GUSTO
UNIVERSITY

Unit-19: Computing Research Project

The Investigation for the enhancement of Self-study Learning through Big Data-driven AI chatbot

Submitted by:

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Primary Research Paper

Pearson Education

Higher Education Qualifications

Declaration

I declare that the submitted primary research paper is completed with relevance information, carefully analyzed data and procedures with my own knowledge and options purely. I will submit this primary research paper only on the GUSTO Learning management Moodle platform as an HND students at GUSTO University located in Yangon. I truly commitment that I haven't been uploaded this research paper on any Department or University/Collage before.

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09-Oct-2024

Abstract

Since the Big Data technologies and AI-driven conversational chatbots are constantly evolve, the way students learning approach has been transformed from relying on ordinary search engines to interacting with chatbots like ChatGPT. So, this research is intended to investigate how GUSTO students can take benefits from applying Big Data-powered AI chatbots into their daily self-study processes. This research is conducted by collecting GUSTO's students' opinions with the well-structured survey and carefully analyzing survey results to find the actual state of research's hypothesis. According to the result of collected data analysis, this study can show the effectiveness of the Big Data-driven AI chatbots on the self-study of GUSTO student while testing the research hypothesis.

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Introduction

The combination of Big Data and Artificial Intelligence (AI) revolute education field these days. Big Data technologies are constantly integrated into the education systems for various purposes which the most obvious one is analyzing student behaviors and extracting insights to improve personalized learning. AI chatbot uses these extracted data to provide quick explanation, feedbacks, relevant study resources and tailor to each student's personalized questions and become valuable tools in the role of supporting self-directed learning. These chatbots give students the ability to practice and learn outside of regular study hours by providing 24/7 help. There are already plenty of strong researches that explore the importance of AI chatbots and Big Data in higher education in the aspect of enhancing student engagement and their academic performance. Even though there were such researches out there, it still lacks to figure out the effectiveness of those Big Data-powered AI chatbots on the self-study aspect of students of specific university scope. Based on this limitation, I decided to research how these Big Data-driven AI chatbots help GUSTO students specifically in their self-directed learning journey. To achieve the useful insight about this research, I have created a well-approached survey which focus on the effectiveness of Big Data-driven AI chatbots on self-study and collects various data from GUSTO students in both qualitative and quantitative format. Then, those collected data sets are cleaned, sampled, and analyzed in order to obtain the exact insights which can support my research question.

This primary research paper starts with the statement of Aim, Objectives and Hypothesis of my research and it briefly contains about the literature reviews which strongly support to continue my research. Then, in this primary research, methodology chosen from the secondary research are carefully analyzed with the research processes and states them as Final Methodology. With the appreciation and declaration of participants who actively anticipant

in the most important part of this research, this primary research paper provides the procedures of how the entire research carried out within 8 months. Moreover, this paper includes the most vital component of this research which is the detailed analysis of each survey answers with the answers' visualizations. Using the results achieved from those analyzed survey answers, the researcher finally discusses about the entire research in the discussion section to evaluate the collected data and its meet of objectives and how it supports the hypothesis. This primary research paper will be ended with the clearly-defined conclusion together with the Harvard references to give credit to the other resources and researchers.

Aim

This research project aims to fill the gap of knowledge regarding the Big Data driven AI chatbot by exploring its effectiveness in enhancing self-study practices among GUSTO students without regarding to future solutions for integrating chatbot into the infrastructure of GUSTO university.

Objectives

1. To explore the effectiveness of using Big Data in Gusto university's AI chatbot to enhance self-study practices among GUSTO students
2. To study the impact of GUSTO university's AI chatbot on the self-study experience of GUSTO students
3. To identify the potential challenges associated with the usage of Big Data driven AI chatbot for improving GUSTO student's self-study performance.

Hypothesis

Utilizing the Big Data-driven AI Chatbot positively influences on the self-study habits and enhance the academic performance of GUSTO students.

Literature Review

As the landscape of higher education is rapidly developing over time, the combination of two strong technologies which are Big Data and AI chatbots has become an essential area in education field. Big Data-driven Ai chatbots has a big potential to improve self-study practices of students from all around the world across various studies. We can begin to grasp how these 2 technologies integration can change the learning experiences of GUSTO student by exploring and examining the roles of chatbots in mentoring, communication, academic performance, and its challenges.

As discussed in the Neumann's research, one of the most useful functions of AI chatbots in higher education is being able to scale mentoring processes. The research could demonstrated that AI chatbots, especially FeedBot and LitBot, which give feedback on students' writing and support reading exercises, can relatively boost student engagement in their self-study. These AI chatbots relieve lecturers from repetitive tasks by automating some aspects of feedback processes efficiently while it helps students to maintain momentum in their studying by providing quick responses. This is particularly essential in large university settings like GUSTO university, where there is a limited number of mentors for individualized attention.

However, the researcher pointed out that AI chatbots still need to modify to respond personalized or complex student questions. This research shape that even though chatbots can improve self-study by giving quick and algorithm-driven feedbacks, there is still need for human intervention in cases of deeper understanding and mentorship is required. The researcher stated that the balance between AI-driven efficiency and human interaction is important to optimize the benefits of AI chatbots in education.

As observed in Slepankova's study on chatbots in higher education, AI chatbots provide not only the academic support but also effective communication between students and universities. This research makes a study on the acceptability and impact of AI chatbots on communication in education settings. This reveals that students often use these AI chatbots for routine queries such as exam data or course information requirements. Slepankova stated that university staff can solve administrative challenges while student's questions are responded quickly and efficiently by streamlining these interactions with AI chatbots.

Moreover, this study highlights the facts that AI chatbot are accepted by students because of their perceived usefulness, effort expectancy, and emotional motivation. Slepankova figured out that students are feel free to ask their personalized questions because of the nonjudgmental nature of chatbots. However, the findings suggest that the capabilities of chatbots are limited in certain way even though they give fast and non-judgmental responses. This study got the insight that students appreciate the simplicity and speed of chatbot interactions but they noticed the lack of deeper engagement and personalized responses. This point out a possible challenge for GUSTO university's Big Data-driven AI chatbot. It may be effective in handling routine queries but they might struggle to fully meet the complex requirements of student engaged in self-study.

In the research observed by Larsson and Eriksson, the integration of AI tools like ChatGPT into self-study routines was explored. Their study reveals that students appreciated the AI chatbots for their ease of use and time-saving advanced features but they were concerns about their accuracy and reliability of information they provided. This insight is important for knowing how GUSTO university's AI chatbot would influence on students' study habits. While the chatbots have its own benefits, the concerns in reliability and accuracy of

information and facts they provided may lead the misleading of students' self-study.

Furthermore, Chaudhry points out the important concerns about the performance evaluation of students using AI chatbots in his research paper. The study conducted on a Bachelor of Business Administration program figured out that ChatGPT could even solve complex academic assignments at certain level comparable to the highest-scoring students. More than that, this study also found that existing AI detectors failed to fully detect AI-generated text which raise concerns about the academic integrity. This study highlights the risk that students become heavily rely on AI chatbots which can potentially reduce their critical thinking and problem-solving skills. In this study, the researcher suggests that even though AI chatbot can help students in improving their academic performance, education institutions must update or modify their assessment methods and enhance the capability of AI detector tools to make sure that students' submitted work remain authentic and genuinely reflective of their understanding. This study makes GUSTO university cautious of these constraints and consider to ensure that students rely on their own skills without becoming too much reliant on AI-generated answers.

In the in-depth study conducted by Kooli, ethical challenges associated with the use of Big Data-driven AI chatbots in education are explored. This research primarily focused on the biases inherent in AI systems, the potential for misuse in academic assessments, and the impact of these technologies on students' critical thinking skills. Kooli's study highlighted the potential unintended consequences of over-reliance on such AI chatbots while they have been appreciated for their delivering quick responses and helping students with their studies. One of the high concerns explored in this study is that students are discouraged to develop their independent problem solving and critical thinking skills in studying because algorithm-based Ai-generated

answers are easily accessible. This aligns with the concerns raised in Chaudhry's study in which the impact of ChatGPT on deeper learning and critical thinking was questioned. These research studies highlight the need of maintaining a balance between AI-chatbots support and human support instruction to make students continue to engage in creative and analytical thinking. Kooli's research suggested that the more cautious way in adopting AI chatbots in education settings and chatbots should be used in ways that complement rather than replace with human interaction in learning processes.

