# Evaluating the integration of generative AI chatbots in Higher Education:

## A pilot study on student perceptions and experiences in UoLW's online UG and PG Laws programmes

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If you did use the AI study buddy, please provide information why you did not.

Evaluating Pedagogical and Ethical Views on AI Tutoring Engagement

## Abstract

This pilot study explored students' perceptions and experiences with a generative AI chatbot in the University of London Worldwide's (UoLW) online international UG and PG Laws degree programmes. The goals of this study were to gauge the extent to which ODL students perceived and used the generative AI chatbot as a complementary tool in their studies, examining their preconceived notions and post-interaction experiences. The research methodology gave precedence to quantitative over qualitative questions, conducted both pre and post the intervention. The sample size varied depending on the question, peaking at 51 and 38 students for the pre-intervention survey and post-intervention survey, respectively.

The study identified significant methodological limitations, such as discontinuity in survey questions before and after the AI intervention and the absence of demographic data on participants. These shortcomings impeded the ability to conclusively establish correlations and assess shifts in student attitudes towards AI technology. To address these issues, the final report was structured into two sections: one examining expectations (pre-intervention survey) and the other focusing on experiences (post-intervention survey). Despite these challenges, a comparative analysis between students' expectations and their actual experiences with AI was nonetheless conducted. This analysis sheds light on the complex dynamics of AI as an educational tool, offering insights into the students' perspectives despite the noted data limitations.

Accordingly, results were analysed in two distinct phases, using the SPSS analysis tool, Excel, content thematic analysis, and validated through Pearson Correlation Analysis. The descriptive results can be categorised into three main areas: 1) Approximately 85% of students clearly had pre-survey and post-survey positive attitude and found the AI chatbot helpful, 2) Around 10% of students had a preconceived negative stance towards AI chatbot use, and this percentage remained the same with the post-survey results, and 3) Feedback from the qualitative analysis of the open ended questions suggested that the AI chatbot's performance in responding to questions fell short of students' expectations. The recommendations furnish a complete concept for holistic integration at UoLW, positioning the University of London at a competitive vantage point scarcely attainable by other institutions.

## Background and introduction

Since its establishment in 1858, the University of London Worldwide (UoLW) has been a pioneer in the realm of higher education, notably recognised for its innovative contributions to distance learning. UoLW's historical significance is highlighted by its wide-reaching impact, having provided educational opportunities to over 40,000 students across 190 countries in 2020, facilitated by a supportive network of over 100 Recognised Teaching Centres in 42 countries. This extensive influence is a testament to UoLW's unwavering commitment to excellence and innovation in open and distance learning (ODL) programmes. Furthermore, UoLW has played a vital role in making higher education accessible to historically marginalised groups, including women and individuals from former British colonies, thereby significantly advancing social equity and educational accessibility on a global scale.

The introduction of Artificial Intelligence (AI) into the educational sector offers an unparalleled opportunity to further enhance the learning experience, particularly through the prism of personalised learning. In addressing Bloom's (1984) "Two Sigma Problem," which demonstrated thus advocates for the superior outcomes of one-to-one tutoring over traditional classroom instruction, UoLW acknowledges the challenge of economically scaling personalised learning. Nevertheless, AI provides promising avenues to overcome these obstacles by enabling scalable, personalised educational experiences.

AI technologies, particularly chatbots enhanced with advanced natural language processing, offer an innovative solution to bridge the educational gap. These AI-driven tools are capable of simulating the dynamics of personal tutoring by providing tailored feedback and responding to student inquiries in real-time, thereby enriching the learning experience with a degree of personalisation previously unachievable on a large scale.

However, the integration of AI into educational frameworks is not without challenges. Ethical considerations, including concerns related to data privacy, information accuracy,

bias, and transparency, present significant hurdles. Moreover, the adoption of AI in education intersects with complex socio-economic, political, and legal dimensions, necessitating a careful, human-centric approach to ensure that AI serves as a complement to, rather than a replacement for, human educational efforts.

The advancement of AI chatbots marks a significant milestone in the educational technology landscape. Initially emerging as basic rule-based systems in the 1960s, these digital assistants have evolved into intricate platforms, leveraging machine learning, conversational AI, and generative AI. Such progress spotlights the substantial impact AI could have on education by reshaping data analysis, creating content, and most crucially, personalizing learning experiences.

The University of London Worldwide (UoLW), seizing these technological strides, has partnered with Noodle Factory to introduce an AI-enhanced pilot programme within its Law courses. This initiative is threefold: it aims to embed an AI 'study buddy Walter' to accompany both undergraduate and postgraduate students, quantitatively measure the effectiveness of this integration, and conduct a qualitative analysis to capture detailed user feedback.

The study centres on an in-depth qualitative evaluation of "Walter," an AI Tutor by Noodle Factory, incorporated into the Law curriculum at the University of London Worldwide (UoLW). It examines Walter's effect on student engagement and achievement, its competency in addressing frequent questions, and its provision of tailored feedback. Additionally, the study investigates Walter's versatility in meeting the varied educational requirements across the spectrum of Law programmes at UoLW, from undergraduate to postgraduate levels. This initiative is a testament to UoLW’s dedication to advancing educational engagement and attainment by innovatively integrating AI into its teaching methodologies.

## Academic background

In line with Bloom's (1984) "Two Sigma Problem," a systematically researched phenomenon highlighting the significant advantages of one-to-one tutoring over

traditional classroom instruction, AI chatbots, utilising advancements in natural language processing, are poised to bridge this educational divide to an extent. These technologies provide scalable, personalised support which and are vastly adopted to reputable educational institutions worldwide (Labadze, Grigolia, and Machaidze, 2023).

These chatbots are capable of conducting conversations, addressing student queries, and delivering customised feedback, paralleling the role of a personal tutor (Koivisto, 2023).

## Ethical Issues

Yet, the broader socio-economic, political, and legal landscape presents greater challenges, raising fundamental questions about regulation, stakeholder roles, social impact, and ethical considerations through a human-centric lens (Labadze et al., 2023; Dai et al., 2020; Hwang & Tu, 2021). These aspects underscore the pivotal role of individuals as users of AI technology, rather than as substitutes, in the heart of technological innovations. The need to establish clear rules and guidelines for the ethical use of AI chatbots in education is crucial. This is especially important for protecting data privacy, ensuring the accuracy of information, reducing bias, and maintaining transparency. When AI chatbots are used in education, it raises several ethical concerns, particularly regarding the safety and privacy of data, as well as the responsible use of AI technology. To address these issues, it's essential to have policies, and protective measures in place (Kung et al., 2023; Masters, 2023; Miao & Ahn, 2023; Sedaghat, 2023).

## Historical background to AI

The development of AI chatbots has progressed significantly since the early 1960s, starting with rule-based systems, advancing through increased complexity and machine learning from the 1990s to the 2000s, integrating natural language processing from the 2000s to the 2010s, and evolving to include machine learning, conversational AI, and omnichannel deployment up to the present day with generative AI technologies (Chung et al., 2023; Tsivitanidou and Ioannou, 2020). AI's main strengths include the capacity

to interpret data and natural language, generate natural language, and create visual content, making it a scalable tool to support human labour in repetitive tasks and those requiring analysis and interpretation. Consequently, AI has been utilised for data processing, predictive analysis, pattern recognition, estimations, planning, conversations, and content creation (Tsivitanidou and Ioannou, 2020). Given these capabilities, AI has been increasingly applied in educational settings, addressing the vast scale of data and the need for individualised support. Researchers such as Nassoura (2022), Hui-Chun Chu et al. (2020), Zawacki-Richter (2019), and Khare and Stewart (2018) suggest that AI in higher education marks a transformative era, enabling highly personalised learning experiences for students from diverse backgrounds and languages.

