ChatGPT: The advancement of knowledge and incorporation for its users

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Abstract— **This research investigates the use of ChatGPT from a user's perspective. The aim of this study is to understand whether users perceive ChatGPT as helpful in enhancing their knowledge and, if so, whether it has been incorporated as a tool for day-to-day knowledge acquisition. This study employs a quantitative approach, using a created online survey provided to willing participants, to collect data from these survey submissions. The collected data was analyzed and measured against the research questions and hypotheses.**

Findings reveal that participants who stated that they have used ChatGPT previously, all reported finding that ChatGPT helped enhance their knowledge. However, while a majority of participants reported incorporating ChatGPT into day-to-day knowledge acquisition, and a positive correlation was found to support this, a third of the participants did not. In addition, supplementary insights were uncovered, providing positive responses on how they rated the responses received based on the prompts they provided, as well as comparing ChatGPT with other tools.

In conclusion, ChatGPT has been found to enhance a user's knowledge within the topic they have chosen, but not all incorporated the tool. Furthermore, recommendations and future research suggestions include expanding the participant base, exploration of additional questions that were used in the survey, and investigation of the prompts used and the perceived value of the responses from the users.

Keywords—ChatGPT, Knowledge Enhancement, Incorporation, User Perception

I. INTRODUCTION

ChatGPT, a revolutionary conversational AI developed by OpenAI, has swiftly gained popularity among the public, corporations, and academia, raising a fundamental question: how valuable is ChatGPT for its users? Introduced on 30th November 2022 [1], ChatGPT utilises Natural Language Processing (NLP) to provide comprehensive response to user queries in a conversational manner [2]. This cutting-edge technology has found to be used in diverse applications, from resolving user uncertainties to enhancing comprehension of complex topics and even generating creative content like stories or poems based on given keywords [3].

Regardless of extensive media coverage and academic interest in ChatGPT's capabilities, research focusing on a user perspective remains limited potentially due to its recent release. This area of research appears to hold significant importance, as despite the extensive discussions and numerous applications described for this tool, there seems to be limited exploration of the user's perspective regarding ChatGPT's role beyond its functionalities.

Understanding not just its capabilities but also how users perceive ChatGPT's performance in meeting their specific needs remains an understudied aspect.

Despite research discovered on ChatGPT on its applicational use, such as solving programming bugs [4, 5, 6], providing education [7, 8, 9, 10], and democratising knowledge [11], there is limited research on user perception of how ChatGPT handles such applications. However, there was some notable studies from Tlili et al. [9], as well as Haque et al. [12] to begin addressing this, but due to ChatGPT's novelty and scope of research at the time, this study aims to expand further; aimed at users from the public to gain insights into their interactions and found usefulness.

This study endeavours to bridge the existing research gap by investigating two crucial aspects: firstly, the extent to which ChatGPT contributes to knowledge enhancement for its users, and secondly, its incorporation into their daily practices of knowledge acquisition. To achieve this, a series of research questions and hypotheses have been formulated.

This study will be conducted by way of a quantitative survey to test volunteer participants whether they have used ChatGPT previously, if the use of it has improved their knowledge, and if they now incorporate ChatGPT into their knowledge-seeking process. This study has the potential to provide benefit to academics, corporations, and the public by providing insights on the usefulness of ChatGPT and could also inspire further research in this area.

The research questions aim to ascertain whether users are actively utilising ChatGPT, whether its usage results in improved knowledge, and if users have adopted ChatGPT as a regular tool for knowledge acquisition. The hypotheses, on the other hand, aim to test the following: firstly, whether the utilization of ChatGPT increases the likelihood of users enhancing their knowledge on a specific topic; and secondly, whether users who experience knowledge enhancement through ChatGPT are more likely to integrate it into their routine for knowledge acquisition. By systematically exploring these research questions and hypotheses, this study seeks to shed light on the role of ChatGPT in empowering users with knowledge and shaping their knowledge-seeking behaviours.

Due to limited time and resources, only one survey will be conducted with mostly closed questions to gather prompt and enriching feedback. Additionally, the analysis will be limited to the collected data without comparison to other datasets, due to the lack of research in this area. It is important to note that bias may be introduced in this study as

participants interested in the topic may be the only ones who choose to participate.

When the survey was conducted, informed consent was provided from each participant, clarifying requirements, expectations, and the option to opt out. Participant data was anonymised to protect identity, with characteristics (occupational status, and course studied where applicable) used for research purposes only. The study allowed participants of any gender, sexual orientation, race, or belief and beyond. No conflicts of interest were anticipated, and there is no expected exposure to risks or dangers for participants.

This study is organised into distinct chapters, each contributing to the exploration of ChatGPT user knowledge enhancement and incorporation. The following is an outline of the structure and content of each chapter:

I. Introduction: The first chapter serves as a gateway to the research, providing an overview of the selected topic and addressing the identified knowledge gap. It outlines the specific aims and objectives of the study, which are designed to bridge the existing gap in understanding. Additionally, this chapter elucidates the relevance of the research and provides insights into the research methodology employed to conduct the investigation.

II. Related Work: The second chapter reviews and evaluates relevant literature related to ChatGPT, with a specific focus on its applications in enhancing user knowledge, incorporation into daily routines, and user perceptions. By analysing existing research, this chapter sets the context for the subsequent empirical investigation.

III. Research Methodology: The third chapter explains in detail the research hypotheses and questions formulated for the study. It provides clarity on the research design, data collection methods, and data analysis techniques used to gather and interpret the survey responses. This chapter ensures the methodological robustness of the research.

IV. Result Analysis: The fourth chapter presents the results obtained from the analysis conducted on the collected survey response data. Graphical and tabular representations of the findings are provided to facilitate a clear understanding of the results. Additionally, this chapter offers contextual information about the survey and its participants.