The research observed by Jude Osakwe states that the challenges of implementing AI chatbots are not just ethical but also technical. His research on Big Data technologies in education has pointed out the large barriers to successful integration because of the lack of resources, insufficient experience, and inadequate government policy. In this research, Jude surveyed professionals across various countries and found out that many education institutions struggle with the technological requirements required to adopt Big Data and AI chatbots effectively. This insight get from this study warns the GUSTO University that they need to understand the potential roadblocks which they might face in fully implementing a Big Data-driven AI chatbot into their learning settings.

As observed in Thakore's study on AI-enhanced chatbots for Big Data in education, instructors can also gain valuable benefits from AI chatbots. In this study, Thakore conducted the qualitative case study that targeted faculty members in engineering and computer science. From this research, the researcher found that chatbots are defined as helpful tools for automating repetitive tasks by giving quick access to course materials and helping in student feedback. Professors included in the research claimed that chatbots also helped them to emphasize on more meaningful interactions with students because chatbots handle routine tasks. This study reveals that big data-driven AI chatbots in GUSTO university has potential to not only improve students'

self-study learning but also support lecturers/instructors and affairs in managing their workloads more effectively.

In brief, this literature review supports this primary research on the effectiveness of Big Data-driven AI chatbots in GUSTO students' self-studying processes. This body of research based on AI chatbots and Big Data in education settings gives a strong foundation understanding on how Big Data-driven AI chatbot of GUSTO university might improve students' self-study practices. This literature reviews were conducted using studies which highlight both the potential benefits and challenges of AI chatbot usages, from enhancing student engagement and giving effective communication to raising concerns about academic integrity and ethical implications.

Final Methodology

In the secondary research, the methodology that will be used in the research is briefly outlined. In this primary research paper, the outlined methodologies are finally confirmed to use according to the nature of the conducted research.

This research adopted research onion model which is similar like layers of onion in which each layer represents different aspects of the research.

This research is intended to investigate the effectiveness and impact of Big Data-driven AI chatbot on GUSTO's students' self-study practices from different perspectives. This research is investigated objectively in which exploring the effectiveness of Big Data-driven AI chatbot on students followed by its benefits, challenges, systems on its own and subjectively in which studying the opinions and feelings of GUSTO students who are going to use this chatbot. This research is conducted by collecting both numerical data and in-depth insights from GUSTO students through well-structured survey. This research includes both "hard" and "soft" concepts so that it doesn't fall into

the clear-cut research category (Derek Jansen, 2023). Because of this, the Philosophy layer of this research is "Pragmatism".

This research is carried out in the top-down approach in which began with defining a clear hypothesis which predict the final result of this research. Then, empirical data collections and analysis are thoroughly conducted to test this hypothesis and drew conclusion according to the results of data analysis. Due to this flow, this research is majorly based on the "Deductive" approach.

In this research, it is obvious that the researcher used "Survey" strategy to conduct the research. The researcher shared the well-structured survey to more than 50 GUSTO students to collect massive data to analyze. Researcher get only 8 months to conduct the entire research. Due to this time constraints and resource constraints, applying other research strategies like interview, case study, and experiment wouldn't be suitable even though they give more holistic views on the research questions. In this case, Survey strategy which need only one time to create and allow multiple-time apply to large group of participants at the same time with the easy way to distribute (via QR code or Survey link). Survey is convenience to ask both qualitative and quantitative questions in single source unlike interview which is not convenience to ask statistical questions.

To gain the valuable insights to support this research, the researcher used both qualitative questions and quantitative questions in the survey. As the qualitative questions, close-ended questions which are multiple-choice (radio, checkbox) and ranking scale are included in the survey. Then, as the quantitative questions, open-ended questions which are started with What do you think, how would you feel, and so on are included. So, "Mixed-methods" approach is applied in this research. To test the research hypothesis, we need deeper understandings and it is not enough only with statistical data. Thus, applying mono approach will not capture the contextual factors and can

involve researcher' bias in contextualize the result which can lead to unreliable results. By combining both qualitative and quantitative results, researcher can get insight into the actual thoughts together with measurable statistical data and this can prevent bias of the researcher.

The time horizon of this research is "Cross-sectional" because this research is conducted within 8 months with a strict timeframe. Additionally, data are collected from participants at a single time frame without tracking the participants over time to study the changes. This research did a comprehensive analysis on the AI chatbot usage for GUSTO's students' self-study processes based on the one-time collected data and it did not extend the timelines with tracking changes and other complexities. This is quicker and need less amount of resources.

To complete the research by getting valuable insight to support the research hypothesis, the researcher used "Data collection and Analysis" techniques and procedures in this research. She collected diverse data points via survey which questions are covering the research objectives. Then, the researcher carried out two type of data analysis which are statistical analysis of quantitative data and thematic analysis of qualitative data. The combination of two analysis provided the robust framework to test the research hypothesis.

Participants

As the main participants of this research, IT students who currently studying computer science at GUSTO university are included. The well-structured survey, which intended to gain the valuable insight, is shared estimate to three classrooms HND 48, HND 50, HND 51 where it has GUSTO IT students who usually apply Big Data-driven AI chatbots for their studying purposes and who are slightly familiar with Big Data and AI concepts. I, the researcher of this research, am really appreciate their efforts in answering my survey with appropriate answers.

Procedures

To complete this research, the researcher performs the well-defined steps which is align with the defined procedures of making out research project. Firstly, the researcher read and explore the articles and research related to Big Data and AI technologies in various field to gain the project ideas. The researcher read the literature and figured out the point that can fill up with own research, which is the current project. After getting the title and concept of the research project, the researcher conducts a formal meeting with her tutors for confirming the title and idea of her research. After a week, tutors confirmed the title and concept of the researcher's research project.

Once the title and concept of research was approved, the researcher started searching research papers, journals, books, and documents related with the concept of Big Data, AI chatbot, Education and Self-study in higher education to read the literature review. The researcher gained a plenty of literature resources which properly may support her primary research. Among them, the researcher filters the most relatable and useful eight literatures and she writes the summarized literature review in the secondary research paper.

Then, the researcher wrote a research proposal together with the details of the research including research title, research question, Aim, Objectives, hypothesis, methodology choices, and reasons/purposes of the research. After she uploaded this research proposal to the organization, the researcher wrote the secondary research paper which composes abstract, introduction, Aim/Objectives/Hypothesis, title/research question, eight summarized literature review together with methodology (onion layer list) and the citation reference for the literature.

Once the secondary research paper which support the primary research, the researcher created well-structured surveys with appropriate questions for data collection and analysis. The researcher thoroughly communicated with

her tutor for creating a well-defined survey to make sure the right question types and formats are used in it. The researcher collected survey data for 3 weeks from appropriate participants. When the data collection reaches its available limit, the researcher sample and clean the collected data to further analysis. Then, the researcher clearly analyzes the cleaned collected data to gain insights.

Using analyzed results, the researcher compared the final results with the primary aim, objectives and hypothesis to extract the exact results on the research question. Then, the researcher briefly presented her research to the tutors and supervisors in the format of poster which include the results and discussion section which is essential in analyzing results of research whether they support defined hypothesis or not.

Finally, the researcher wrote the primary research paper which contain details about the research, literature review, describing (or) confirming final research methodology, results analysis and then the overall discussion which bring the final insight of this research project. It also includes the citation reference links in Harvard reference format and the required appliances.

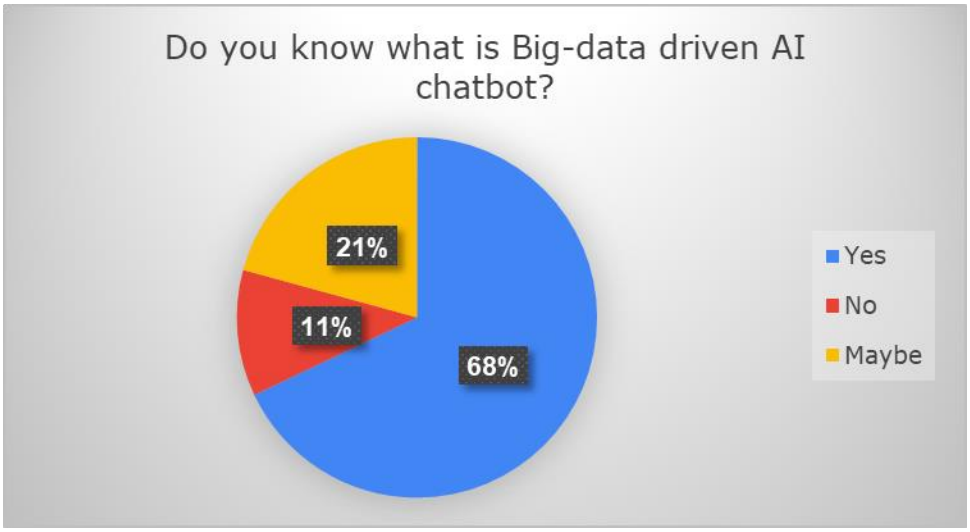
By doing these procedures month by month systematically, the research finally obtains the valuable insight on the effectiveness of Big Data-driven AI chatbot in self-study aspect of GUSTO students.

