, their inclusion is beyond the scope of this research.

The rest of the article is organised as follows. The second chapter briefs about the state of the art of information search and retrieval and the impact of the current technology disruption on IR. Chapter 3 focuses on the methodological approach of this study in shedding light on the role of new technology and the LLM-based tool ChatGPT on students' information retrieval habits. In Chapter 4, the study results are analysed and discussed against the state-of-the-art IR methods and practices, and finally, in Chapter 5, the concluding remarks including the limitations identified as well as possible ways forward, are summarised.

## **2. Background**

The literature on the history of information research shows that IR history is long and did not originate with the Internet (Sanderson & Croft, 2012), even though one of the primary uses of the Internet is information retrieval (Liaw & Huang, 2003). Students, who are constant information seekers for knowledge-building purposes, rely on factually correct, scientifically proven information and largely trusted collections of information originating from the discipline of librarianship (p. 1). This was also stated by (Wilson, 2000) when he noted that in the course of seeking information, students might interact with manual information systems like the library (Tubachi, 2018). However, the need for a retrieval system shortly became essential when the information collection became too difficult to manage by traditional cataloguing in the library (Sanderson & Croft, 2012). At present, technology has significantly impacted the use of conventional IR since computer-based IR tools emerged on the horizon of IR due to the ease of storing and mechanically retrieving large amounts of information with technology (Singhal, 2001, p.35). Since the information search strategies, impacted by modern technologies and methods that are highly flexible in adapting to one's choice, are growing in attraction, the traditional methods are losing their 'weight of attraction' (Singhal, 2001).

The development of search engines and ranked retrieval enabled by the World Wide Web (www) also made IR services easily accessible (Sanderson & Croft, 2012). Internet-based information retrieval would have collapsed if there were no search engines soon enough, as Liaw & Huang (2003) point out. While seeking information, individuals, including students, interact with computer-based systems using the Internet (Thindwa et al., 2019). Currently, there is an offshoot of Artificial Intelligence (AI) called Conversational AI, which can engage in conversation with users when they are trying to access information during information-seeking (Kulkarni et al., 2019). These applications, which are now components of IR systems, mimic human interactions by identifying speech and text inputs and translating their contents into other languages using massive amounts of data, machine learning, and natural language processing (Rangoli, 2023). Initially, Natural Language Processing (NLP) was proposed as a tool to enhance retrieval effectiveness but was seen to have limited success (Singhal, 2001). However, Sanderson & Croft (2012) stated that the route to creating successful IR systems required much innovation and thoughts over a long period. Today, this is justified by the role of AI and how it is increasingly constituting a major source of innovation by performing various tasks hitherto attributed to humans alone by using a combination of NLP to analyse language with the use of machine learning (ML) (Rangoli, 2023). Moreover, there is a growing interest in and adoption of conversational AI applications across sectors for various purposes. In the education sector, for example, a study showcased the role of conversational AI and why users utilise conversational AI applications to fulfil their information needs (Mckie et al., 2022). In addition, the potential of using conversational agents to improve the academic research experience for university students for enhanced service delivery has also been explored (Mckie & Narayan, 2019; Schmitt et al., 2022). As the field of AI continues to advance at a rapid pace, it is becoming increasingly clear that conversational applications such as ChatGPT will have a significant impact on the education sector, particularly on the way scientific articles are written and edited (Gilat & Cole, 2023). However, what is not yet clear is the influence of these applications, especially ChatGPT, on the information-seeking and retrieval behaviour of students in HEIs. No previous study has investigated nor considered how the use of ChatGPT as an IR tool is being used for information discovery by students in HEIs. As this field of study remains in an emerging stage, this study will therefore aid future studies and can provide perspective in designing IR tools that are more user-inclined by investigating how information has been impacted.