V. Discussion of Results: The fifth chapter interprets the results found in the previous chapter, comparing them against the original research hypotheses and questions. Furthermore, it explores unexpected insights discovered during the analysis and relates the findings to the existing literature. This comprehensive discussion adds depth to the interpretation of results.

VI. Conclusion: The final chapter synthesises the key findings, revisiting the research objectives to summarise the main outcomes. It emphasizes the most significant recommendations for future research that could expand upon the current work presented in the study. The conclusion highlights the implications of the study and reinforces the contribution of this research to the broader field of ChatGPT and user-centric AI applications.

II. RELATED WORK

A. Background and Aims

ChatGPT – is a large language Model (LLM) Artificial Intelligence (AI) tool created by Open AI which answers requests via Natural Language Processing (NLP) tasks [1], applicable in various practices. However, does ChatGPT allow for further education or knowledge enhancement for its users? Therefore, this chapter aims to examine currently available research and literature – or lack thereof - on whether users get to enhance knowledge further in that area from their perspective, and if so, is ChatGPT then incorporated into their day-to-day activities. The proceeding sections intend to highlight the literature reviewed and break out into separate themes uncovered.

B. ChatGPT evaluation and applications

The evaluation of ChatGPT and the applications it can use or used with, shows as the most dominating theme found in currently available research. The studies in the next paragraphs of this section represent the potential of ChatGPT adoption, but without external validation from users.

A study seen from Surameery and Shakor [4], examines ChatGPT use in solving programming bugs, understanding if the tool aids in debugging assistance, explanation, and corrections for software development procedures. Additionally, a comparison examined between ChatGPT against Integrated Development Environments (IDE's) to trial effectiveness between practices; concluding that whilst IDE's help with multiple features and capabilities but more complex to interpret, ChatGPT however allows for a more approachable, explainable, and intuitive way in handling programming bugs. This study extends further from works by Sobania et al [5] and Bang et al [6]. The study – in silo – provides partial context about how ChatGPT is useable .and against other tools but provides no specific examples on what bugs examined and if solvable. Additionally, no research was found on software developers using ChatGPT to solve any programming problems nor a perception of how this has helped them.

With Sobania et al [5], an evaluation performed back in January 2023 against ChatGPT on responses regarding if a piece of code has a bug and how it should be fixed; concluding a mostly positive but mixed results on performance – particularly where verification is needed, but better responses compared with other tools once context is applied on either side of the query. This study extends research from Surameery and Shakor [4], showing detailed examples of prompts used and responses from ChatGPT stating "would yield ChatGPT to be a viable tool that would help software developers in their daily tasks". This excerpt from the research was not the focus and more a buildable foundation, where the research helps at least partially address gaps the above research presents.

Additionally, Bang et al [6] evaluates ChatGPT against a series of public datasets covering different tasks, and how it compares with other LLM's – stating a satisfactory performance, but not without the risk of external

hallucination – where a confident response provided without any justification from its training [13].

An article by Su, Lin, and Lai [14] suggests using ChatGPT to support students' argumentative writing in classrooms. The authors propose that ChatGPT can help students formulate clear and logical claims supported by evidence to persuade others. They conducted experiments with ChatGPT using various prompts to measure its feedback performance. Additionally, they recommend that teachers instruct students to create their own outlines before seeking feedback and inspiration from ChatGPT for future learning. While this paper highlights the potential benefits of using ChatGPT in the classroom, it lacks an experimental exploration of student control and test groups to evaluate the impact on argumentative writing performance. Furthermore, the perspectives of both teachers and students regarding the use of ChatGPT in this context remain unexplored, presenting an opportunity for further investigation.

Based on studies presented above, similar themes occur by way of testing ChatGPT and its application with evaluation against different metrics, other LLM's or other tools. More importantly, gaps seen through the literature thus far in that, whilst ChatGPT has been tested on performance and practice in silo for a particular use or topic, there appears to be little view from an array of users collected to understand whether users have adopted its practice on scenarios presented above, giving space for this research to help explore this gap.

C. ChatGPT and enhancement of user knowledge and incorporation

This section of the chapter groups together research found on the potential use of ChatGPT being able to enhance a user's knowledge. The studies found below provide a great introduction into how ChatGPT has potential of utilisation both from an introductory or general view, as well as using specific cases evaluated against the tool. However, these show foundations of work that others could extend further.

Aljanabi [7] extends the notion of using ChatGPT, enabling possibilities and future directions for users and the software itself. This paper provides a great introduction into the use of ChatGPT and opportunities it presents, such as a potential for user personalisation, and alluding to integration for different working fields, and enhancing lives in meaningful ways. However, as Aljanabi [7] frames this work as an introductory piece into the subject, no specific provable claims are made here.

Similarly, an excerpt from Liberman [8] suggests ChatGPT as a tool to explore sources of information for users, focusing on students as a primary user, assisting with understanding context of a subject. Although, Liberman does go further to say that ChatGPT may not provide accurate information in all areas for its user. Again, this source does provide a highlight on what ChatGPT is and how it can assist with context, but little information of how it provides knowledge enhancement and detail is lacking to explain further, understood upon exploring this source considering the context provided.

Whilst sources above provide more of an introduction into ChatGPT as a field to explore rather than how users perceive the use of ChatGPT, the next set of sources delve further, albeit with limited range. A study produced by Kung et al [10] explored performance of ChatGPT on the United States Medical Licensing Exam (USMLE). Although the research's primary focus was testing ChatGPT performance against the exam, a held discussion on the results was noted on whether ChatGPT can assist knowledge enhancement for users sitting the exam by providing insight into areas that needs development. However, limitations of this research keep it focused on ChatGPT and its output from USMLE, other than alluding exploration into knowledge enhancement for medical students sitting the exam and further incorporation into day-to-day use. Therefore, a gap in the study represented by no medical student participation shown against this study to explore the improvement of scoring in the USMLE.