### Background to the AI pilot project

The research undertaken within the University of London's online undergraduate and postgraduate degree programmes focused on the efficacy of a generative AI chatbot as an educational instrument. The objective is to delve into students' perceptions and interactions with this technology within their academic pursuits, evaluating both their initial assumptions and their reflective experiences following engagement with the chatbot. This study aims to bridge the gap between theoretical potential and practical application, shedding light on how such technological innovations can enhance the educational landscape (Kung et al., 2023; Masters, 2023; Miao & Ahn, 2023; Sedaghat, 2023).

## Literature review

The literature review explores AI technology and its application in higher education, focusing on key areas that have constituted key objectives of the AI study buddy Walter pilot. It examines tutors' and students' perspectives on automated feedback provided by 'AI tutors', their attitudes towards AI-driven tutoring technologies, the personalised learning experiences facilitated by AI compared to traditional human tutoring, and assesses their views on the broad pedagogical and ethical implications of engaging with an AI-driven tutoring project. However, before delving into these themes, the review will first provide a further body of research for contextualisation.

## Types of AI chatbots

The landscape of Artificial Intelligence (AI) chatbots encompasses a diverse array of types, each with distinct functionalities and applications, ranging from rule-based systems to generative AI models. Rule-based chatbots, which operate on predefined pathways and responses, are designed for specific, straightforward tasks, utilising keywords and simple conditional statements to interact with users (Koivisto, 2023). In contrast, AI chatbots, particularly those powered by machine learning, offer dynamic interactions by learning from user engagement over time, thus enabling them to handle more complex queries and provide personalised experiences. Among these, generative AI chatbots represent a cutting-edge subset, leveraging deep learning models like Generative Adversarial Networks (GANs) and Transformers to produce novel content and responses, simulating human-like creativity and adaptability in conversations (Goodfellow et al., 2014; Vaswani et al., 2017).

This evolution of chatbots from rule-based to generative AI models marks a significant advancement in AI's ability to engage in more nuanced and meaningful interactions. For instance, generative AI chatbots can creatively address user queries, compose personalised text, and even generate new ideas, thereby extending their utility beyond simple question-answering to include roles such as tutors, healthcare advisors, and creative assistants (Koivisto, 2023). Despite these advancements, the implementation and user acceptance of such technologies vary, highlighting the importance of understanding the specific capabilities and limitations of each chatbot type to effectively integrate them into various domains, including education, customer service, and healthcare.

## Solving the Academic Two Sigma Problem

In 1984, Bloom highlighted the Two Sigma Problem, revealing the significant advantages of one-to-one tutoring over traditional classroom settings, with tutored students outperforming their peers by two standard deviations. Bloom (1984) identified mastery learning (ML) form of formative assessment with feedback) as a crucial element underpinning the effectiveness of one-to-one tutoring. He noted that through mastery

learning, students could achieve performances up to 84% above their traditionally taught peers. This approach, incorporating personalised tutorial instruction, reinforcement, formative assessments, timely feedback, and corrective measures, as well as the use of cues and explanations, altogether creates the two-sigma phenomenon. Subsequent research studies have consistently affirmed the superiority of individual tutoring over conventional group teaching (Steenbergen-Hu and Cooper 2013; and VanLehn et al. 2010).

From all key AI educational supporting activities such as: answers to short questions, complete quizzes, locate information, interpret material and case studies, the provision of formative feedback and evaluation of assessment could be the hardest for AI to provide, yet, with the highest possible educational impact on students' performance (Tan and Lim, 2024; Yin, Goh and Hu, 23). Recent studies and meta-analysis by Deng and Yu, (2023) and Tan and Lim (2024) also suggest that AI tutor could impact positively, and students' motivation although there have been contradictory viewpoints. For instance, Koivisto (2023) holds that the human element in tutoring, particularly 'inspiring effect' remain as an AI's shortcomings.

## Adaptation of AI technology in education

The integration of Artificial Intelligence (AI) in education has been a topic of both optimism and concern among tutors and students alike. While AI offers opportunities for personalised learning and efficiency in administrative tasks, there is a growing apprehension regarding its potential to depersonalise education and replace human educators, perceived as a more expensive asset than AI chatbots (Luckin et al., 2016). These concerns extend beyond mere economic considerations, touching on psychological and social implications, such as issues of trust, empathy, and the overall quality of the educational experience (Zeide, 2019). The economic argument often posits AI as a cost-effective alternative to human labour, stirring fears among educators about job security and the undervaluing of human expertise (Susskind & Susskind, 2015). However, it is crucial to find a balance that leverages AI's benefits while preserving the unique qualities of human tutors. This involves recognizing and nurturing roles that AI

cannot fulfill, thereby ensuring a complementary relationship between human educators and AI technologies (Broughan & Prinsloo, 2020).

## Automated Feedback: Perspectives from Tutors and Students on AI Tutors

The integration of Artificial Intelligence (AI) in educational settings has prompted a diverse range of reactions from tutors and students, particularly concerning AI's role in providing automated feedback. The initial scepticism often revolves around the efficacy of AI in delivering personalised and contextually relevant feedback, which is crucial in educational environments. Research by Balfour (2013) highlights the potential of automated feedback systems to provide timely and detailed feedback but notes the challenge in achieving the nuanced understanding that human educators offer. Concurrently, educators express concerns regarding the validity and reliability of feedback provided by AI, questioning whether such technology can align with pedagogical goals and standards (Buckingham Shum et al., 2016).

Furthermore, the potential discrepancy between educators' expectations and the actual feedback provided by AI underscores a significant concern, particularly in light of the logistical challenges associated with monitoring AI-student interactions comprehensively (O'Neil, 2016). Despite these apprehensions, there is evidence to suggest that perceptions towards AI feedback evolve positively once students and educators engage with the technology. A study by Zheng et al. (2018) found that exposure to AI feedback systems can alter initial preconceptions, leading to a more favourable view of AI's potential in enhancing learning experiences.

However, an underlying concern persists among educators regarding AI's role as a supplementary educational tool versus a replacement for human tutors, with implications for job security and professional identity (Selwyn, 2019). Students, while generally positive about their experiences with AI feedback, also express a desire for a balanced approach that includes both human and AI contributions, highlighting concerns over the devaluation of human educators' roles (Rosé et al., 2019).

In sum, while AI offers promising avenues for enhancing educational feedback mechanisms, the journey from scepticism to acceptance is complex and fraught with concerns about validity, reliability, and the future role of human educators.

## Attitudes of tutors and students towards AI-driven tutoring technologies

The proliferation of AI-driven tutoring technologies in educational contexts has catalysed a significant shift in the attitudes and experiences of both tutors and students towards technology in learning. This shift encompasses a range of perspectives, from enthusiastic adoption to cautious scepticism, reflecting broader debates about the role of technology in education. Henrie et al. (2015) underscore the importance of understanding user attitudes towards educational technologies, as these attitudes significantly influence adoption rates and educational outcomes. In the realm of AI-driven tutoring, the personalisation and adaptability of learning experiences are frequently cited benefits, offering tailored support that can adjust to individual learner needs (Kumar, 2016).

However, this technological optimism is often tempered by concerns over the impersonal nature of AI interactions and the potential for such technologies to undermine the human elements of teaching and learning (Baker & Inventado, 2014). Tutors, in particular, express apprehensions about the efficacy of AI-driven technologies in replicating the nuanced feedback and emotional support that human educators provide, raising questions about the validity of AI as a standalone educational tool (Woolf, 2010). Moreover, the potential for AI to encroach upon traditional teaching roles introduces anxieties related to job security and the devaluation of professional educational expertise (Selwyn, 2019).