### 3. Methodology

In this research, a survey approach is chosen to empirically and systematically capture the perception and behaviour of students in the context of ChatGPT as an IR tool. Data collection was based on an Internet questionnaire due to its flexibility and reachability. This choice is also partly due to the target group chosen, i.e., higher education students, who prefer digital forms over manual forms when it comes to data collection options (Denscombe, 2021). For wider reachability, personalised messages were sent through various student social media groups, particularly WhatsApp. Follow-up messages were sent per time as reminders to click on the provided link that leads to the web form. Also, the minds of respondents were prepared as to the probable duration of the questionnaire and expectations. The questionnaire consisted of 23 close-ended questions, divided into two sections; 1) demographic information and 2) ChatGPT and Information Search Process, which was developed based on the ISP model (Kuhlthau et al., 2008) and other literature on information search. The questionnaire, including a cover letter, was designed using Google Forms and the same was sent to different student groups and platforms using the Internet.

The sample was drawn from a broad population of students from undergraduate to postgraduate levels. Non-probability sampling was chosen due to the aim of this study which is to produce an exploratory sample rather than a representative cross-section. Blended with the snow-balling technique, students contacted were requested to share among their networks which created a rippled effect. Both techniques are used to get the best information available from the respondents who are in different degrees of study as it is particularly suited for creating an exploratory sample that can best give insight into the research question at hand. A summarisation and visualisation approach was followed to interpret the data collected from the research instrument since visualisations are better at providing a holistic view of student perceptions. Numerical data was generated after assigning codes to responses collected through a close-ended questionnaire. Descriptive summarisations were performed on nominal data collected, and a quantitative data analysis platform IBM SPSS (Statistical Package for the Social Sciences), was used for the presentation of the summaries.

There was no ethical complication associated with the data collection and analysis of this study since no sensitive data was collected, nor were the conclusions subjected to ethical implications. To ensure anonymity, no personal details were collected, inclusive of email addresses. To ensure this, an informed consent form was introduced at the beginning of the questionnaire, which vividly describes the purpose of the research and concerns that potential respondents may likely have.

### 4. Results and Discussion

Following the research design, a questionnaire with two sections was created and opened for three days in March 2023, and data was gathered using an online survey in Google Forms. The link to the form was sent directly to students' platforms on popular social media. Students in higher institutions (undergraduate, graduate, and postgraduate) were the respondents. In the span of 3 days, 60 responses were collected.

#### 4.1 Sociodemographic of respondents

The sociodemographic distribution of the respondents is presented in Table 1. Accordingly, the respondents are mostly from graduate and postgraduate levels, with nearly equal proportions of males and females, and mostly distributed among subject areas of Health, Social Sciences and STEM.

Table1: Sociodemographic data of the respondents

Variables		Frequency (%); N = 60
Gender	Male	34 (56.7)
	Female	26 (43.3)
Age	18-25yrs	9 (15)
	26-32yrs	25 (41.7)
	33-40yrs	22 (36.7)
	41-45yrs	2 (3.3)
	Above 45yrs	2 (3.3)
	Undergraduate	4 (6.7)

Variables		Frequency (%); N = 60
Level of education	Graduate	26 (43.3)
	Postgraduate	30 (50.0)
Field of study	Humanity	6 (10.0)
	STEM	15 (25.0)
	Social sciences	16 (26.7)
	Health sciences	17 (28.3)
	Business	6 (10.0)

### 4.2 Analysis of the Results

**Awareness:** Findings from the empirical data collected revealed that ChatGPT is mostly explored by students at the postgraduate level of education. Although the AI tool is commonplace nowadays, the popularity among the population studied is not as high as typically forecasted (Rudolph et al., 2023). The cumulative frequency of respondents who use it sometimes and those who use it often is just more than half the number of respondents, i.e., 52%. Though this result seems to be mixed, it revealed certain influences and experiences of the sampled users. Figure 1 shows this distribution of responses.