A separate study found from Yue et al [11] explores use of ChatGPT providing financial knowledge to non-financial users, testing queries on how it can explain financial terms and metrics such as alpha, beta, earnings to price (EP) or Illiquidity to a user based on different context and publication approaches. This study is beneficial in that ChatGPT has capacity to help individuals gain financial knowledge to assist in making informed decisions. Nevertheless, no evidence located of assessing these exercises against participants to evaluate the claims made, on whether users understood the information provided, found helpful to them, as well as adds to their day-to-day routine of expanding knowledge further.

Firat [15] conducted research exploring the utilisation of ChatGPT to enhance the learning experience for autodidactic (self-taught) open education students. The research highlights ChatGPT's potential to transform students' learning experiences by offering personalised support, real-time feedback, and convenience of flexible working, among other benefits. However, the paper acknowledges limitations and emphasis for further research in this area. At time of writing, there is no evidence in this paper available regarding student use of ChatGPT in open education with autodidactic learning. Additionally, the lack of peer review raises concerns about the reliability and validity of the claims.

To summarise above, some evidence is found to exploring the notion of ChatGPT against users for knowledge enhancement, and a good introduction into possibilities that could be held here, although there seems to be a gap in measuring user engagement of the tool, instead focusing into more of what the tool can do.

D. ChatGPT with user perception

Finally, this section focuses on available research regarding use of ChatGPT from a user perspective, and any indications as to what ChatGPT use is for the present and potential future user. Unfortunately, due to novelty of this view of research exploration there are limited pieces of research at present, but an aim here is presenting what is currently available and observed.

Tlili et al [9] conducted a case study on the use of ChatGPT by educational users. They explored initial user interactions and experiences, analysed Twitter networks and sentiments related to ChatGPT, and conducted interviews with participants. The study found that ChatGPT has potential as a learning aid and for idea generation. Although, whilst this source provides a solid foundation, there are

limitations such as a small participant group, a narrow focus on education, and qualitative rather than quantitative research, meaning that user perspectives are immeasurable.

Haque et al. [12] conducted research on 12th December 2022, analysing sentiments of early adopters of ChatGPT using Twitter data. They employed Latent Dirichlet Allocation (LDA), an unsupervised topic modelling technique to understand user perceptions by grouping topics based on user sentiment [16]. The results indicate predominantly positive sentiments across all topics, with some negative and neutral seen as well. The study concludes that early adopters generally responded positively to ChatGPT, but also considered its implications for certain professions, due to its ability performing some required tasks. While this research provides valuable insights into early adopters' perceptions, it has limitations such as the potential changes in ChatGPT since the study and the lack of peer review, which affects the reliability and validity of the claims. Nevertheless, this research offers a useful indicator for the present-day user perception of ChatGPT.

To close off what is discovered in the above, two pieces of research is found concerning the measurement of user perception on ChatGPT. A great foundation is formed based on these where data is collected to understand how people have engaged with the tool. However, limited research is uncovered in this area and provides justification of this paper to explore further in terms of gathering current insight.

E. Conclusion

This chapter evaluates existing research on individuals who have used ChatGPT to assess its impact on knowledge acquisition, both generally and within specific domains. It also examines the integration of ChatGPT into their daily activities. The findings suggest that ChatGPT is still relatively new since its release by OpenAI in November 2022 [2]. While there has been progress in this area, notable research gaps exist in understanding participant adaptation and interactions, with a focus found instead on isolated studies solely focused on the research topic. Furthermore, the scarcity of peer-reviewed resources due to the novelty of this research field.

III. RESEARCH METHODOLOGY

The goal of this chapter is to explain how the research was performed, research questions and hypotheses used, dataset construction, pre-processing steps, and analysis executed; all to establish whether ChatGPT – if used – has enhanced a user's knowledge; and if so, has ChatGPT then since been incorporated into a user's routine for knowledge acquisition.

A. Research Hypotheses

The following information below represents a set of two alternative research hypotheses (**RH**) explored as part of the study, where the first hypothesis has impact on the second hypothesis.

- **RH1**. "The utilization of ChatGPT increases the likelihood of enhancing a user's knowledge on a specific topic."
- **RH2.** "Users who perceive ChatGPT as enhancing their knowledge are more likely to incorporate ChatGPT into their routine for knowledge

acquisition compared to those who do not perceive ChatGPT as enhancing their knowledge."

Based on these hypotheses proposed, there were research questions in addition to re-confirm or extend the response further.

B. Research Questions

As well as the hypotheses explored, additional research questions (**RQ**) were applied to provide further context in this area.

- **RQ1.** Is ChatGPT being used by participant?
- **RQ2.** If ChatGPT is being used by the participant, did the use of it enhance a user's knowledge?
- **RQ3.** If ChatGPT did enhance a user's knowledge, has ChatGPT been adopted by the user for routine knowledge acquisition?

C. Research Design

This dissertation uses a quantitative study for its speed and ability to address specific questions, allowing for future repeatability and measurement of attitude changes [17-18]. The quantitative method offers objectivity, generalisability to a broader context – enabling a foundation to build further research upon, and the ability to measure the potential cause and effect between users' knowledge enhancement of ChatGPT and its incorporation into daily use. Statistical inferences are also be used to test the hypotheses set [19-20]. Qualitative research, although valuable for building themes, providing context, and gaining insights from participants [20], could be a good candidate for future studies once this preceding research is complete. Due to time and resource constraints, a mixed method approach is not feasible, making the quantitative study the preferred approach.