Students, on the other hand, exhibit a dualistic attitude towards AI-driven tutoring technologies. While recognising the benefits of personalised and on-demand learning support, students also express a desire for human interaction and the irreplaceable value of teacher feedback (Rosé et al., 2019). Concerns about the over-reliance on technology and the potential erosion of critical thinking and problem-solving skills

emerge as significant considerations for students navigating AI-enhanced learning environments (Buckingham Shum et al., 2016).

Despite these varied perspectives, there is a consensus on the potential of AI-driven tutoring technologies to transform educational practices. The challenge lies in balancing technological advancement with the preservation of essential human elements in education. As Zheng et al. (2018) suggest, the integration of AI technologies in education requires a nuanced approach that respects the complementary roles of technology and human educators. This approach should aim to leverage the strengths of AI to enhance educational outcomes while maintaining a focus on the socio-emotional and cognitive development that human interactions uniquely provide.

## Personalised Learning

The advent of AI-driven technologies in education has marked a significant departure from traditional human tutoring methods, particularly in the realm of personalised learning. AI's capacity to tailor educational content and pedagogical strategies to the individual needs of learners presents a transformative potential that contrasts with the one-size-fits-all approach often associated with conventional educational settings (Vander Ark, Tom. 2012). Personalised learning, facilitated by AI, leverages data analytics and machine learning algorithms to adapt in real-time to the learner's progress, preferences, and challenges, offering a customized learning journey that optimizes individual learning outcomes (Xie et al., 2019).

Comparatively, traditional human tutoring, while inherently personalised, is limited by logistical constraints such as class size, time, and the tutor's capacity to equally address the unique needs of each student. Baker (2016) highlights that human tutors provide the crucial elements of empathy, understanding, and motivational support, which are not easily replicated by AI systems. However, the scalability of personalised attention in human tutoring is constrained, often leading to a compromise in the level of individualisation achievable in larger educational settings (Koedinger et al., 2013).

AI-driven personalised learning systems aim to bridge this gap by offering scalable, individualised learning experiences that can adjust content, pace, and learning strategies to suit each learner's specific requirements. Studies by Olney et al. (2012) have demonstrated the effectiveness of AI in enhancing learning outcomes through personalised feedback, adaptive learning paths, and predictive analytics that anticipate learners' needs. Nonetheless, the effectiveness of these AI-driven approaches is contingent upon the integration of comprehensive and accurate learner data, raising concerns about privacy and data security (Drachsler and Greller, 2016).

Despite the promise of AI in personalising education, the synthesis of AI and human tutoring elements is seen as the optimal approach to harnessing the strengths of both. Human tutors excel in providing socio-emotional support, understanding nuanced learner expressions, and fostering a motivational learning environment, aspects where AI currently falls short. Conversely, AI can manage and analyze vast amounts of data to deliver personalized learning experiences at scale, a task unfeasible for individual educators (Ferguson, R., & Buckingham Shum, S., 2012).

## AI for students with learning difficulties and impairments

AI offers personalisation and transformative prospects for students with learning disorders such as dyslexia, dyspraxia, dyscalculia and other, and those with visual or auditory impairments (Yenduri et al., 2023; Hopcan et al., 2023; Garg and Sharma, 2020). The integration of AI into educational settings, enables the development of personalised learning experiences tailored to the specific needs of each student. With relatively modest investments, educational institutions have the potential to significantly enhance global education accessibility. This approach, however, necessitates the involvement of specialised educators who are adept at leveraging AI technologies to foster an inclusive, supportive learning environment for all students (Yenduri et al., 2023; Hopcan et al., 2023; Garg and Sharma, 2020).

## Assessment of views on the broad pedagogical and ethical issues implications of engaging with an AI-driven tutoring project

The integration of Artificial Intelligence (AI) in tutoring projects brings to the fore a complex array of pedagogical and ethical considerations that educators, students, and stakeholders must navigate. The pedagogical implications of AI-driven tutoring extend beyond the mere adoption of technology, prompting a re-evaluation of teaching methodologies, learning outcomes, and the role of educators in an AI-enhanced educational landscape.

From a pedagogical standpoint, the incorporation of AI into teaching and learning processes has the potential to significantly alter the dynamics of education. AI-driven systems can provide personalized learning experiences, adapt teaching materials to the learner's pace, and offer immediate feedback, aspects that are increasingly recognized for their value in promoting student engagement and learning efficacy (Kumar, 2016; Buckingham Shum et al., 2016). However, participants in AI tutoring projects express concerns regarding the potential reduction in critical thinking and problem-solving skills that can arise when students become overly reliant on AI for answers and guidance (Weller, 2018). There is also apprehension about the diminishing role of human interaction in learning, which is fundamental to the development of social skills and the cultivation of a supportive learning community (Zhao, 2019).

Ethically, the deployment of AI in education raises significant questions concerning data privacy, consent, and the security of personal information. The reliance on extensive data collection to fuel AI algorithms introduces vulnerabilities and ethical dilemmas related to the stewardship of sensitive student data (Prinsloo & Slade, 2017). Moreover, there is an ongoing debate about the fairness and bias inherent in AI systems, with concerns that algorithms may perpetuate existing inequalities or introduce new forms of discrimination (Selwyn, 2019). Participants in AI-driven tutoring projects are increasingly cognizant of these issues, advocating for transparent, equitable, and responsible AI use that prioritizes the welfare and rights of learners (Eynon, 2018).

Engagement with AI-driven tutoring projects thus requires a careful consideration of both pedagogical and ethical implications. Participants highlight the need for educational institutions to develop policies and frameworks that address these concerns, ensuring that AI technologies are implemented in ways that enhance educational quality without compromising ethical standards or the human elements of learning (Ferguson & Buckingham Shum, 2012; O'Neil, 2016). The ultimate goal is to harness the benefits of AI in education while mitigating potential drawbacks, fostering an environment where technology serves as a tool for empowerment rather than a source of contention.

## Noodle Factory's AI chatbot study buddy Walter

### Company background

ND is established over 12 years ago by co-founders Yvonne and Jim, originated from a learning and development company designed to address the scalability challenges in education. Initially targeting corporate education, the founders soon realised that educators in schools encountered similar hurdles. This led to ND expanding its services to cater to a broader audience, including higher education, K-12, and corporate sectors globally, aiming to facilitate more effective and scalable educational practices (Noodlefactory, 2024).

### ND AI chatbot capabilities and educational package

ND's pilot project with the UoLW started prior to the release of ChatGPT as a traditional machine learning-based chatbot. Unlike generative AI chatbots, rule-based and chatbots primarily operate on predefined pathways and responses, making them suitable for straightforward tasks where the queries and their corresponding answers fall within a well-defined scope (Khare, Lam, & Khare, 2018). Whereas generative AI chatbots can produce novel responses and content, effectively simulating a more creative, human-like interaction, including images, videos and other content. There is limited information on the exact type of AI chatbot that the ND's offers and its specific design. However, in the following section we will explore its interface, design and functionalities.

## ND's AI study buddy Walter functions

The key functions are separated between two groups, tutors and students.

### Functions for tutors

Once logged in the user-friendly dashboard offers a personalised greeting (as shown in figure 3.0 further below) indicating a tailored experience with features aimed at tracking, monitoring, and enhancing educational processes.