Result Analysis

In this part of the report, the results received from the survey form which collects data form GUSTO students are clearly analyzed. This analysis intended to grasp understanding on the perspective of GUSTO students about the efficiency of Big Data driven AI chatbot for their self-study processes. In the survey's result, it includes different results from Radio button questions, Check box button questions and Open-ended questions.

Question 1: Do you know what is Big-data driven AI chatbot?

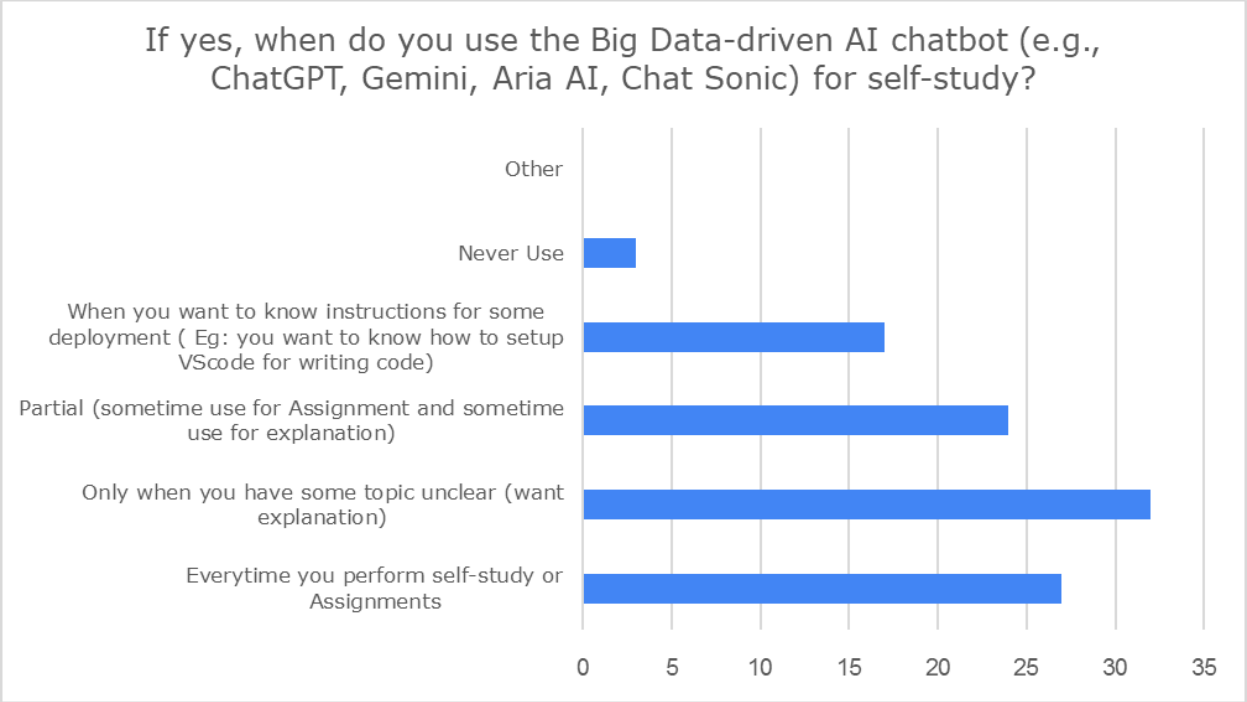
	Participants	Mean	Frequency
Yes	36	0.67924528	67.9245283
No	6	0.11320755	11.32075472
Maybe	11	0.20754717	20.75471698



The largest percentage of students, 68% of them chose "Yes" which indicate that they've already familiar with the concept of Big Data and Ai chatbots so that they can be assumed as ready to use modern technology into their academic setting. However, there are 21% who chose "Maybe" with uncertainty and the other 11% of them chose "No". This shows that these students need more educational efforts to have enough knowledge to use these modern technologies and avoid misunderstandings.

Question 2: If yes, when do you use the Big Data-driven AI chatbot (e.g., ChatGPT, Gemini, Aria AI, Chat Sonic) for self-study?

	Participant	Mean	Frequency
Everytime you perform self-study or Assignments	27	0.262135922	26.21359223
Only when you have some topic unclear (want explanation)	32	0.310679612	31.06796117
Partial (sometime use for Assignment and sometime use for explanation)	24	0.233009709	23.30097087
When you want to know instructions for some deployment (Eg: you want to know how to setup VScode for writing code)	17	0.165048544	16.50485437
Never Use	3	0.029126214	2.912621359
Other	0	0	0



These results received from this quantitative question reveal different ways of how GUSTO students use Big Data-driven AI chatbots for their self-study purpose.

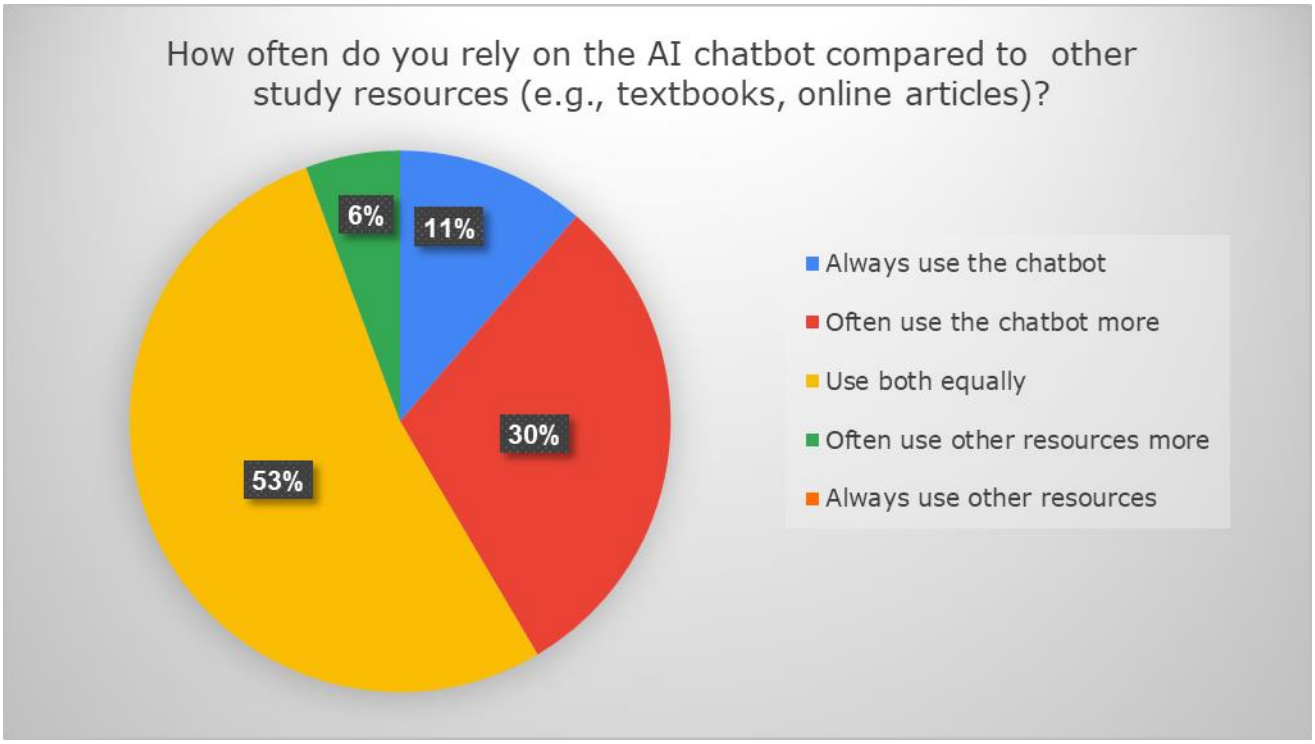
Most of the students (32 students) mainly rely on AI chatbots only when they need clear explanations or assistance with unclear or complex topics. This indicated that students' demand for chatbots as an on-demand learning tool for solving particular learning challenges. The noticeable portions of students (27 students) stated that they use Ai chatbots regularly when they're doing self-study and assignments. This suggested that these students use Ai chatbots deeply into their daily study routines. This regular usage tell that the students see Ai chatbot as an effective assistance tool in their learning process.