1) Quantitative Research Method

Quantitative research will utilise a survey study methodology to collect information via a questionnaire, asking specific, mainly closed-ended questions and analysing the results [21]. The purpose of the survey is to gather participant feedback on ChatGPT's usage, knowledge enhancement, and adoption. Conducted online, it aimed to access a large participant group to help ensure an optimal response rate compared to physical submissions [22]. The survey is cross-sectional as the research is novel, to establish responses from one point in time [22] over a period of approximately one month, that could be potentially compared against for future research.

D. Preparation

Before research began, the survey was created ready for distribution, aimed to be done within the research project timeline. A copy of the survey used can be found in **Appendix A**.

E. Population and Participants

The sample size used in this research consists of all individual responses who interacted with the survey providing input regarding the topic of ChatGPT. However, some user characteristics were collected to allow for analysis and aid future research.

The respondents who participated in this study consisted of individuals who completed a survey titled "ChatGPT: The advancement of knowledge and incorporation for its users". The survey was distributed to the

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public - by way of social media platforms as well as a post on the Wrexham Glyndwr University's Canvas discussion board – to access a link to the Google Forms questionnaire that was created.

The survey was made available to all potential respondents, and their participation was entirely voluntary. By including all respondents who participated, this study aimed to capture a comprehensive understanding of user perspectives regarding ChatGPT. Furthermore, this approach allowed for a broader range of insights to be uncovered, enhanced generalisability of findings from a diverse range of individuals, and reduced potential for sampling bias.

F. Data Collection

As this research utilised an online survey, an online questionnaire instrument was deployed. This instrument was created via a software tool known as Google Forms. With this method, a link was distributed via social media posts or direct communication on multiple platforms such as LinkedIn, Discord, and Facebook. Additionally, A link was also provided on the Wrexham Glyndwr University's Canvas discussion board. The steps followed in the data collection process were the following:

1. A link shared with individuals across multiple social platforms to access the Google Forms survey created. Additionally, a link to the created questionnaire was distributed via email or direct communication via social media where requested.
2. The participants answered questions and made their submission.
3. At the end of the time allotted to receive responses, data was exported from Google Forms into a downloaded CSV (Comma Separated Values) file.
4. From there, the csv file was imported into a python jupyter notebook script producing the relevant statistics and analysis.

1) Data Collection Suitability

The decision to collect the required data from the created survey – as described in the section above – was to allow for the speed and quality of responses that were received. Moreover, given the constraints of time and resource available for this research, this was the most optimal method to collect data, as well as allowed for ease and approachability for the participant.

G. Data Analysis and Results

1) Management and Storage

As described in the previous section, data was collected via a Google Forms questionnaire, then exported into a CSV (Comma-Separated Values) file, which then is imported for analysis and statistical generation.

2) Software and tools used for data analysis

The CSV file was imported into Python, a user-friendly and interpretable high-level programming language [23-24]. Python supports data analysis through libraries like pandas for data analysis and manipulation [25], and SciPy for statistical tests [26], all facilitating statistical analysis and data visualization for the collected data. Additionally, as well as the python libraries mentioned above, ydata-profiling library was also utilised to harness its exploratory data analysis (EDA) capabilities [27]. The justification of using python, compared with other data analysis methods such as

MATLAB, R or SPSS for example were due to a factor that contributed to the decision of using python. Mainly, its versatility, ease of use and readability. Python is framed as a general-purpose programming language, with extensive libraries being able to cover various research domains, and beyond, as well as being able to integrate into other programming languages, frameworks, and practices better, allowing for potential future development, regardless of avenue that is taken; where languages such as MATLAB, R, or SPSS remain more domain specific [28].

3) Data Analysis Steps

The following list of tasks were executed to present findings and derive insight from the data collection:

a) Pre-processing

Most participant data collected will consist primarily of categorical responses, including yes or no choices and some characteristic information selected from multiple choice selection (e.g., occupational background, highest level of education). Consequently, data conversion also transformed categorical values into numerical representations, utilising transformative logic. Additionally, free-text information was collected pertaining to a recent prompt used in ChatGPT as well as limited user characteristics. at a high level, the following steps taken regarding the pre-processing of data are as follows:

1. Removal of identifiable information and renaming of questions used in the survey, to represent the research question they relate to.
2. Conversion of values held in the research questions into numeric format.
3. Renaming of the remaining questions used in the survey for conciseness. Table I below shows the questions used in the survey, and the variable name they were renamed to.
4. Conversion of remaining survey attributes into respective data types. This information can also be seen in Table I.
5. For the values relating to the prompt entered by the user, the industry sector the user is related to, and the course the student is studying, punctuation and stop words were removed, with the aim to simplify text only keeping the relevant wording [29]. This step was perceived to be useful for additional insight generation.

Table I Information collected from survey, renamed to variables for python analysis.

Question in survey	Variable in python code	Data type
N/A (Captured by survey submission)	Timestamp	Datetime
Question one	consent_obtained	Category
Question two (Related to **RQ1**)	rq1_question	Integer
Question three (Related to **RQ2**)	rq2_question	Integer
Question four	rating_response	Integer
Question five	prompt_entered	String
Question six	prompt_obtainable_elsewhere	Category
Question seven (Related to **RQ3**)	rq3_question	Integer
Question eight	num_chatgpt_uses	Category
Question nine	rating_comparison_other	Integer
Question ten	occupation_status	Category
Question eleven	education_level	Category

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Question twelve	professional_sector	String
Question thirteen	student_course	String

The questions used in the survey can be found in **Appendix A.**

b) Descriptive Analysis

Initial analysis summarised data points using tables and graphs. Examples included total participant count, percentages of population with specific characteristics. Additionally, analysis addressed the main research questions:

1. How many participants have used ChatGPT previously? This piece of analysis was related to **RQ1**.
2. How many participants found ChatGPT enhanced their knowledge? What percentage of the population reported knowledge enhancement, and the percentage where it did not. This was related to **RQ2**.
3. Among participants who reported knowledge enhancement, how many now use ChatGPT for knowledge acquisition. This piece of analysis was associated with **RQ3**.