The key functions include:

1. **Set Up Contextualised Chat**: This feature allows users to expand the knowledge base of their chatbot by incorporating documents, thereby enriching the chatbot's responses with contextually relevant information. For example, a tutor can upload all learning and teaching materials and for a specific subject/module and thus generate the knowledge base from which it can extract information once it is asked by the students.
2. **Set Learning Outcomes**: A tool to define and align learning outcomes with the knowledge generated by the chatbot, ensuring that the educational content provided meets specific learning objectives. The supported File types are: .docx, pdf, and pptx.
3. **Create a Quiz**: An interactive module that empowers educators to create quizzes as a means of assessing students' understanding and retention of the material.
4. **Generate Knowledge**: This function enables the extraction of key points from uploaded documents to develop a refined knowledge base that can be utilised by the chatbot for informative interactions.
5. **Summarise Document(s)**: A productivity tool that allows for the summarisation of individual documents or the merging of multiple documents to create new, concise compilations of information.
6. **Usage Trends**: This function provides a comprehensive access to metrics such as average usage time, number of chat sessions, including use by users and conversational turns.

7. **Open feedback**: There is a feedback option named ‘Virtual Assistant Rating’ available to students to choose from the five choices Likert’s scale from ‘very dissatisfied to very satisfied’.
8. **Customisation of the chat**: This option offers its users to customise their chatbot based on their preferences such as prompts, logos with colours of choice, and specific questions.
9. **User information:** This function allows tutors to check users’ names, private emails, and active status. Additionally, information permits the allocation of students to specific learning groups.
10. **User role change:** Tutors can switch between roles as tutors-student and vice versa. This allows tutors to experience students chatbot capabilities.

The dashboard offers an "Onboarding Call with Learning Success Manager" feature to provide tutors/urser with support and guidance in setting up their account, indicating a high level of user support and customer service within the system. Overall, the dashboard streamlines the integration of AI capabilities with educational content management, fostering an interactive and efficient teaching and learning environment. The interface can be seen in the following figure.

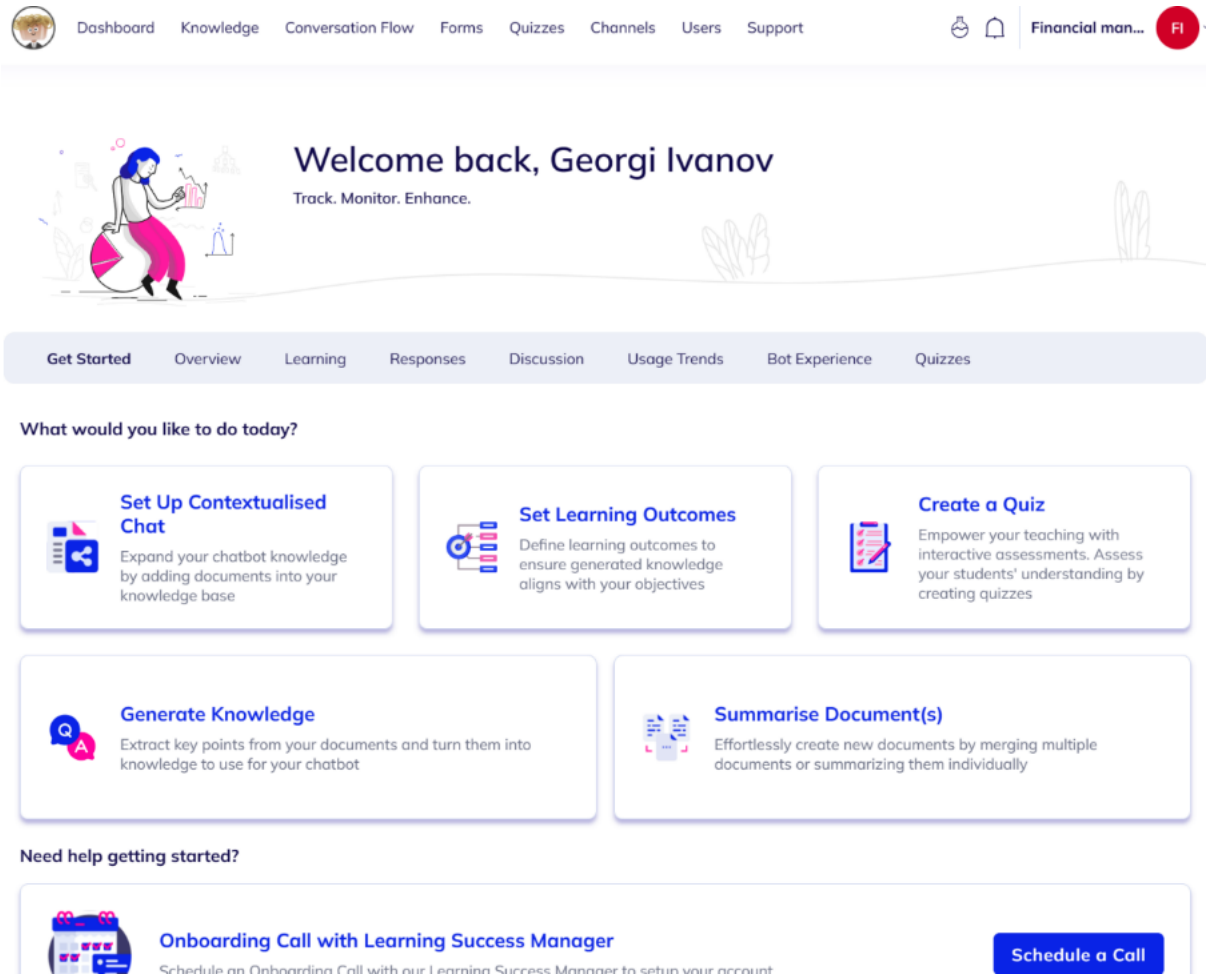


*Figure 1.0: Administrative interface panel for tutors.*

## Functions to students by the AI chatbot study buddy Walter

Walter offers users the ability to inquire about specific modules within the UG Law course, including "Regulation and infrastructure of arbitration" (Module A), "Arbitration agreement" (Module B), "Arbitration tribunal" (Module C), and "Investment arbitration and specialist arbitration" (Module D). The chatbot invites users to engage with these modules for detailed information or to participate in quizzes by prompting with "take a quiz," an interactive element designed to test and reinforce learners' knowledge.

Below the main chat interface are additional features for the user experience:

1. **Chat:** Enables real-time conversation with Walter, allowing for instant feedback and assistance.
2. **Bookmarks:** Offers users the ability to bookmark important information or sections within the chat for easy retrieval.
3. **Sessions:** This could refer to tracking past interactions or setting up learning sessions with the chatbot.
4. **Question Board:** A feature likely designed for posting queries that may be addressed by the chatbot or the community.
5. **Reports:** Possibly provides users with analytics on their interactions or progress in learning modules.