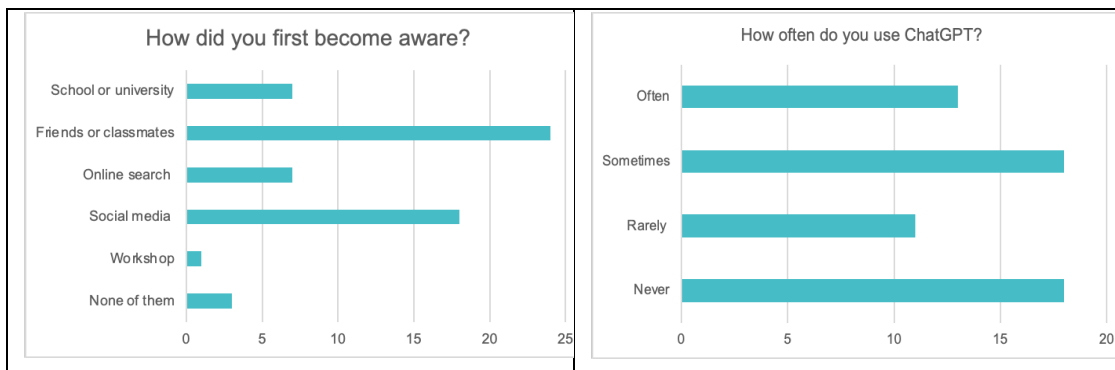


Figure 1. Channels of awareness (left) and Frequency of use (right) of ChatGPT as an IR tool

Accordingly, the trends of using ChatGPT are yet to emerge. Students have become aware of the tool via different channels, mainly friends and social media. The analysis also indicates the existence of diverse reasons why students seek information. Some reasons are obligatory, while some are optional.

**Use and effectiveness:** The purpose and context of the use of ChatGPT are shown in Figure 2.

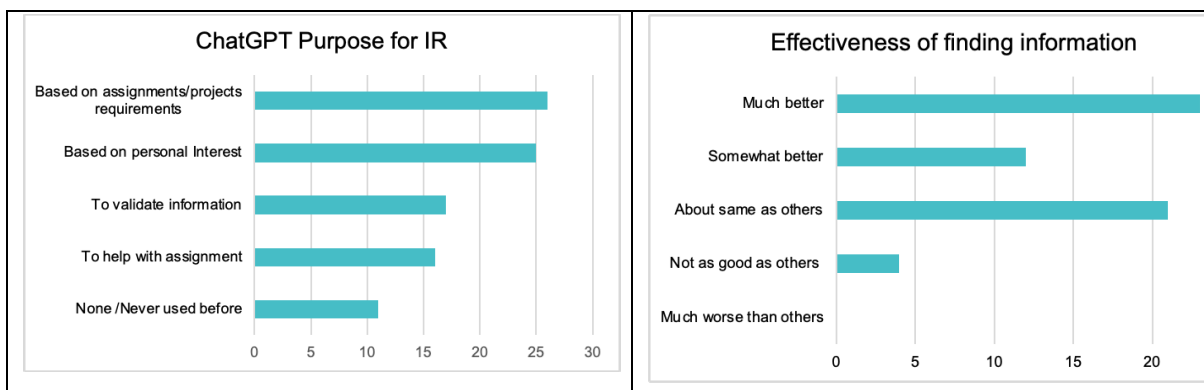


Figure 2. The purpose of use (left) and godness of the results (right)

Respondents in this study have explored the tool mostly when carrying out their project tasks or writing their assignments as a part of their academic engagement. A reasonable number of the respondents also use it based on pure personal interest. This trend aligns with what Tubachi (2018) stated about the reason information is sought. The results also show that ChatGPT is more effective at finding information compared to other competitive AI tools. When considering the effectiveness of the information search, students also trust the tool

compared to other conversational AI applications such as Google Assistant and Search engines such as Google and Bing. Of the respondents, 23 believed that ChatGPT is much better than other AI conversational tools and Search engines (c.f. Figure 2 (right)). Only 4 (6.7%) stated that it is less effective than other tools.

**Challenges:** On average, students have not been challenged by the demands the tool is associated with. However 16 students mentioned various problems they encountered during the use of the tool, while 15 others had some issues but did not hinder using it. For instance, network and connection issues (due to the heavy demand for the tool) and the difficulty involved with evaluating the credibility of the information it provides have been questionable for some students. A few respondents (16.7%) stated that it is difficult to enter an appropriate prompt or query that works best for the AI tool. The total outcome of students' perception of the quality and the efficiency of the tool is in Figure 3.