The analysis also explored limited participant characteristics and additional questions asked for potential insights. These characteristics included – at a high-level- the participant's occupational status, highest level of education, and either the industry the participant works within if a working professional, or the course currently studied if the participant is a student. Moreover, participants were asked additional questions such as rating the response provided form their prompt given by ChatGPT, if the information could have been obtained elsewhere, how many times they have previously used ChatGPT, and a rating to compare the response given on their prompt, when compared with other tools to acquire the information they queried.

c) Pearsons Correlation Coefficient

Pearson correlation assesses the strength and direction of a linear relationship between two variables, indicating their closeness [30-31]. This study examined the association between ChatGPT users who have experienced knowledge enhancement and the integration of ChatGPT into their daily knowledge acquisition routine. The `pandas.DataFrame.corr('pearson')` function in pandas [32] will be employed to generate a correlation table. Additionally, the pearsonr(x,y) function from the scipy.stats package [33], was also used to confirm this, along with providing the p-value showing the statistical significance. A positive correlation was anticipated, signifying that users who enhance their knowledge with ChatGPT are inclined to incorporate it into their regular knowledge-seeking practices, supporting **RH2**. Furthermore, the p-value provided from the pearsonr function was expected to show a value of less than 0.05, indicating statistical significance   Table II shows the variables used for the Pearson correlation coefficient analysis, which related to the RQ variable referred to, and supported confirmation of claims made in **RH2**.

Table II Variables used for Pearson's Correlation Coefficient Analysis.

Question in survey	Variable defined in python after pre-processing steps	RQ related to variable

When you used ChatGPT - based on the prompt you entered - did the response help enhance your knowledge in that area?	rq2_question	**RQ2**
If ChatGPT did enhance your knowledge, have you used it more into your day-to-day routine since?	rq3_question	**RQ3**

d) Hypothesis Testing

To assess the statistical significance of survey results and investigate the two hypotheses, an employment of the binomial test in python was used using the scipy.stats library package [34,35]. The null hypothesis, in both cases, will assume that only 50% or more of the participants reported no improvement in their knowledge and the inclusion of ChatGPT as a tool for regular knowledge acquisition. Should less than half of the responses demonstrate this trend, the null hypothesis will be rejected, and the alternative hypothesis, which aligns with the research theories, would be accepted [36,37].

4) Results from analysis

The results are displayed in both tabular, graphical – in terms of data visualisations - and textual formats for the reader dependent on the context of what is being shown. Furthermore, the python code used to produce the analysis can be found in **Appendix B**. Furthermore, more results from the analysis can be found from the ydata-profiling report in **Appendix C.**

H. Ethical Considerations

As research involved the perception of participants' view in form of a quantitative survey study, there remained potential items that were considered. Participants' rights had been prioritised throughout the study, and all procedures will adhere to ethical guidelines outlined by The Institute of Electrical and Electronics Engineers (IEEE) [37] within their code of ethics [38].

Participants were provided with a clear explanation of the study's purpose, the benefits this research aims to bring, and procedures involved. Informed consent was obtained from each participant before participation ensuring they can withdraw from the questionnaire at any time, confirming they can make informed decisions. The consent was documented through the online survey platform, with participants required to indicate their voluntary participation by selecting the option "I agree to these terms and wish to participate", before the survey began.

Participants' confidentialities were maintained. Data collected is stored and anonymised. Only the researcher the dissertation supervisor will have access to the data, which will be used solely for research purposes. No personal identifying information was expected in the survey results but was separated from survey responses during analysis.

The study poses minimal risks to participants. However, measures were taken to mitigate potential risks, such as providing clear instructions on the survey process to avoid any confusion. No conflicts of interest that could compromise the objectivity or integrity of the research were detected.

1) Action to obtain ethical approval

To get ethical approval for this research project, a proposal was sent to the dissertation supervisor, due to the ethical consideration outlined. Whilst this study involves the use of humans to get their views on the use of ChatGPT, there is minimal to no harm or misconduct expected towards participants who engage with the survey. A signed copy of the ethical approval of research projects in online programmes form can be found in **Appendix D**.

I. Limitations

Particularly as this piece of research delved into a novel area concerning ChatGPT, limitations were uncovered and need to be addressed to provide as much transparency as possible. Due to limited time and resources, only one survey will be conducted with a limited series of mostly closed questions to gather prompt and enriching feedback. Additionally, the analysis will be limited to the collected data without comparison to other datasets, due to the lack of research in this area. Furthermore, it is important to note that bias may be introduced in this study as participants interested in the topic may be the only ones who choose to participate.

IV. RESULTS ANALYSIS

The objective for this section of research was to present the results from analysis against data collected from survey participant responses. Firstly, a description of results for **RQ1**, **RQ2**, and **RQ3** respectively. Secondly, outcomes from hypotheses tests completed to support claims made in both **RH1** And **RH2**. Furthermore, additional insights were generated regarding the remaining questions gathered from the survey. Over the course of one month, a total of **17** individuals responded to the survey, all of which provided consent to participate. Further detailed results from the analysis are placed in **Appendix B** and **Appendix C** for additional perusal.