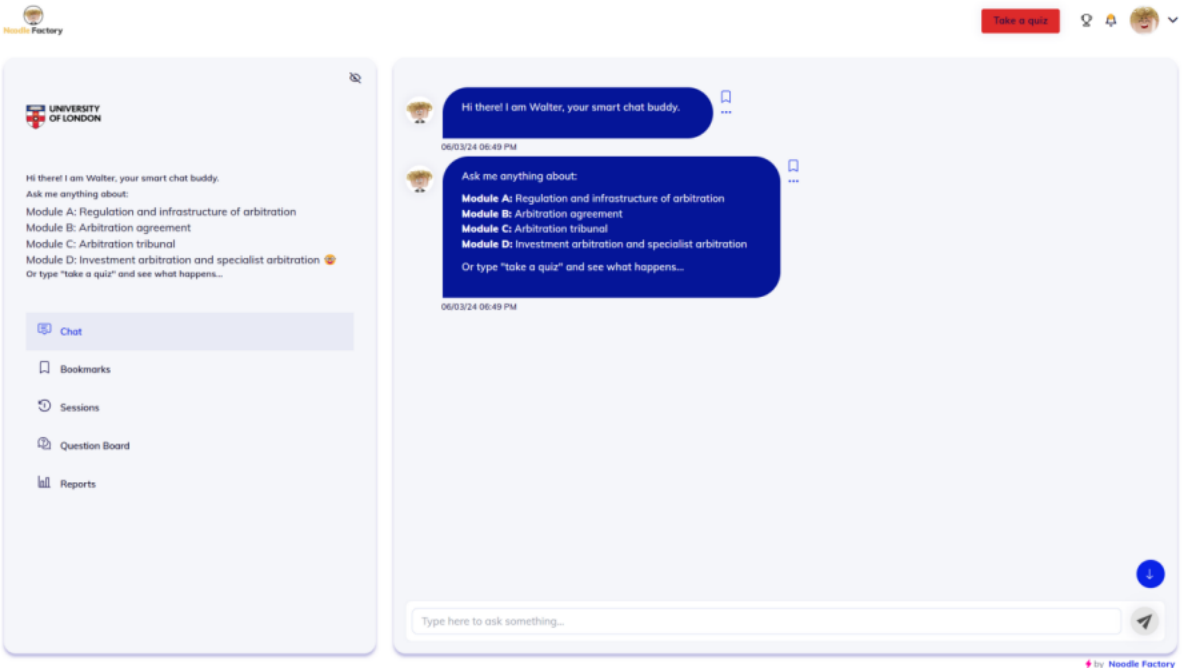


*Figure 2.0: Study buddy Walter's interface*

## Integration of Noodle Factory AI chatbot

The integration of chatbots is facilitated through embedding a code on a desired webpage. This method enables the chatbot to be effortlessly displayed within the Virtual Learning Environment (VLE) system and can be tailored for inclusion on any chosen module page. This integration process is typically undertaken by the institution's Information Technology (IT) or Learning Technology (LT) team, in collaboration with

both the Programme Manager and Programme Director, ensuring a coordinated approach to the VLE's module management.

## Challenges in Implementing Chatbot and AI Technologies

Despite AI's technologies potential, the development and implementation of chatbot and AI technologies in education face significant challenges. Insufficient training datasets, integration, ethical concerns, user attitudes, and programmeming complexities are among the primary hurdles (Okonkwo & Ade-Ibijola, 2021; Pérez et al., 2020). **Integration of AI to macro (organisations) and miso (programme) and micro (module) level happens only through specified training and strategic operations with high likelihood of failure.** Additionally, the need for data privacy and security, potential biases, and the requirement for educator training in AI usage present organizational and ethical considerations that must be addressed to ensure effective integration into educational systems (Tahiru, 2021; Crompton & Burke, 2023).

## Holistic and administrative approach to students' lifecycle through AI

The integration of Artificial Intelligence (AI) across the student lifecycle offers a transformative approach to enhancing the educational journey, from admission, socialisation to graduation. Educational institutions are increasingly adopting AI technologies, such as chatbots for student services, automated grading, and academic advising, to support student success and streamline processes (Khare, Stewart, and Khare, 2018; Labadze, Grigolia and Machaidze, 2023).

Adopting AI in education necessitates a comprehensive evaluation of technological, social, political, economic, cultural, and ethical factors. This balanced approach is crucial for leveraging AI's benefits while addressing potential constraints and challenges, including ensuring data privacy, addressing ethical implications, and promoting inclusivity and accessibility (Khare, Stewart, and Khare, 2018; Labadza, Grigolia and Machaidze, 2023).

AI's role in facilitating personalised and experiential learning is significant, offering adaptive learning experiences tailored to individual student needs, preferences, and learning patterns. This personalisation extends to dynamic content delivery, assessment, and feedback, contributing to more engaging and effective learning environments. Moreover, AI can enhance experiential learning through simulations and interactive scenarios, enriching the educational experience (Khare, Stewart, and Khare, 2018; Labadze, Grigolia and Machaidze, 2023).

Aspects such as career opportunities, personal recommendations, friendships, empathy, and other social elements continue to elude AI tutoring capabilities. The consensus across most studies is that AI chatbots enhance the pace of learning and provide a more tailored learning experience (Khare, Stewart, and Khare, 2018; Labadze, Grigolia and Machaidze, 2023).

## Methodology and methods for data collection and analysis.

This pilot study examined student perceptions and experiences of a generative AI chatbot implemented in the online international UG and PG Laws degree programmes at the UoLW. The research aimed to evaluate the extent to which Open and Distance Learning (ODL) students regarded and utilised the AI chatbot as a supplementary resource in their academic studies, assessing both their pre-existing expectations and subsequent experiences post-interaction. The methodological approach prioritised quantitative analysis while incorporating qualitative elements to enrich the investigation, with data collection occurring both before and after the deployment of the chatbot in 2023. The participant cohort comprised varying sample sizes, with a maximum of 51 students participating in the pre-intervention survey and 38 in the post-intervention survey.

The study acknowledged some significant methodological limitations, notably the lack of continuity between the pre and post-intervention survey questions and the absence of demographic information about the respondents. These limitations hindered the ability to draw conclusive correlations and evaluations on shifts in student attitudes towards AI technology before and after its intervention. Consequently, the data analysis

was bifurcated into two sections corresponding to the distinct phases of expectation (pre-intervention) and experience (post-intervention). The analysis employed a combination of SPSS for statistical examination, Excel for data management, and content thematic analysis for qualitative insights, with Pearson Correlation Analysis providing validation for the findings.

## Data collection

Data collection for this study was organised into two key phases: pre-intervention and post-intervention, occurring over a four-month period in 2023, and targeted both undergraduate and postgraduate Law students at the UoLW. The pre-intervention phase was dedicated to evaluating students' expectations, specifically their perceptions and attitudes towards the implementation of AI tutors for automated feedback. In contrast, the post-intervention phase focused on gathering students' actual experiences and reactions following their engagement with the AI-driven tutoring technologies. This dual-phase approach was designed to facilitate a thorough comparison of initial expectations against the tangible experiences with AI in educational environments, providing a nuanced understanding of AI's impact on learning and teaching.

## Data analysis of pre and post interventions surveys

In both the pre- and post-intervention surveys, data handling remained consistent, differing only slightly in the type of Likert scale used. Initially, information was processed in its raw form, with responses captured on a scale from 1 (strongly disagree) to 5 (strongly agree), and verbatim responses were organized in Excel spreadsheets. The Likert scale data were systematically encoded—numerical values were assigned to represent specific attitudes (e.g., 1 = strongly disagree, 2 = disagree, etc.)—for further analysis in SPSS. This analysis aimed to identify significant correlations and assess the reliability and validity of both sets of survey responses, despite the minor differences in the Likert scale's configuration and questions between the two surveys.

## Data management

The anonymity of all participants was stringently protected, ensuring that no evidence could potentially disclose their identities. Data management and storage were rigorously controlled, with access restricted solely to the researchers involved in this project, securely housed within the University of London's databases.

Data was initially processed in its unaltered state, capturing responses on a scale ranging from 1 (strongly disagree) to 5 (strongly agree) and other similar, alongside verbatim responses collated in Excel spreadsheets. The Likert scale data were methodically encoded, with numerical values representing specific attitudes (e.g., 1 = strongly disagree, 2 = disagree, etc.) for subsequent analysis in SPSS to identify significant correlations, as well as to assess reliability and validity.

Furthermore, open-ended responses were examined through content thematic analysis, enabling a nuanced interpretation of qualitative data. This analysis was integrated with the quantitative findings, providing a comprehensive overview of the study's outcomes.