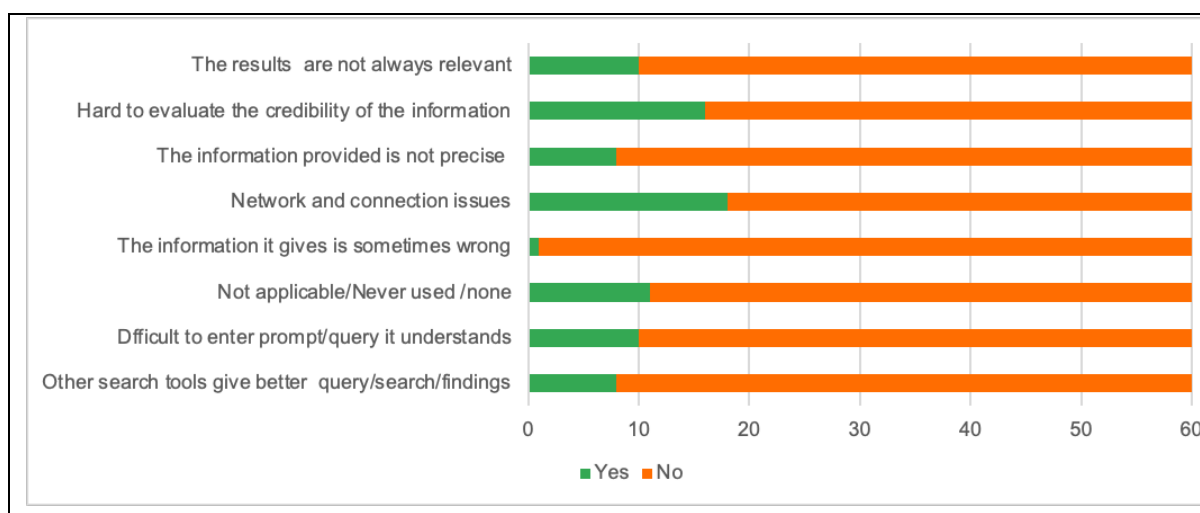


Figure 3. Challenges associated with using ChatGPT

**Trust in the functions:** The respondent's perception of the trustworthiness of the tool was surprisingly high. Only 8 out of 60 thought information provided by the tool can be wrong sometimes. As twice as much as that believed, the credibility of the information cannot be verified easily. Furthermore, the students recognised the precision of the information in ChatGPT outcomes, with only ten students doubting the relevance. Regarding the effectiveness of the approach for seeking information, 27 indicated that ChatGPT had raised their curiosity level. More than half the group stated that ChatGPT usage had increased their confidence in finding information. Although seven respondents indicated that the emergence of ChatGPT has probably reduced their research skills, the majority think the use of the tool doesn't impact their abilities. While only 15% indicated that ChatGPT has made them become more sceptical about information they find online, 53 out of 60 were using it as a tool for IR at some point in their academic life. The complete summary of the respondents' behavioural impact is presented in Figure 4.