Partial one also has a great number of responses (24 students) and this shows that many students use Ai chatbots based on their needs such as sometime use for Assignment and sometime use for explanation. This indicated that Ai chatbots are valuable when students need additional help in both their assignments and understanding concepts. Some dedicated group of students (17 students) stated that they use Ai chatbots for technical assistance such as guiding deployment with detailed instructions. This result points out that Ai chatbots are not only useful for general study purposes but also for more practical (or) hands-on tasks like coding setups.

However, fewer students (3 students) choose "Never use" and this presence of non-user indicates that there might be some barriers to adopt Ai chatbots or alternative uses that have not been fully explored.

Question 3: How often do you rely on the AI chatbot compared to other study resources (e.g., textbooks, online articles)?

	Participants	Mean	Frequency
Always use the chatbot	6	0.113207547	11.32075472
Often use the chatbot more	16	0.301886792	30.18867925
Use both equally	28	0.528301887	52.83018868
Often use other resources more	3	0.056603774	5.660377358
Always use other resources	0	0	0



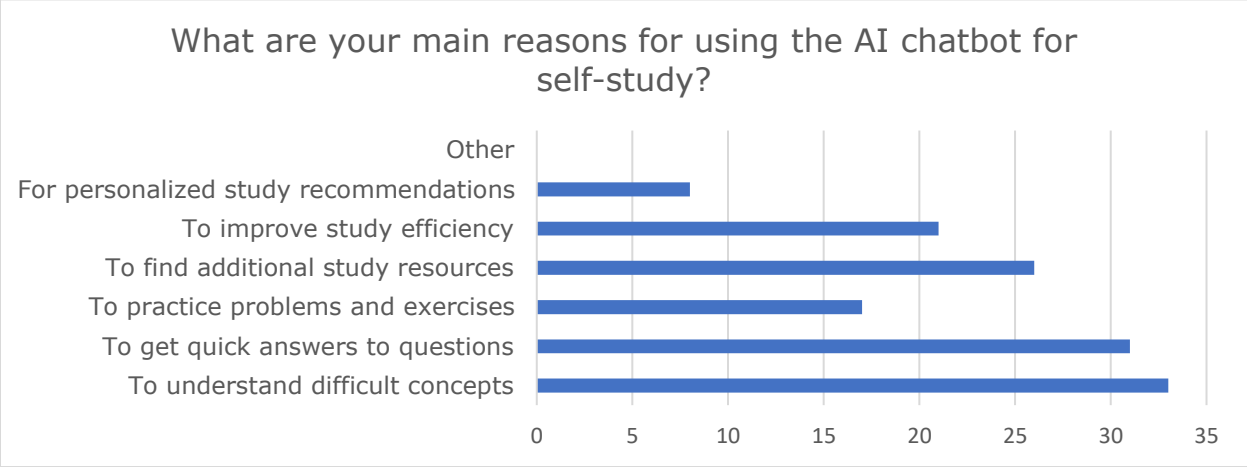
The largest group of students (53%) expressed that they use both Ai chatbot and other study resources equally. This indicated that Ai chatbot is as useful as traditional resources like textbooks and online articles for a large portion of students. But a noticeable portion of students (30%) said that they often use the chatbots more than traditional resources which clearly showed that many students finds the Ai chatbot more useful or convenient to use

compared to others study resources. Then, a noticeable portion of students, 11% of them stated that they always use Ai chatbots which indicate that they heavily rely on the chatbot for their studying processes.

However, a relatively small portion of students, 6% of them expressed that they mostly always use other resources more than Ai chatbot and no participants chose the "Always use other resources" which mean there is no one who always use other resources without using Ai chatbots. These results emphasize the big influence of Ai chatbots on most of the students while very relatively few preferring traditional resources exclusively.

Question 4: What are your main reasons for using the AI chatbot for self-study?

	Participant	Mean	Frequency
To understand difficult concepts	33	0.24264706	24.26470588
To get quick answers to questions	31	0.22794118	22.79411765
To practice problems and exercises	17	0.125	12.5
To find additional study resources	26	0.19117647	19.11764706
To improve study efficiency	21	0.15441176	15.44117647
For personalized study recommendations	8	0.05882353	5.882352941
Other	0	0	0



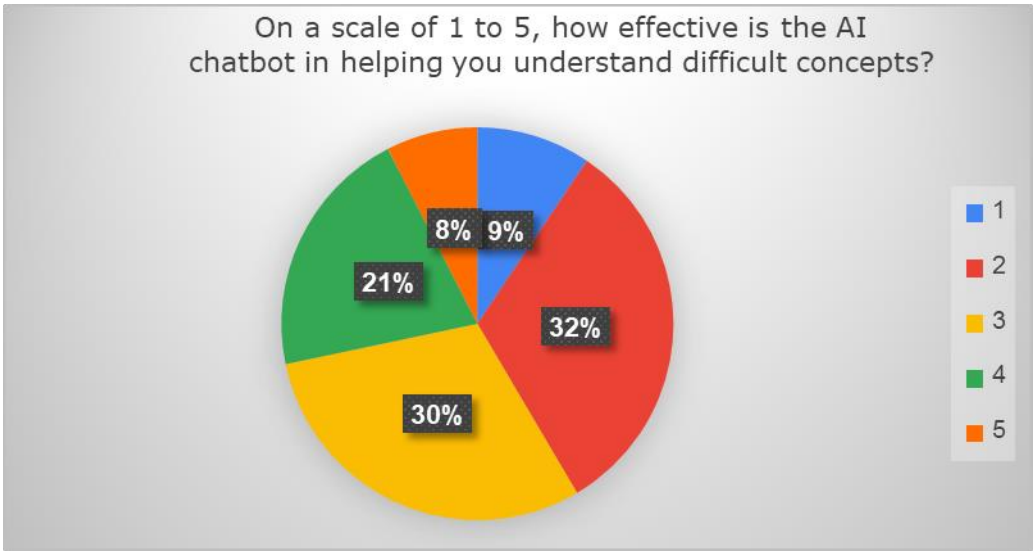
Around 33 students reported that they use Ai chatbot for understanding difficult concepts which indicated that they primarily appreciate the chatbot for being able to clarify complex topics and make their studying/learning easier. A large portion of student around 31 participants use the Ai chatbot to get immediate answers to their questions. This showed that students highly value Ai chatbot for its responsiveness and being able to give instant information that is important during study sessions.

Another 21 students chose "Improving study efficiency" and another 26 students chose "Finding additional study resources" which shows that GUSTO students see the chatbot as an assistance tool which can help them study smarter, not harder by reducing time waste and giving them access to wide range of materials and resources in relatively short time.

A noticeable portion of 17 students expressed that they use chatbot to practice problems and exercise which pointing out some students rely on it for their interactive learning and self-assessment during self-study sessions. A relatively small number of students, 8 students use the chatbot for personalized study recommendations. This small portion indicated that this feature is helpful but it might not be as useful as other features of chatbot for GUSTO students.

Question 5: On a scale of 1 to 5, how effective is the AI chatbot in helping you understand difficult concepts?

	Participants	Mean	Frequency
1 (Extremely effective)	5	0.094339623	9.433962264
2 (Very effective)	17	0.320754717	32.0754717
3 (Moderately effective)	16	0.301886792	30.18867925
4 (Slightly effective)	11	0.20754717	20.75471698
5 (Not at all effective)	4	0.075471698	7.547169811



In this result, the largest portion of students (32%) choose "Very effective" which indicated that most of the students find the Ai chatbot very effective in helping them understanding difficult concepts. This presence showed that Ai chatbots are very good in simplifying complex concepts with easy-to-understand explanations. For this portion of students, chatbot plays a main role in breaking down complex material.

Another 30% of students found the Ai chatbot moderately effective which mean that chatbot can provide some explanations but it might not solve all their challenges in understanding complex topics. This showed that the chatbot gives useful insights while they may still be gaps in the depth or quality of explanation for some users.

About 21% of students stated that the chatbot is slightly effective for them. For this group, they may likely feel that the chatbot offers some assistance with difficult concepts but it is not enough for them to deal with more complex materials.