## Data shortcoming and Insight generation

The dataset's primary limitation was the lack of a coherent link between the questions in the pre- and post-intervention surveys, save for one question, coupled with a significant lack of demographic details about the participants. This gap in the data hindered the ability to construct detailed participant profiles that could have revealed specific trends associated with various demographic characteristics, including educational, social, geographical, psychological, and technological proficiency dimensions. An attempt to correlate responses using the 'response ID' proved unreliable due to discrepancies in the data files, further complicating the establishment of consistent correlations between participants' pre- and post-intervention contributions. This methodological gap significantly restricts the analysis to generic insights, omitting a more nuanced understanding of shifts in attitudes or perceptions specific to diverse participant profiles.

Despite these inherent shortcomings, the survey's pre- and post-phases independently provided highly valuable data. While it was not possible to trace responses back to individual participants, the collective insights garnered offer a comprehensive view of the entire sample's perceptions about the AI study buddy, Walter chatbot, and their experiences post-interaction. To navigate these challenges, the analysis was segmented into two distinct parts: pre-data and post-data analysis. This approach facilitated a focused examination of the participants' attitudes towards and experiences with the AI-driven tutoring system, highlighting its utility despite the noted limitations. A dedicated section was thus crafted to bridge the gap between anticipated outcomes and actual experiences, elucidating the complex relationship students share with AI as an educational aid, thereby ensuring the generation of meaningful insights despite data challenges.

## Pre-intervention survey report results

### Student Attitudes Toward AI Tutoring Technologies

The preliminary survey results indicate three distinguishing groups towards the use of AI chatbots in learning among 51 respondents. The first group just under ten percent of respondents harboured a preconceived belief that AI chatbots would not enhance their learning or experience. The the second group about eight percent of participants remained ambivalent, frequently selecting 'neutral' on a Likert scale ranging from (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree) for most questions. Notably, a significant majority, the third group, approximately 82 percent, demonstrated a positive attitude towards AI, acknowledging its benefits, having used similar technologies, or expressing an intention to use AI chatbots in the future. These results indicate the average levels of understanding and comfort with AI among participants before using the AI study buddy. The mean scores suggest a moderately high level of understanding and comfort with AI in educational settings among the respondents in the pre survey results.

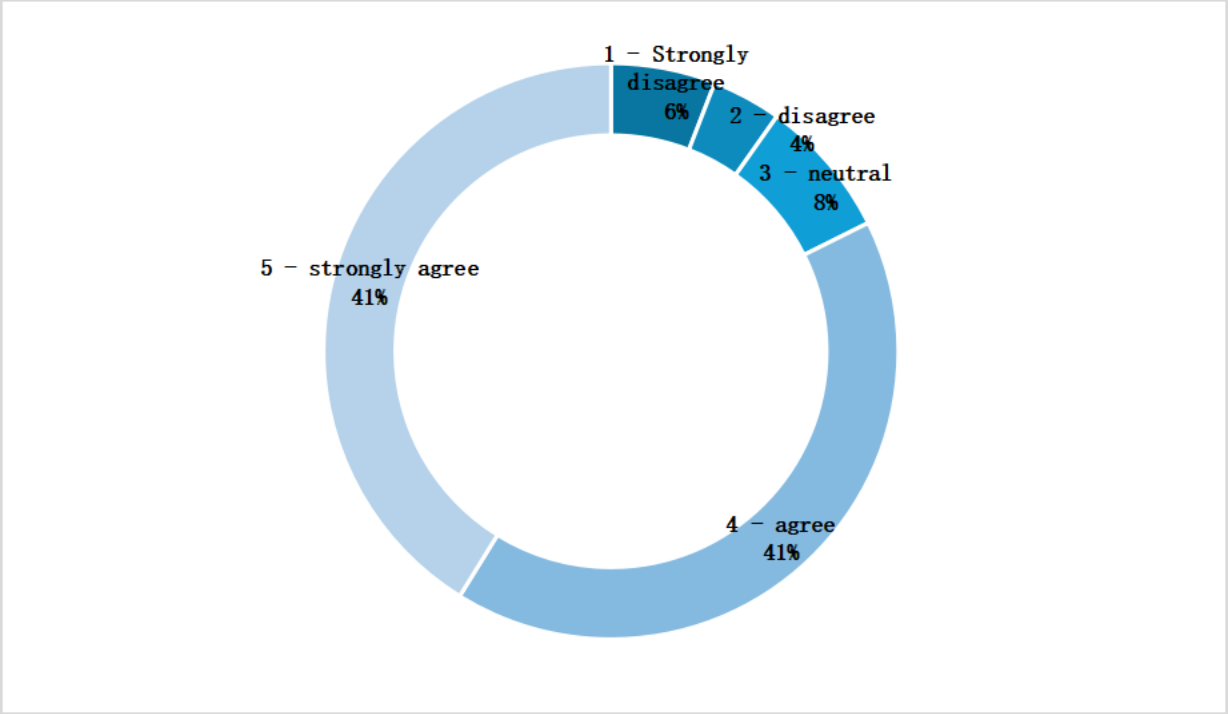


*Figure 3.0: I think AI can improve the learning experience in percentage.*

The doughnut graph visualises the responses of participants on their belief in an AI study buddy's ability to provide personalised and timely feedback. It shows that the majority opinion is divided almost equally between 'agree' (37%) and 'strongly agree' (37%), indicating a strong positive reception towards the AI study buddy concept. A smaller but notable portion of the respondents remain neutral (16%), while very few express disagreement (6% 'disagree' and 4% 'strongly disagree'). The data suggest that the concept of an AI study buddy is well-received, with a clear majority of participants leaning towards positive acknowledgment of its potential benefits in providing feedback. The small percentage of neutrality and disagreement could indicate some reservations or a lack of sufficient experience to form a strong opinion. Overall, the sentiment towards the AI study buddy is largely optimistic among the participants.

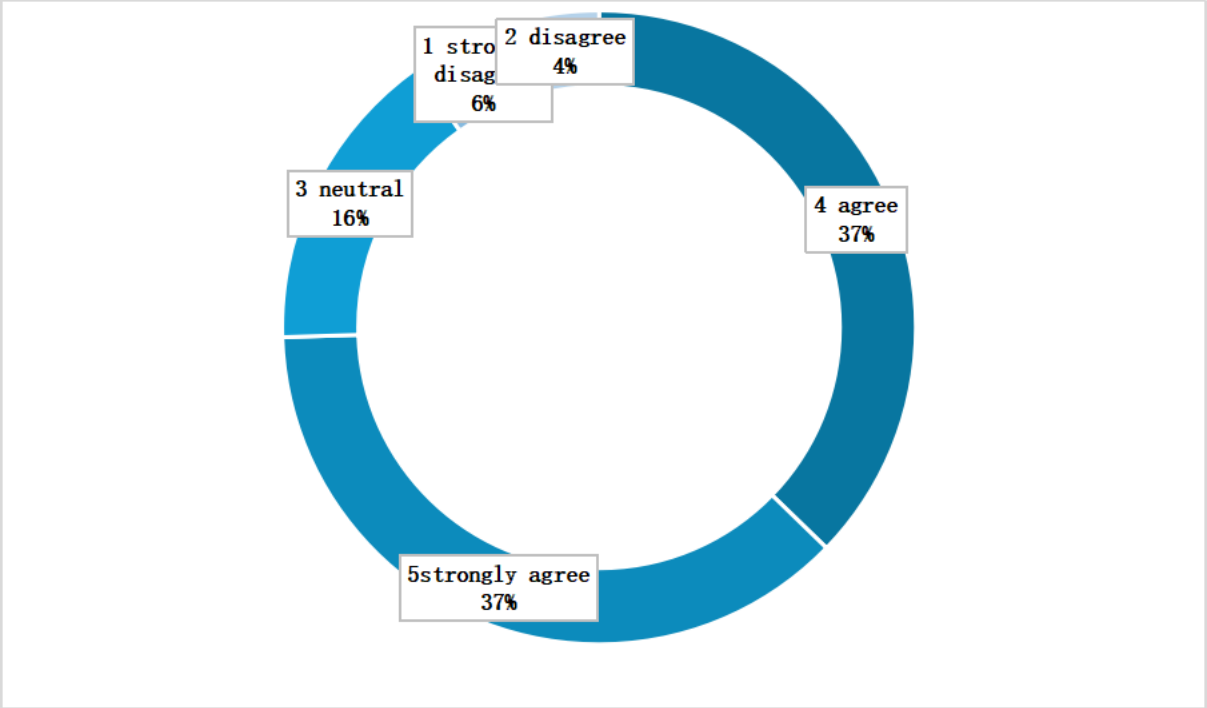


*Figure 4.0: I think an AI study buddy can provide personalised and timely feedback.*