A. RQ1.Is ChatGPT being used by participants?

In this RQ, the aim was to quantitatively analyse individuals who have agreed to participate in the study, how many have used ChatGPT previously. The rationale of RQ1 being, to confirm the assumption that ChatGPT was used in the public domain. Fig. 1 represented the distribution of respondents who answered the question "Can you confirm if you have used ChatGPT previously?". Of those values, 15 of the participants identified to have used ChatGPT, and 2 participants who have not.
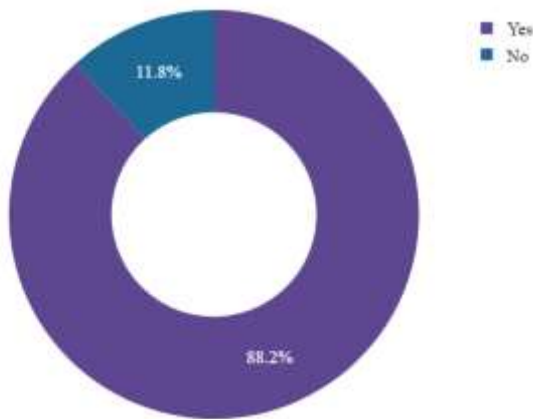

Fig. 1. Distribution of participants who have used ChatGPT.

B. RQ2. If ChatGPT is being used by the participant, did the use of it enhance a user's knowledge?

With RQ2, the focus was to understand, of those 15 participants who have used ChatGPT previously, did the use of it help to enhance their knowledge based on the prompt they entered. The analysis confirmed that all 15 participants said ChatGPT helped to enhance their knowledge. Confirmation of this can be found in **Appendix B**.

C. RQ3. If ChatGPT did enhance a user's knowledge, has ChatGPT been adopted by the user for routine knowledge acquisition?

The final research question, assessed of those who claim ChatGPT enhanced their knowledge, how many have since used it as an aid toward day-today knowledge enhancement. Of the 15 participants who stated ChatGPT enhanced their knowledge, Fig. 2 showed that 10 of those individuals have then incorporated it into their routine for gaining knowledge.
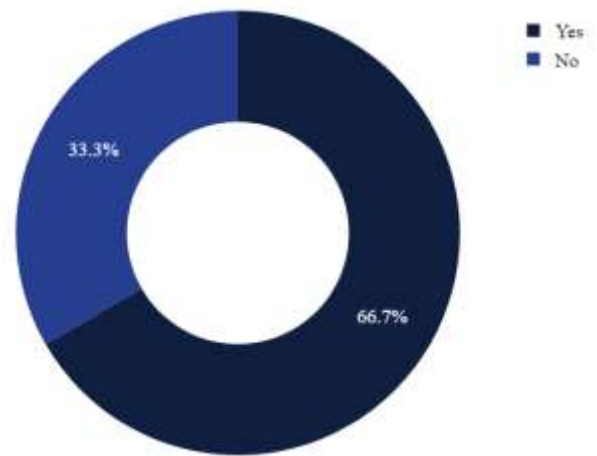

Fig. 2. Distribution of participants who have adopted ChatGPT for routine knowledge acquisition.

D. RH1. The utilisation of ChatGPT increases the likelihood of enhancing a user's knowledge on a specific topic.

For RH1, the application of the binomial test was used to support the hypothesis presented and reject the null hypothesis that only 50% of participants or less state the use of ChatGPT is likely to enhance a user's knowledge, based on the prompt entered and response the user was provided with. Therefore, of the 17 respondents, 15 were used within the test – based on conclusions found in RQ1. The results from this test are documented in Table III.

Table III Results of RH1 binomial test

Element in binomial test	Value
Number of observations where RQ1 is Yes	15
Number of responses who replied Yes to RQ2	15
Probability used in binomial test	0.5 (50%)
p-value from binomial hypothesis test	0.000030517578125

E. RH2. Users who perceive ChatGPT as enhancing their knowledge are more likely to incorporate ChatGPT into their routine for knowledge acquisition compared to those who do not perceive ChatGPT as enhancing their knowledge.

1) Binomial Test

As well as RH1, a binomial test was also executed against RH2, with the aim to support its claim. Based on the 17 respondents, 15 were used for the test, established from the results of RQ2. The outcomes from this test were recorded in Table IV.

Table IV Results from RH2 binomial test

Element in binomial test	Value
Number of observations where RQ2 is Yes	15
Number of responses who replied Yes to RQ3	10
Probability used in binomial test	0.5 (50%)
p-value from binomial hypothesis test	0.15087890624999997

2) Pearsons Correlation Coefficient

In addition to the binomial test measuring the p-value to confirm the statistical significance, the Pearson correlation was used to evaluate the relationship between users claiming ChatGPT enhanced their knowledge, and if the user has incorporated into routine knowledge acquisition since. Results presented in Fig. 3, documented a Pearson R value of 0.620661, and p-value of less than 0.05.
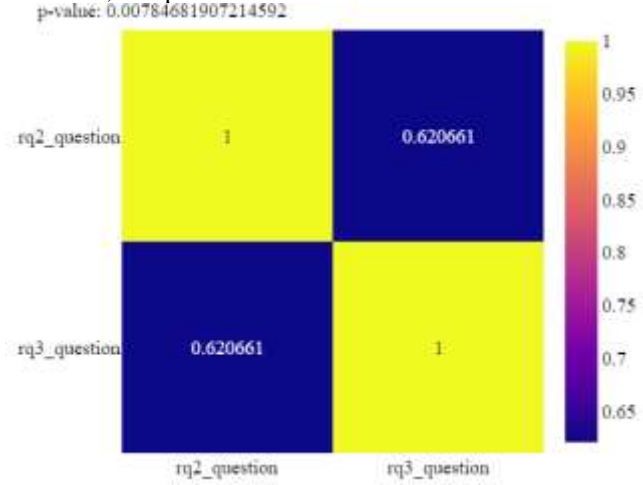

Fig. 3. Results from RH2 Pearson Correlation Coefficient.