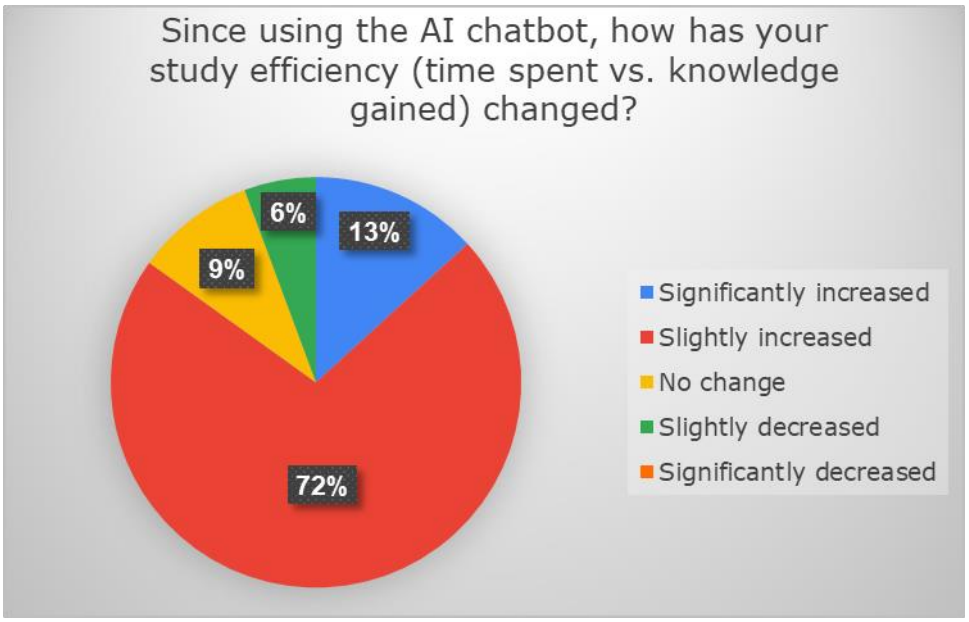
Only 9% of students chose "Extremely effective" which indicated that the chatbot is highly useful in assisting them understand difficult concepts but

this relatively low percentage pointed to the need of improvement in the ability of chatbot to fully address the complex topics for most users.

A very relatively small portion of student, 8% of them complained that chatbots are not at all effective for them in explaining difficult concepts. These students might have had negative experiences with the usage of chatbot and they might find its explanations are not sufficient or lack to clarify the complex concepts which need human instructions.

Question 6: Since using the AI chatbot, how has your study efficiency (time spent vs. knowledge gained) changed?

	Participants	Mean	Frequency
Significantly increased	7	0.13207547	13.20754717
Slightly increased	38	0.71698113	71.69811321
No change	5	0.09433962	9.433962264
Slightly decreased	3	0.05660377	5.660377358
Significantly decreased	0	0	0



In this quantitative result, a majority of students, 72% of them chose "Slightly increased efficiency" which indicated that the chatbot is helping most of the GUSTO students to manage their study time by allowing them to achieve

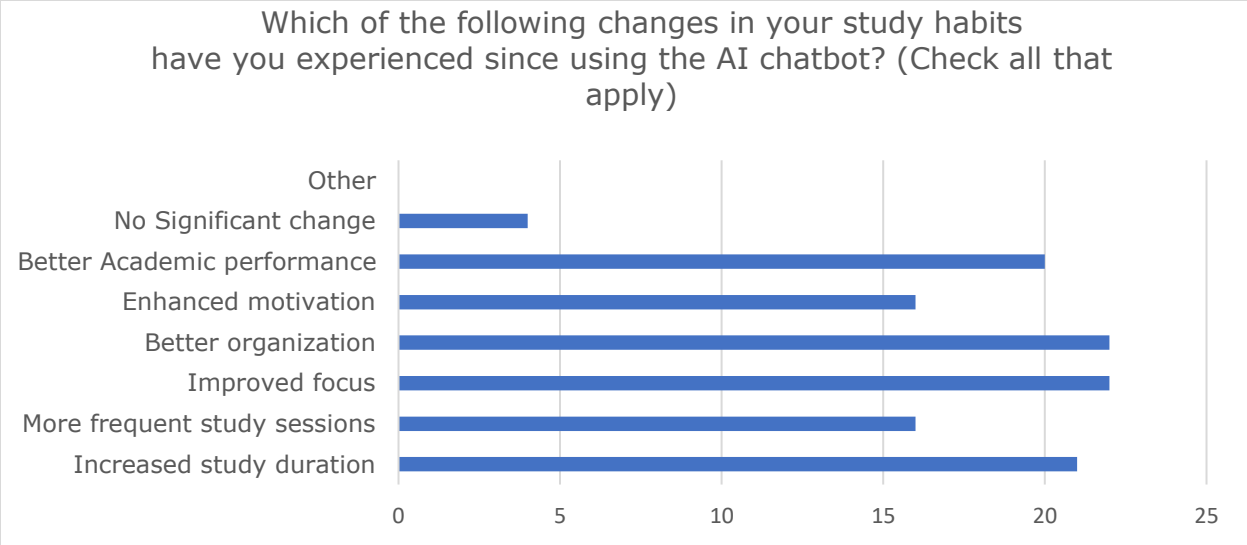
more knowledge without necessarily increasing the time spent studying. There are 13% of students who feel they significantly increase their study efficiency using Ai chatbot. This indicated that some students might see a substantial improvement in how they optimize their study time and the amount of knowledge they received during their study sessions.

However, there was no change in their study efficiency for 9% of them which suggest that the chatbot hasn't highly impact their study processes (may be due to different learning style) for these students. There are 6% of them who expressed that their study efficiency has slightly decreased since they use the Ai chatbot. This may point that the chatbot may be a distraction or give less useful information than other study techniques for these students. Because of this, this might reduce the efficiency of their study processes.

But there is no student who expressed "Significantly decreased efficiency" which indicated that the chatbot doesn't have that much dramatically negative impacts on every student' study habits and efficiency.

Question 7: Which of the following changes in your study habits have you experienced since using the AI chatbot? (Check all that apply)

	Participant	Mean	Frequency
Increased study duration	21	0.17355372	17.3553719
More frequent study sessions	16	0.1322314	13.2231405
Improved focus	22	0.18181818	18.18181818
Better organization	22	0.18181818	18.18181818
Enhanced motivation	16	0.1322314	13.2231405
Better Academic performance	20	0.16528926	16.52892562
No Significant change	4	0.03305785	3.305785124
Other	0	0	0



In this quantitative checkbox question, which ask their study habit changes after using Ai chatbot, the largest portion of students (22 students) reported they can improve their focus on the self-study and another 22 students mentioned that they have better organization. This pointed out that the Ai chatbot helps GUSTO students to stay concentrated on their tasks and manage their study time and material more effectively.

Many students, 21 students also said that their study duration is increased after using AI chatbot which indicated that the chatbot can encourage longer study session by making the study session more engaging and accessible so that students motivated to spend more time studying. Another 20 students expressed that their academic performance is significantly increased after using Ai chatbots. This indicated that Ai chatbot is useful for students to enhance their academic outcomes because of its ability to give quick answers, provide clear explanation of complex concepts and help with study organization. Another 16 students reported they frequently do study session more than before and another 16 students said that their motivation to keep study is generally enhanced after using AI chatbots. These results indicated that the Ai chatbot not only help GUSTO

student to study more regularly but also foster their willingness to perform academic activities.

Interestingly, there are 4 students who reported that they have seen no significant changes in their study habits. This might suggest that the ai chatbot has not had a noticeable impact for some students which might be because of different learning styles or study preferences may not align with the ai chatbot's features.

Question 8: Can you share a specific example of how the AI chatbot has helped you with your self-study?

	Participants
Code debugging/ programming assistance	7
Concept Explanation and Simplification	11
Study Resource Recommendation	4
Assignments and Task Assistance	6
General Study Efficiency	15
Miscellaneous answer	10

In the qualitative question which ask GUSTO students to share specific example of how AI chatbot has helped them with their self-study, most of the students (15 students) answered that AI chatbot helped them in general study efficiency by helping them streamline their study practices. This suggested that the Ai chatbot is an effective tool for GUSTO students to manage time and improve overall productivity. Another 11 students answered that it helps them with concept explanation and simplification. This implies that the ai chatbot is useful for GUSTO students to explain them complex material more effectively and easily which positively impact on their learning experience.