The donut chart portrayed in shades of light blue displays participants' concerns regarding the privacy and security of their data when using an AI study tool. A substantial 39% of respondents strongly agree, underscoring considerable concern. Those agreeing constitute 19%, which, together with the strong agreements, captures a prevailing apprehension. Neutral responses account for 12%, while 18% disagree, indicating a smaller portion of the respondents have less concern or trust in the security measures in place. Lastly, 12% strongly disagree, suggesting a high level of confidence in the data privacy and security of the AI study tool or a possible undervaluing of these issues. Collectively, the chart signifies that data privacy and security are prominent considerations for most of the surveyed individuals.

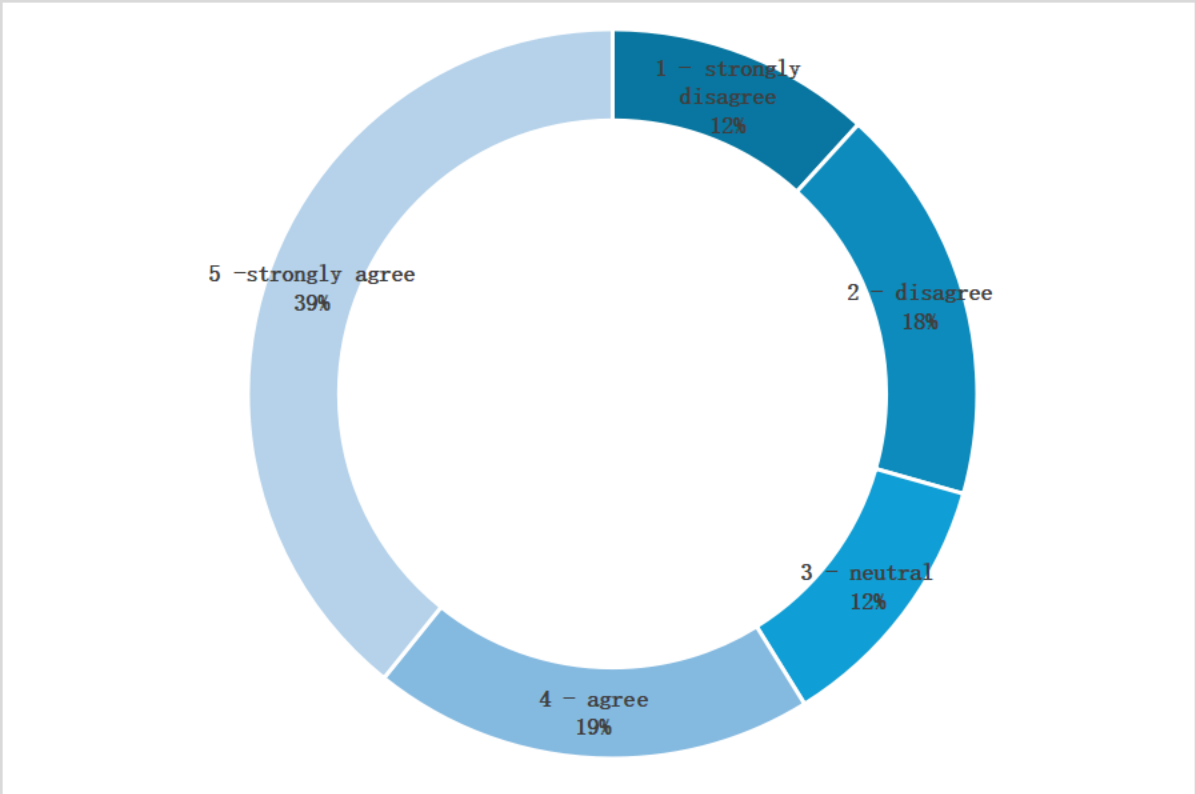


*Figure 5.0: I am concerned about the privacy and security of my data when using AI chatbot*

The donut chart illustrates responses to the statement 'I prefer human teachers over an AI study buddy.' A plurality of respondents, 43%, are neutral, indicating no strong preference between human teachers and AI study buddies. Notably, a combined 43% of respondents express a preference for human teachers, with 25% strongly agreeing and 18% agreeing with the statement. This demonstrates a notable inclination towards human-led instruction. On the other side of the spectrum, 14% of respondents show a clear openness to AI as study buddy, with 8% strongly disagreeing and 6% disagreeing with the preference for human teachers. The data indicates a spectrum of attitudes, with a considerable number of respondents remaining neutral, potentially reflecting uncertainty or a lack of familiarity with AI in educational settings, while a nearly equal portion of participants exhibit a definitive preference for human teachers.