F. Additional Insights

In addition to the results obtained in response to the formulated research questions and hypotheses, supplementary insights emerged from the remaining survey questions and their corresponding data. Although these findings were not the primary focus of this study, they provide valuable additional perspectives on the utilisation of ChatGPT from the users' standpoint, thus justifying further investigation in this domain. All pertinent information is also accessible within **Appendix C**. It is important to note that only the questions deemed relevant and significant will be included here; not all results from the remaining survey questions will be displayed.

1) Rating ChatGPT Response

One set of information captured and analysed related to question four of the survey, stored as variable 'rating_response', where the user was asked to rate the response from being not useful, to being the exact information needed., they received from ChatGPT based on the prompt entered. The most common rating was 4 with 35.3% of the participant population reporting this. This information was also represented in Fig. 4.
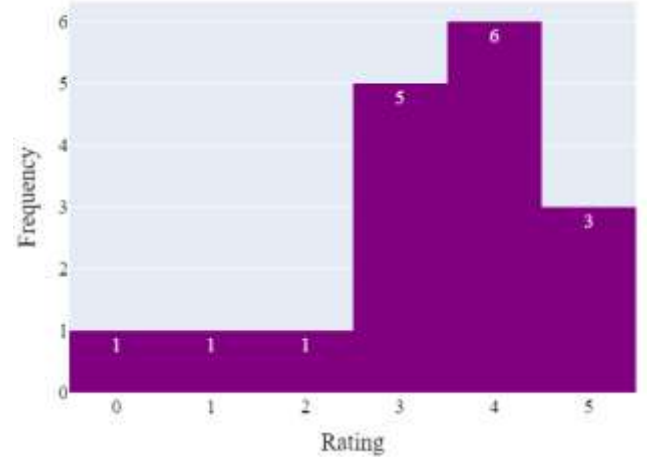

Fig. 4. Distribution of rating the response a user received from ChatGPT.

2) Comparing ChatGPT to other tools

An additional set of analyses was conducted concerning question nine in the survey, which was stored as a variable named 'rating_comparison_other.' In this question, participants were asked to compare their usage of ChatGPT with other tools, such as a Google search or browsing YouTube, for acquiring knowledge on a particular topic. They were requested to rate, on a scale from 0 to 5, whether ChatGPT facilitated the process of knowledge acquisition compared to other methods. The results of this analysis are illustrated in Fig. 5.
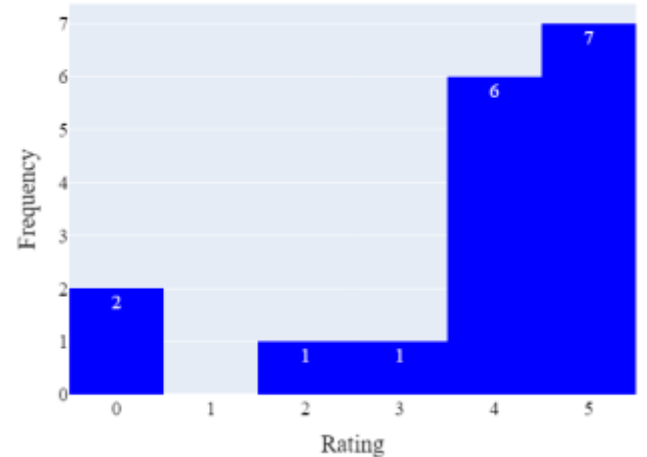

Fig. 5. Distribution rating ChatGPT to other tools.

V. DISCUSSION OF RESULTS

Now the results are elucidated above, this section evaluates results with the data collected, against the research questions and hypotheses, all to answer whether ChatGPT enhances user knowledge as well as incorporation into routine knowledge acquisition.

A. Results from Research Objectives

Findings from RQ1 indicate that not only has ChatGPT been widely used by most survey participants, but it also supports the theory and previous research indicating active usage by the public.

Regarding RQ2, the data indicates unanimous support among respondents for the theory that using ChatGPT enhances their knowledge. The analysis of RQ2 reinforces the significance found in RH1, indicating that ChatGPT usage increases the likelihood of improving user knowledge. Thus, the results provide evidence that participants perceive ChatGPT as a valuable tool for gaining deeper insights into subjects of their interest.

This insight, discovered in the current study, aligns with similar themes and findings observed in previous research conducted by Tlili et al. [9] and Haque et al. [12], who recorded user experiences of early adopters of ChatGPT. Results from RQ3 and RH2 provide interesting insights regarding the incorporation of ChatGPT into routine knowledge acquisition. While approximately two-thirds of participants reported integrating ChatGPT into their knowledge acquisition process, the binomial test in RH2 did not show statistical significance ($p > 0.05$), with the p-value recorded at > 0.15. However, the Pearson's Correlation Coefficient revealed a moderately positive relationship ($r = 0.620661$) and statistical significance ($p < 0.008$) between users who found ChatGPT enhanced their knowledge and its incorporation into routine knowledge acquisition.

Hence, based on the information presented above, users show a willingness to incorporate ChatGPT further into their daily knowledge-gathering activities, provided they have experienced enhanced awareness through its use in the past.

B. Findings from Supplementaty Insights

In addition to the outcomes evaluating the research objectives of this study, supplementary analyses were conducted on select remaining survey questions that were completed by the participants.