About 7 students reported that Ai chatbot once help them with technical troubleshooting and coding issues. This reflected that the GUSTO students get assist in addressing specific programming challenges and the ai chatbot enhance their learning experience especially for who study coding-heavy courses. Another 6 students claimed that ai chatbot help them to manage and complete their academic tasks and assignments. This indicated that the Ai chatbot can help GUSTO students improve their task management and ensure they stay on track with their assignments which contribute to the overall academic success. A relatively small portion of students, 4 students reported that AI chatbot help them in fining study resource recommendation.

About 10 students answered miscellaneous answers and this suggested that they may lack the usage on such Ai chatbots for their studies or they may feel unsafe to express their opinions there.

Question 9: How has the AI chatbot influenced your motivation and engagement with your studies?

	Participants
Immediate Support and Quick solutions	11
Personalized learning and interactive engagement	7
Convenience	5
Efficiency	5
Time management	3
Skill development	3
Positive Reinforcement and Encouragement	3
Minimal (or) No impact	6
Maximal (or) very influence	4
Neutral and General feedback	4
Miscellaneous answer	2

In this qualitative result, we can see that the most answered topic is immediate support and quick solutions in which 11 students expressed their opinions that they think Ai chatbot enhance their motivation to study by giving immediate support and answers to their personalized questions and reduce frustration and delays in their study processes. Another large number of students, 7 students reported that they value the Ai chatbot for giving a more personalized and engaging learning style. They revealed that personalized interactions boost their motivation and keep them more interested in their learning.

Another 5 students mentioned convenience to use the AI chatbot and they revealed that they can easily access resources and receive efficient support so they are more likely to stay engaged to study. Another 5 students focused on the efficiency of using Ai chatbot and they reported that they can streamline their study processes and save time because of the ability of chatbot. This maintain their motivation to keep study.

3 students mentioned time management, another 3 students mentioned skill development, and last 3 students mentioned positive reinforcement. These all responses pointed out that the Ai chatbot support these students by helping them manage their study time efficiently, develop additional skills related to their self-study processes and they feel positively reinforced. Even though, there is a small participant, these factors contribute to improving both motivation and engagement in their self-studies.

There are small numbers of students, 4 students found the chatbot is very useful and have a substantial positive impact on their self-study habits and practices. However, there are 6 students who stated that they don’t feel Ai chatbot has significantly influenced on their motivation and engagement to study. This indicated that chatbot can benefit many students but it is not widely impactful for some students. Another 4 students stated that they feel

neutral about its impact and this may found that ai chatbot cannot give a profound motivational effect on every student. Lastly, there are 2 participants who answered miscellaneous answers which cannot be analyzed.

Question 10: How does your self-study experience using the AI chatbot compare to traditional study methods (e.g., textbooks, class notes, online articles)?

	Participants
Preference for AI Chatbot	9
Time efficiency	6
Dynamic/Interactive/ Personalized learning experience	6
Summarization and Simplified Explanations	2
Preference for Traditional Methods	3
Immediate VS Delayed feedback	3
In the middle of AI chatbot and traditional methods	9
Miscellaneous and unspecific answer	15

In this qualitative result, there are about 9 students' answers are indicating they prefer the chatbot more than traditional resources for their self-study processes. This implies that AI chatbot is more useful for these students over traditional methods because of their convenience, interactivity, and personalized support. Another 9 students answered that their preference is in the middle of Ai chatbot and traditional methods. This indicated that many students think both Ai chatbot and traditional study methods are useful for their self-study because they might see the strengths of both methods.

Certain number of students, 6 students reported that they think the ai chatbot can boost time efficiency and they see the chatbot as a tool that help

them manage their study time better. Another 6 students expressed that they appreciate the adaptive and responsive ability of the Ai chatbot. Their answers pointed out the strengths of chatbot which can tailor study experience compared to static traditional techniques like textbooks or notes.

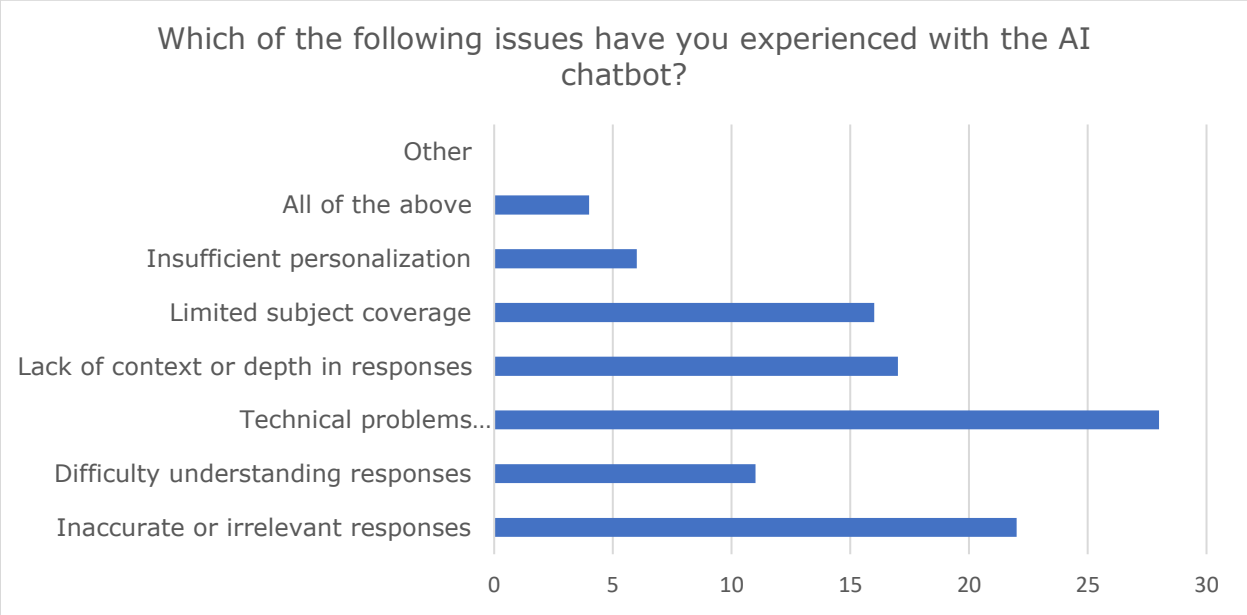
However, there are 3 students who answered that they prefer traditional study methods and this indicated that some students still like conventional study style over the Ai chatbot. This can be because of the reliability and depth of information given by the textbooks and class notes. About 3 students focused on the differences in response time between Ai chatbot and traditional methods. Students who answered this are likely appreciate the quick feedback and response provided by Ai chatbot that help them in quick clarification and support while traditional methods is seen as more delay compared to the Ai chatbot because of their delays in giving feedback like waiting for a teacher's input or consulting textbooks.

A relatively small number of students, 2 students stated that they rely on Ai chatbot for breaking down large and complex topics. This showed that Ai chatbot are brilliant in giving clear and concise explanations which can help students understand every topic easily in their self-study processes.

Even though most of the students give insightful answers, a large number of students, 15 students give miscellaneous and unspecific answers which cannot be further analyzed. This might suggest they have diverse or no experiences with the case Ai chatbot versus traditional techniques.

Question 11: Which of the following issues have you experienced with the AI chatbot?

	Participants	Mean	Frequency
Inaccurate or irrelevant responses	22	0.211538462	21.15384615
Difficulty understanding responses	11	0.105769231	10.57692308
Technical problems (e.g., crashes, slow performance)	28	0.269230769	26.92307692
Lack of context or depth in responses	17	0.163461538	16.34615385
Limited subject coverage	16	0.153846154	15.38461538
Insufficient personalization	6	0.057692308	5.769230769
All of the above	4	0.038461538	3.846153846
Other	0	0	0



In this checkbox result, the largest portion of students, 28 students chose technical problems such as crashes or slow performance. This pointed that these large numbers of students have experienced system issues which block or disrupt their usage of the Ai chatbot and ruin their self-study processes.

The second most chosen issue was inaccurate and irrelevant responses which 22 students might experience. This highlighted the facts that such Ai chatbots are typically helpful but providing inaccurate and contextually irrelevant information become a problem for many students.

About 17 students chose the lack of context or depth in the responses of the chatbot. This concern indicates that the chatbot's capacity to provide complete, in-depth responses is limited, which can be especially troubling for students who are studying difficult subjects or require in-depth clarifications.