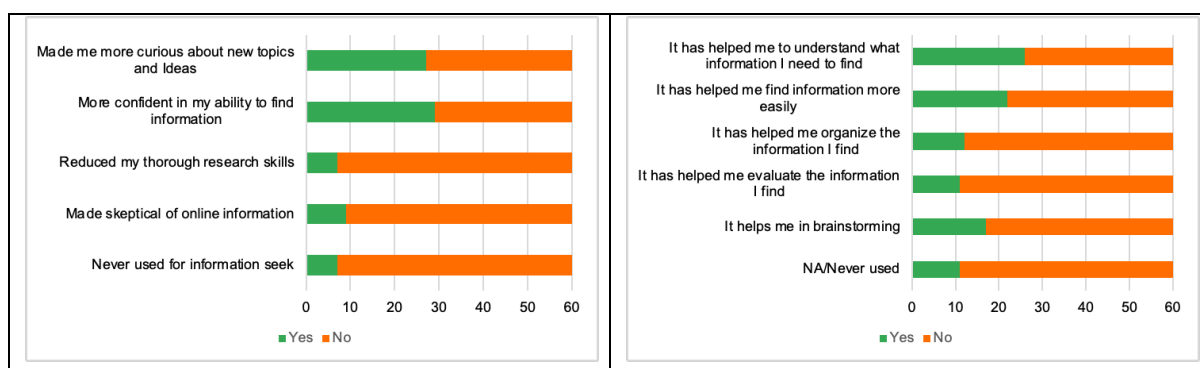
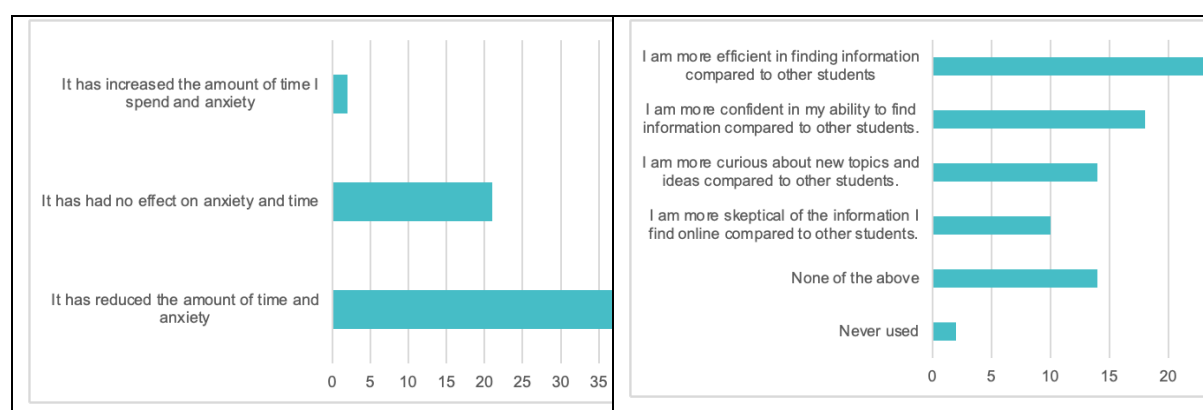


Figure 4. ChatGPT impact on students' IR behaviour (left) and the support for IR (right)

Obviously, the support students think they can get from the tool varies in a large spectrum since, naturally the information-seeking behaviour is associated with many factors (Tubachi, 2018). 26 respondents (43.3%) felt that ChatGPT has helped them understand the exact information they need to find. Respondents rarely recognized

the impact of the tool as an information evaluation tool; only 11 respondents (18.3%) indicated that it has helped them evaluate the information they find. All in all, they may not be seeing a great challenge or negative impact of using the tool. The respondents perceive that ChatGPT has grossly reduced the time needed to search for information online as well as the anxiety associated with the search process. This may be a reason for the sporadic acclaim the application was able to acquire since its launch in 2022. According to (Morville, 2005), individuals will use an interface or methodology that is most straightforward when finding information. In terms of the impact on the respondents' approach to seeking information, this study identified the increased curiosity level and increased confidence level among higher education students as the greatest impacts. The varied kinds of experience are also in tandem with the ISP model (Kuhlthau et al., 2008) which posited that there are affective and cognitive feelings users encounter when seeking information. The deep understanding of feelings associated with its use is significant. It can be explored to make positive interventions when aiming to improve IR efficiency in this era of AI for IR.

**User competence:** The results also show that ChatGPT is more efficient in finding information compared to the other competitive AI-based tools. Even though the use of it is not pronounced among the population studied, many of the respondents (50%) stated that they are very confident in their ability to find and evaluate information drawn by ChatGPT. The complete spectrum of responses is as in Figure 5.



**Figure 5. Students' perception of IR-associated time and anxiety perspective (left) and self-assessment of IR competence (right)**

Accordingly, 60% of the respondents indicated that using ChatGPT has reduced the time needed to search for information, thereby the anxiety associated with seeking information. On the converse, 3.3% stated that it had increased the time associated with seeking the information as well as the anxiety level (c.f Figure 5 (left)). As Figure 5 (right) indicates, students believe in them when it comes to finding information. 24 students recognise themselves as more efficient than their fellow students in IR. 18 are confident in their ability of IR. The self-assessment of the student's competence is a strong indicator of information literacy of students, which indirectly may also contribute to reduced anxiety and improved confidence in using the tool in the future.