The analysis of question four, focused on user's rating of the response received from ChatGPT based on the prompt entered, provides valuable insights into the perceived usefulness of the system's generated responses. As shown in Fig. 4, 9 of the 17 participants (52.94%) rated the response of ChatGPT at 4 or higher, suggesting a substantial proportion of users found ChatGPT's responses to be highly relevant and tailored to their queries, meeting their specific information requirements effectively. The high percentage of participants selecting rating 4 indicates a positive user experience, reflecting the system's ability to generate contextually appropriate and accurate responses.

The supplementary analyses on question nine, where participants compared ChatGPT with other tools for knowledge acquisition, revealed valuable insights. Fig. 5 shows approximately 76% of participants rated ChatGPT favourably, finding it efficient in acquiring knowledge compared to Google searches or browsing YouTube. These positive ratings suggest ChatGPT's promise as a valuable tool for gathering information on specific topics, leveraging its natural language processing capabilities to enhance the user experience. However, around 24% of participants gave lower ratings, indicating ChatGPT's limitations in certain instances.

Further investigation into these contexts could offer valuable insights for future improvements.

C. Limitations to Address

This section discusses the limitations encountered during the research on the user perspective of ChatGPT utilisation. These limitations warrant careful consideration to ensure the accuracy and reliability of the research outcomes and to identify opportunities for further investigations.

1) Participation in Study

One primary limitation of this study is the small number of survey submissions available for data collection, analysis, and insight generation. Only 17 participants volunteered to take part in the survey. While the data collected contributed to the findings, the limited sample size may impact the generalisability of the research. With a larger and more diverse participant pool, a broader understanding of the research questions and hypotheses could have been attained.

2) Research Scope

The research aimed to explore the user perception of ChatGPT as a tool for knowledge enhancement and adoption. However, while survey questions were used to address the research objectives, additional questions in the survey data could have enriched the research measurements or expanded the scope further. For instance, analysing the relationship between the prompt entered in ChatGPT and the participant's rating of the response, or investigating the correlation between the rating of response and participant's rating of ChatGPT compared to other usable tools, could have provided valuable insights. Furthermore, exploring how industries or courses participants were involved in might have influenced the results could have offered a deeper understanding of the findings. Considering the scope of this research, it serves as a starting point for exploring numerous criteria related to ChatGPT user perception in future studies. The initial investigation has laid the groundwork for collecting and measuring various aspects of user perception.

3) Methodology

The employed research methodology in this study was quantitative, chosen for its simplicity and efficiency in data collection and analysis, given the time and resource constraints of the research. However, adopting a mixed methods approach, combining a quantitative survey study with qualitative follow-up interviews, could have provided a more comprehensive understanding of how participants perceive ChatGPT and its usage, offering valuable contextual insights. Despite this limitation, the quantitative survey and its presented results represent an initial breakthrough in this research area, creating a foundation for future investigations to delve deeper into participants' perceptions.

VI. CONCLUSION

Irrefutably, the aims of this research were to capture user perception of ChatGPT, specifically to understand whether ChatGPT enabled the enhancement of knowledge based on what the user provided the tool with, as well as if ChatGPT has been incorporated into a users' life for routine knowledge acquisition, since it enhanced the knowledge for its user. The attainment of these aims was facilitated through an online quantitative survey submitted by volunteer participants, which the data was collected, analysed, and measured against the research questions and hypotheses established.

The findings from this study suggest if ChatGPT has been used to explore a topic by a user, it has been directly able to enhance their knowledge. However, whilst the findings suggest the above, and a majority would use ChatGPT into day-to-day knowledge enhancement, there was still a small proportion that do not. Additionally, the findings indicated that more insights had the ability of exploration, to further understand of a user utilising ChatGPT.

The insights garnered from this study, have the potential to benefit a diverse range of audiences seeking to comprehend user relationships and behaviours with ChatGPT. For instance, corporations could leverage this research to assess the efficacy for employees in gaining knowledge for training purposes. Academic institutions, on the other hand, could explore how ChatGPT could explore the impact of its utilisation amongst students on specific courses. Additionally, even OpenAI themselves, who created ChatGPT, to understand how the tool is being used, what prompts were helpful or less so when receiving feedback and why based on additional factors that may be influencing interactions. Finally, individuals themselves looking for an alternative aid to use in answering queries to improve their knowledge in that area.

A. Recommendations for Future work

Whilst this study has certainly shed light into understanding knowledge enhancement and incorporation for a ChatGPT user, limitations are uncovered as well as potential avenues could be explored in future research to build upon findings presented here, further developing the understanding of user perception in ChatGPT.

A notable limitation was the modest size of the participant pool involved in this study. By expanding the participant base, researchers could attain more robust estimates that could be inferred with greater confidence to the wider population. Furthermore, such an approach would enable the exploration of additional insights that may surface within various subgroups, thereby enhancing the comprehensiveness of the study.

Additionally, a suggestion for further analysis of the additional questions and their results from the survey submissions may enable consideration of other factors contributing to a user's decision on the usefulness and incorporation of ChatGPT.

Moreover, it would be beneficial to conduct a more detailed comparison of ChatGPT's results with those of other similar tools. Such a comparative analysis would provide valuable insights into the unique strengths and weaknesses of each tool, assisting users in evaluating their preferred choice for obtaining query responses on specific topics.

Furthermore, exploring the prompts entered by users when interacting with ChatGPT and their perceived value could unveil a deeper comprehension and context, explaining why certain prompts are deemed more useful than others by the same or different users.

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VIII. APPENDICES

A. Survey Created to Collect Responses

B.   Python code for Dissertation Analysis

C. Exploratory Data Analysis (EDA) Report from y-data profiling

As well as below printout, please see interactive version here:

Appendix C - EDA
report - LouisOthen

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D. Ethical approval Form of research projects in online programmes