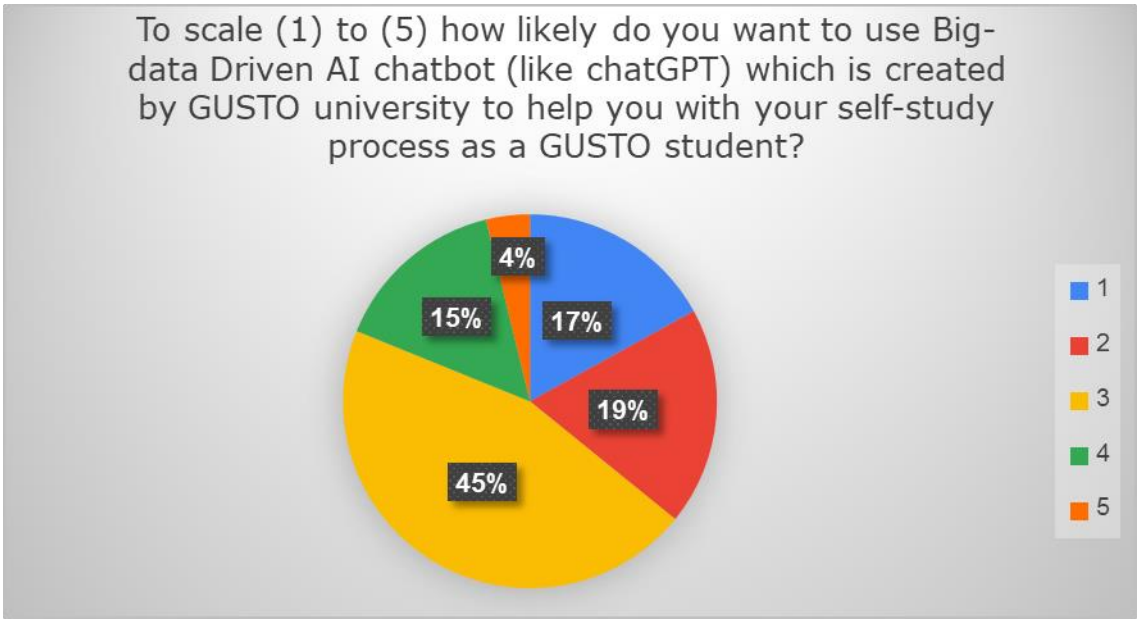
16 students highlighted the chatbot’s limited subject coverage. This implies that it may not serve all academic fields equally and the AI chatbot's knowledge base may need to be expanded to include a broader range of subjects in order to meet the various needs of students.

11 students said they had trouble understanding the chatbot's responses. This suggests that it could not always be easy for students to understand the language or intricacy of the responses, which could make it more difficult for them to gain valuable insight from the interaction. Insufficient personalization was the least frequently stated complaint, with only 6 students mentioning it as a concern. This implies that although most students value personalization, they do not find lack of it to be a big disadvantage.

4 students said they had encountered every problem listed above, suggesting that a small percentage of users might have had more persistently negative experiences with the chatbot's operation in general, from technical problems to the quality of responses.

Question 12: To scale (1) to (5) how likely do you want to use Big-data Driven AI chatbot (like ChatGPT) which is created by GUSTO university to help you with your self-study process as a GUSTO student?

	Participants	Mean	Frequency
1 (Very Likely)	9	0.1698113	16.981132
2 (Likely)	10	0.1886792	18.867925
3 (Neutral)	24	0.4528302	45.283019
4 (Unlikely)	8	0.1509434	15.09434
5 (Very Unlikely)	2	0.0377358	3.7735849



In this ranking scale result, the largest portion of student, 45% of them stand on the neutral towards using the Big Data-driven Ai chatbot developed by GUSTO university. This result indicated that students are not either fully against the idea or highly enthusiastic about using this chatbot. This neutral answer might because of a level of uncertainty or the need of more information/experience with the Ai chatbots before expressing a strong option.

There is combined total of 36% in which 19% of Likely and 17% of Very Likely which expressed they are either likely or very likely to use this Ai

chatbot. This showed that these significant number of students understand value in using such chatbot to improve their self-study practices.

Around 19% of students in which 15% of Unlikely and 4% of Very unlikely to use this Ai chatbot which indicated a noticeable portion of students are not ready to adopt this technology into their study landscape. This resistance could result from a desire for standard self-study techniques or worries about the chatbot's performance (e.g., problems like technical problems or incorrect answers as described in other questions).

Question 13: Which specific features that you want to be included in the GUSTO's big-data driven AI chatbot for enhancing Self-study?

	Participants
Personalized Learning Paths & study plans	4
Progress Tracking & Analytics	3
Real-time feedback & Quizzes	5
File uploads, Voice, Image Support	3
Resource & Career Recommendations	4
Adaptive learning & AI Assistance	5
Burmese Language Support	1
Plagiarism checker & Paraphrasing tools	2
Offline access	1
Mixture answer (more than one features)	4
Security features	1
Against comment	5
Miscellaneous and unspecific answer	12
ChatGPT inspiration	3

About 5 students requested real-time feedback and quizzes which indicated that students prefer real-time interactions which help them access

their learning progress instantly and quizzes which can support their self-study by offering regular assessments. Another 5 students expressed that they prefer to add adaptive learning and AI assistance into the Ai chatbot which reflect their desire adjustable for individual learning needs which can provide them with tailored content and guidelines.

About 4 students answered that they want Ai chatbot which can provide personalized learning paths and study plans. This indicated the demand for individualized instruction that adapts to each student's learning style and development. This shows a strong interest in features that help students plan and manage their studies more effectively. Another 4 students expressed that they need resource and career recommendations features in Ai chatbot which showed that some students want ai chatbot to further assist them by giving related academic resources and guideline on their career paths. This showed that student want the ai chatbot goes beyond the studying assistance and they desire holistic support for their career development. Another 4 students answered mixture answer which indicated their desire of a well-rounded chatbot that integrated a combination of certain features like adaptive learning, real-time feedback, and personalized paths to improve their self-study experience.

A few students, 3 students of them answered they prefer the feature allow tracking their progress and getting analytics on their performance overgrowth. They want the chatbot to help them monitor their study patterns and improvements so that they can reflect to themselves and can improve their self-study performance. Some students (3 students) reported that they want Ai chatbot to be able to support uploading different types of media inputs (files, voice, images) which indicated that these students desire a more interactive and versatile study experience where they can use various data formats for further analysis and clarification. Another 3 students suggested to inspire existing popular AI models like ChatGPT that indicate they find

ChatGPT useful for their self-study processes and they might want common conversational capabilities integrated into GUSTO's chatbot.

A couple of students stated that Ai chatbot should include plagiarism checker and paraphrasing tools which indicated that these students might ensure their academic integrity and maintain their work's quality and originality.

1 student answered that he/she want to include Burmese language support into the GUSTO's Ai chatbot. This showed that chatbot providing materials and assistance in native language is more accessible and effective for a wide student base, especially those who are more prefer studying in their native language. Another 1 student requested to be able to use this Ai chatbot without internet access to improve its usability in places where internet connectivity is unstable or has no internet. Another 1 student mentioned security feature should be stricter than before if Ai chatbot use Big Data.

Amazingly, there are totally 5 students answered negative comments that against the idea and certain features. This might suggest concerns on some facts like privacy or over rely on Ai. The largest numbers of student (12 students) gave unspecific and varied answers which cannot analyzed. This indicated their uncertainty or lack of knowledge or expectations regarding the specific features should be included in the chatbot.

Question 14: Do you think that using Big Data in the GUSTO's AI chatbot can be more effective for functioning?

	Participants
Positive answer on the fact that Big data improving AI chatbot personalization and efficiency	12
Brief affirmative responses	23
Concerns about Big Data usage (Privacy and Security)	2
AI related with Big Data	3
Uncertainty answer	5
Against answer	5
Miscellaneous answer	3

In this qualitative result, 23 students' answers are brief affirmative response that they agree with the idea of using Big Data in the Ai chatbot but they haven't provided detailed reason of why they agree. This showed the general positive sense to the concept but without a strong sense of understanding of the details. However, there are 12 students whose answers are positive detailed responses which directly agree the concept that Big Data can improve the chatbot's personalization and efficiency. This indicated that these students have certain level of knowledge on the improvements in the functionalities of chatbots when Big Data is integrated.

About 2 students expressed their privacy and security concerns on using Big Data in GUSTO settings which points out the minority of students have some knowledge on the ethical and security considerations regarding the usage of Big Data and they are worried about the privacy and security consequences related to using Big Data (vast amount of GUSTO university's data and students' data) in the Ai chatbot.

Among the students, 3 students answered about Ai-related with Big Data which is possibly reflect technical or integration issues between AI and Big Data. But these topics are not main concerns for most students because of their fewer participants.