### 4.3 Discussion of the study outcomes and research validity

During this empirical work, it has become apparent that research on conversational AI tools for IR is becoming popular, and there is a vast and relatively unexplored research domain in this field. There are several aspects of AI for IR, particularly from the users' perspectives that are yet to be investigated. The results are in agreement with previous studies that have explored why students primarily seek information, which is the goals laid down by their educational pursuits (Tubachi, 2018) and also the fact that during information seeking, students interact with IR tools (Sambe, 2017; Wilson, 2000), which results in varied experiences. A strong linkage has also been shown between seeking information, and the students' preferences to explore digital IR tools. This is in tandem with (Sambe, 2017), where it was stated that it is more traditional for students to search for information beginning with digital tools like web search engines. The work of (Morville, 2005) also is in agreement with this study and shows that HEIs prefer the use of digital tools enabled by the Internet instead of resources provided by librarians in the library, although it did not specifically highlight the use of ChatGPT during the information search process. The summary of the findings is encapsulated in Figure 6.



**Figure 6. The summary of the outcome**

Further studies might be in demand to further establish the discoveries of this research, the research only covered a specific sample of students, partly due to its methodological choices. Due to the maturity of the tool, the technology penetration, and typical resource (time-inclusive) constraints in conducting the research may have possible biases on the outcome. As suggested by (Denscombe, 2010), a mixed-method approach could provide deeper insights into the facts found in this study. This is, however, not to disparage the findings described in this study in whatsoever way. Continued research into the influence of ChatGPT as an IR tool appears fully justified as it has become necessary to expand the knowledge base in this domain due to its recency. Also, since there is a mixed result about the usage of ChatGPT, the study population can be widened to enable more diverse samplings of students especially at the undergraduate level, as this study could not elicit more data from them. Likewise, future studies streamlined to a certain field of study can possibly be explored. By it, certain fields within the HEIs can be concentrated on to know how the use of ChatGPT influences students in such spheres. Areas such as the usefulness and efficiency of the tool in the context of IR can also be delved into for deeper research inquiry or comparative discussion within the scope of other search engines or conversational AI tools. Likewise, since many information-seeking theories are prevalent, future work can concentrate on the relevance of these theories to AI tools for IR which would further help to deepen understanding of their usage and effects over time. This can help steer more interest in how students in HEIs seek knowledge, interact with them, their perception of AI usefulness based on experience, and understand how conversational AI applications can be designed to better support students' information needs and learning outcomes, particularly by using technology adoption frameworks such as Technology Acceptance Model (TAM) (Silva, 2015).

## 5. Concluding remarks

Information seeking is both a compulsory and voluntary exercise among students (Tubachi, 2018). Several approaches are employed by students when seeking information and a variety of tools are used to facilitate the science of seeking information. While the library still plays a vital role in seeking information, it is however being shifted towards search engines followed by conversational AI tools. This study has shown that the use of the library for information is becoming a rather uncommon or archaic activity among students. The empirical data from 60 respondents indicate that ChatGPT, the conversational AI tool based on LLM, is a known tool for IR

among HEI students and that it has some weighted influence on the way they seek information through their perceived experiences. The use of ChatGPT has reduced the anxiety of information search, the time associated with seeking information, and increased the confidence with which students seek information, as well as the curiosity levels among the respondents studied. However, challenges in and of using the tool were highlighted. This includes appropriate prompts and difficulty in evaluating the credibility of the search outcomes, the network and connection issues (due to the popularity of the tool) are some of the negative users' experiences that must be improved upon to maximise this disruptive AI tool. Overall, because of its acclaimed effectiveness in IR, the practice may have shifted from the traditional ways of seeking information towards the new technology affordances. Analysis revealed that only 10% of the respondents are less likely to use ChatGPT for IR purposes. This is a good indicator of the usefulness of the tool for the purpose. This knowledge can be used to further improve user experience and continued satisfaction with the application for IR in practice. Furthermore, this study revealed that students prefer technology-based tools for IR and their selection of a particular tool is premised on its effectiveness in meeting their diverse information needs. Results from this study can result in practical applications for improving the efficiency of libraries in the digital age and renewing their continued relevance for IR. Although this study has identified a gap by emphasising the need to examine the influence of AI conversational tools on HE students and has further confirmed studies from previous research on the varied nature of experiences underscoring information behaviour, it also highlights the need for further research to gain a deeper understanding of this AI phenomenon owing to the limited sample size. A larger-scale enquiry could provide more robust evidence and validate the findings described herein, which would be valuable for practitioners in the IR ecosystem.

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