While most of the students answer different aspects of Big Data and AI chatbot, 5 students give uncertainty answers and another 5 students against the idea. This indicated the confusion or a lack of knowledge about how Big Data would enhance the performance of Ai chatbot. This reflected that not all students are seen of its actual values. Another 3 students give miscellaneous answers which cannot be analyzed and did not fit into the questions. This may be because they don't exactly know about this topic.

Discussion

This research is intended to investigate the effectiveness of using Big Data-driven AI chatbots in enhancing self-study practices among GUSTO students. The findings of this study meet the stated objectives and provide valuable insights into how Big Data-driven Ai chatbots influence on academic behaviors, what benefits they give, and what challenges they raise. The following discussion analyze these findings to connect them to the research objectives, analyze whether the research support or deny the stated hypothesis and considers the wide implication for the academic settings at GUSTO and AI technology in education.

First objective

The first objective was to explore the effectiveness of Big Data in Ai chatbots for enhancing self-study practices. According to the analyzed result of Question 14, the large numbers of students strongly agreed on the fact that integrating Big Data can enhance personalization and efficiency in the Ai chatbot. Even students who were not exactly know the specific benefits still

showed a positive attitude toward the idea. This insight directly supporting the first objective. Most of the answers indicated that Big Data can improve the ability of chatbot to meet diverse learning needs by giving personalized content. According to the analyzed result of Question 13, students have great interest in adaptive learning, personalized study plans, and performance analytics. This further shape the role of chatbot in enhancing self-study practices. Furthermore, in the Question 5, 32% of students rated the Chatbot as "Very effective" in explaining complex concepts while other 30% of them found it "Moderately effective". These results suggested that chatbots significantly enhance students' understanding. These analyzed results of Question 6 further prove this point, with 72% of students expressing increased study efficiency which suggesting the chatbot help them in knowledge gaining without long study hours.

Second Objective

The second objective is to study the impact of the Ai chatbot on self-study experiences of students. As explored in the Analysis 8, the chatbot positively influenced on the study habits for many students, mainly through some features like quick response, clear explanations of difficult concepts. According to the evidence in Analysis 7, many students reported improvements in their focus, organization and motivation and they appreciated how the chatbot smooth their study processes. From the analysis of Question 1 to Question 10, it consistently showed that GUSTO students use the Ai chatbot to get explanation on complex concepts, manage study tasks and improve their academic performance. In the result of Analysis 4, students reveal that they often use the chatbot to grasp difficult topics and accessing quick answers to their questions. In additional, in the analysis 8, it found that some students have begun to use Ai chatbots in more practical aspects of their self-study and academic routines such as technical troubleshooting or managing assignments. This strongly indicated that the Ai chatbot not only

play a role as a study tool but also play a role as a versatile assistant in other learning areas. All these insights and findings highlight that GUSTO students see the Ai chatbot as a more highly effective tool in providing support they need to self-study beyond traditional resources. For large group of GUSTO students, the Ai chatbot seems to give a more interactive and engaging self-study environment that directly boost their learning outcomes. To conclude, based on these findings, the researcher assumed that this study aligns with the second objective of exploring Ai chatbot's impact on GUSOT students' self-study practices.

Third Objective

The last objective of this research is to identify the potential challenges related with the usage of Big Data-driven Ai chatbot. Despite the exploring positive impacts, the study could also figure out various challenges regarding the use of Big Data-driven Ai chatbots. This was addressed in the analyzed result of Question 11. Most of the students, 28 and 22 students respectively, reported the issues of technical problems and inaccuracies in responses which they have experienced while using existing ai chatbot. Also, in the Analysis 14, some students raise their concerns on the issue of privacy and data security. Even though only a minority of 2 students distinctly mentioned this, GUSTO university should consider to address these concerns, especially when they handling Big Data of university and students. Moreover, in the analyzed result of Question 11, some students pointed out the limitation of ai chatbot in giving in-depth and contextualized responses. This clearly showed off that its functionality might not be enough for certain academic topics and advanced study needs. All of these point out in the study meets the last objective of this research of exploring potential challenges of using Big Data-driven Ai chatbot for self-study.

Supporting the Hypothesis

Overall, the research findings are supporting the research hypothesis. Gusto students' statement of the chatbot's capability to improve their study efficiency, improve focus and better organization, and provide them tailored learning experiences are the evidence of the facts that the Big Data-driven Ai chatbot has a positive influence on student study practices and academic performance. The findings from the answers of Students also reveal that they rely on Ai chatbot as a useful self-study tool, further support this hypothesis. Even though they point out the potential challenges of using Ai chatbot, these challenges do not outweigh the overall positive impact of the chatbot on GUSTO students' learning outcomes.

Implications of Big Data-driven Ai chatbot for GUSTO University

These findings and valuable insights lead to the belief that GUSTO university could highly benefit from integrating a Big Data-driven Ai chatbot system into its academic infrastructure. As the results of survey analysis 13, GUSTO students have particular features, which they want to integrate into the GUSTO-developed Big Data-driven Ai chatbot, for future chatbot developments such as real-time feedback, personalized study plans, and adaptive learning capabilities which can improve the usability of Ai chatbot.

Furthermore, results from the analysis 12 demonstrates that although a large number of GUSTO students are very likely and likely to use GUSTO-developed Big Data-driven Ai chatbot while some are unlikely to use. Plus, Analysis 14 points out that although a large number of students are in favor of using big data in the AI chatbot, more has to be done to raise awareness and comprehension of the ways in which big data may improve the efficiency and personalization of the chatbot. This gives GUSTO the chance to improve the technology infrastructure while simultaneously teaching students about the benefits and effective use of these technologies.

Theoretical and Practical Contributions

On a theoretical level, this study contributes to the growing body of research on the use of Ai and Big Data in education by investigating how Big Data-driven Ai chatbots can improve self-study practices. The findings are correspond with personalized learning theories which support innovation that adjusts to each and every students' unique requirements in order to enhance their academic performance and engagement. More than that, it turns out that Ai chatbots can play a essential role in the improvement of personalized education models.

On a practical level, this study reinforces the argument that Ai chatbot can be used to enrich traditional learning materials through offering a adaptive and interactive solutions. This study also highlights the need for improving chatbot functionality, increasing their performance, and robust privacy safeguards to guarantee their widespread adoption.

Limitations and Future Directions

Even though the findings of this study provide valuable insights, it also has limitation. The first thing is that the sample size of this research is not fully represent the entire GUSTO student body and there can be some students who are less familiar with Ai and Big Data technologies were underrepresented. Also, this study only highlights on the investigation of effectiveness of Big Data-driven ai chatbot on the GUSTO students' self-study practices without investigating on the implementation aspects. Plus, the technical limitations and security concerns raised by some participants (GUSTO students) points that the current existing chatbot might not be as reliable or secure as needed for wide use in the academic settings. This study lack of the detail researching on those concerns.

Future research should focus on detail implementation of Ai chatbots and refining their technical capabilities and addressing privacy concerns.

Moreover, longitudinal studies should be conducted to trace how these Ai chatbots influence on Higher educational students' long-term academic performance and whether these chatbots can be integrated into formal educational assessments like traditional study resources.

Conclusion

In conclusion, this research supports the stated hypothesis that Big Data-driven AI chatbots can positively influence GUSTO students' self-study habits together with the evidence. However, the actual implementation of such systems depends on the ability of GUSTO university to address technical challenges, streamline functionality, and grantee privacy and security of its stakeholders. This study also points out the importance of personalized and adaptive learning functionality which can significantly improve the role of the Ai chatbot as a useful educational assistant tool in GUSTO's academic infrastructure. This primary research paper is tightly composed with introduction, aim, objective, hypothesis, final methodology, literature review, participants, procedures, thoroughly result analysis, discussion on those findings and Harvard reference links.

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Appendices

Survey Google form:

https://forms.gle/gKfeF8zQGp4kTU1NA

Research Poster:

https://docs.google.com/presentation/d/1QrD0HJpjgHbfQOGfYjD5UUJVRlwULs_z/edit?usp=drive_link&ouid=111982511978182456421&rtpof=true&sd=true

Data analysis Table:

https://docs.google.com/spreadsheets/d/1HeCRTOMdetrwSfxP6nRyHCkD4-kMLzXt/edit?usp=drive_link&ouid=111982511978182456421&rtpof=true&sd=true

Reflection report:

https://drive.google.com/file/d/1rD-yYpPHmO0xDfjiaHQyU5pT9_Kwv4sD/view?usp=drive_link