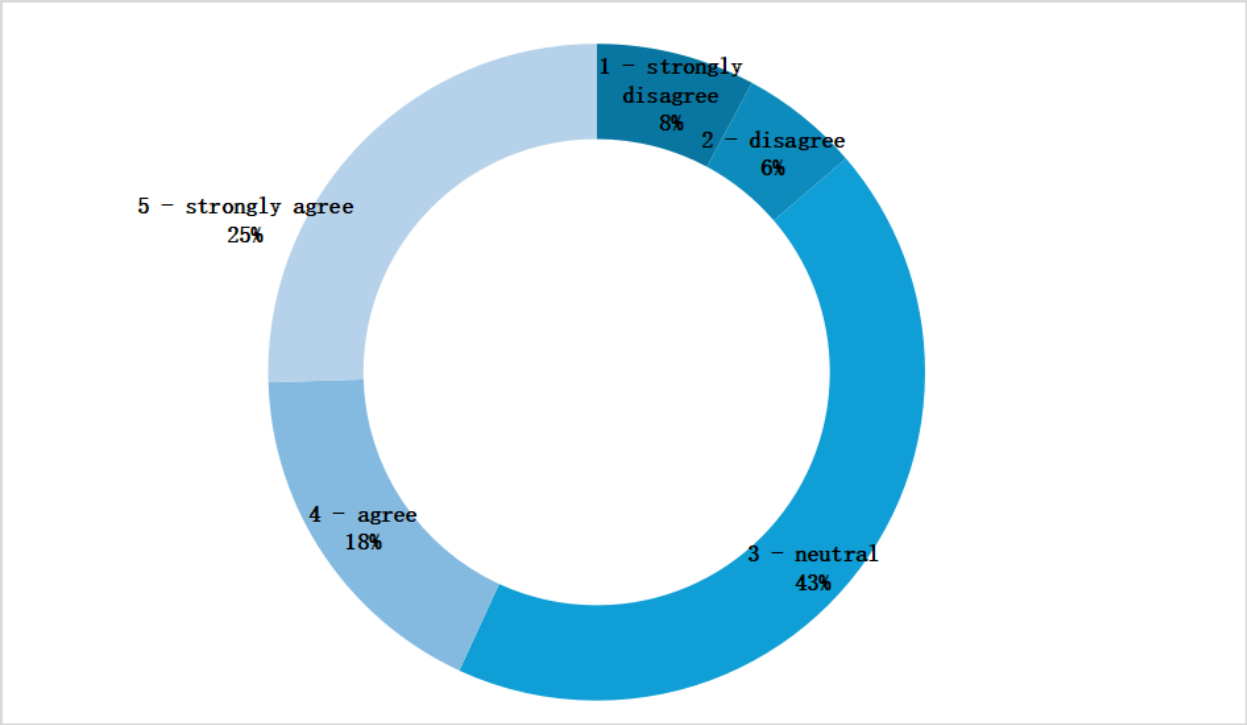


*Figure 6.0: I prefer human teachers over an AI study buddy.*

The survey results in graph number 7.0 indicate a largely positive expectation for AI study buddies, with 70% of participants expressing agreement (37% strongly agree, 33% agree) that the AI would understand their questions and provide helpful answers. A smaller segment of 20% is neutral, and only 10% disagree (6% strongly disagree, 4% disagree), suggesting most respondents anticipate effective assistance from AI in their studies.

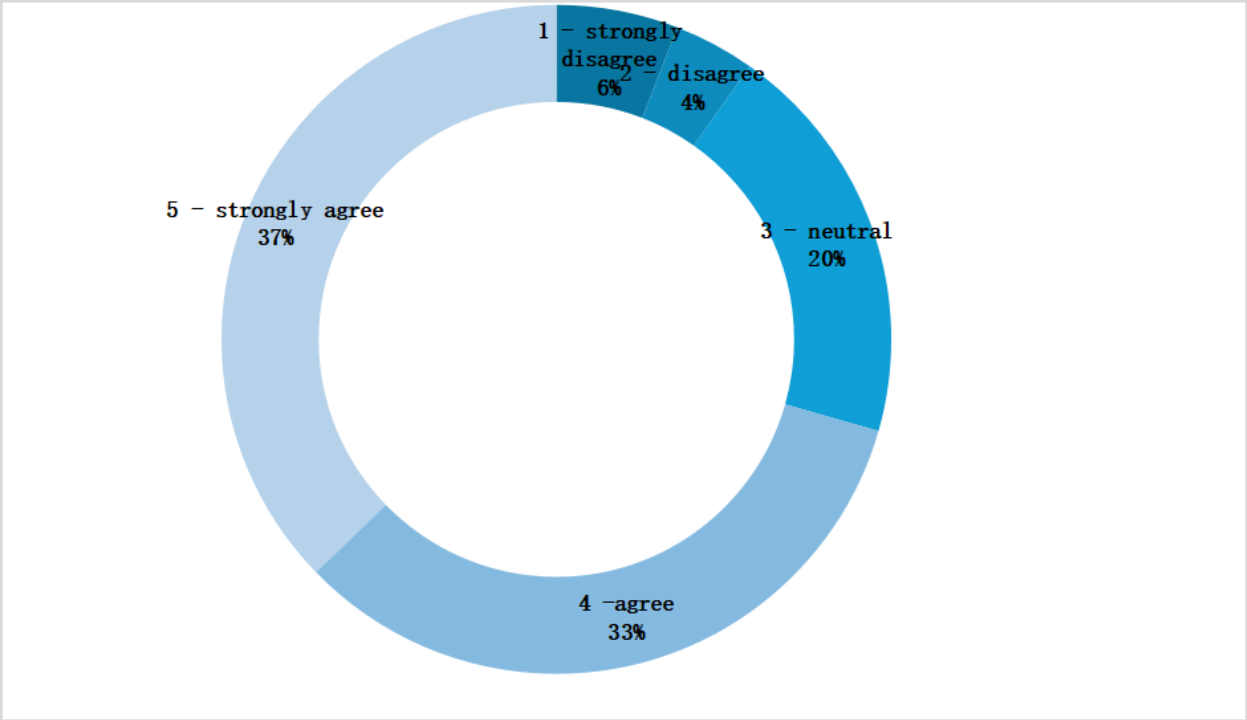


*Figure 7.0: I expect the AI study buddy to understand my questions and provide helpful answers.*

The results revealed in the next graph number 8.0 suggest that 61% of respondents are optimistic about an AI study buddy adapting to their learning style and pace, with 30% strongly agreeing and 31% agreeing. Meanwhile, 31% remain neutral, and a minority of 8% express disagreement, including 6% who strongly disagree and 2% who disagree.

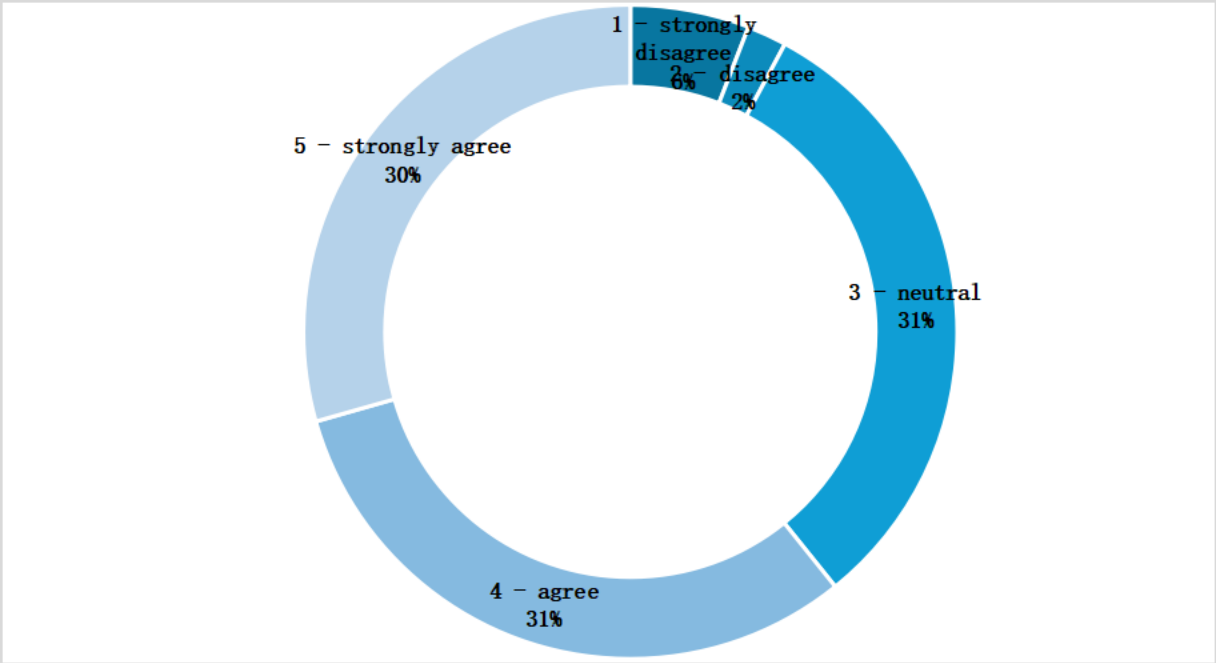


*Figure 8.0: I expect the AI study buddy to adapt to my learning style and pace*

The majority of participants in graph 9.0, imply that 74%, are positive about the potential of an AI study buddy to enhance their academic performance, with an equal split of 37% strongly agreeing and 37% agreeing. Neutral responses account for 20%, while only 6% strongly disagree with the notion, indicating overall confidence in the effectiveness of AI for academic improvement.

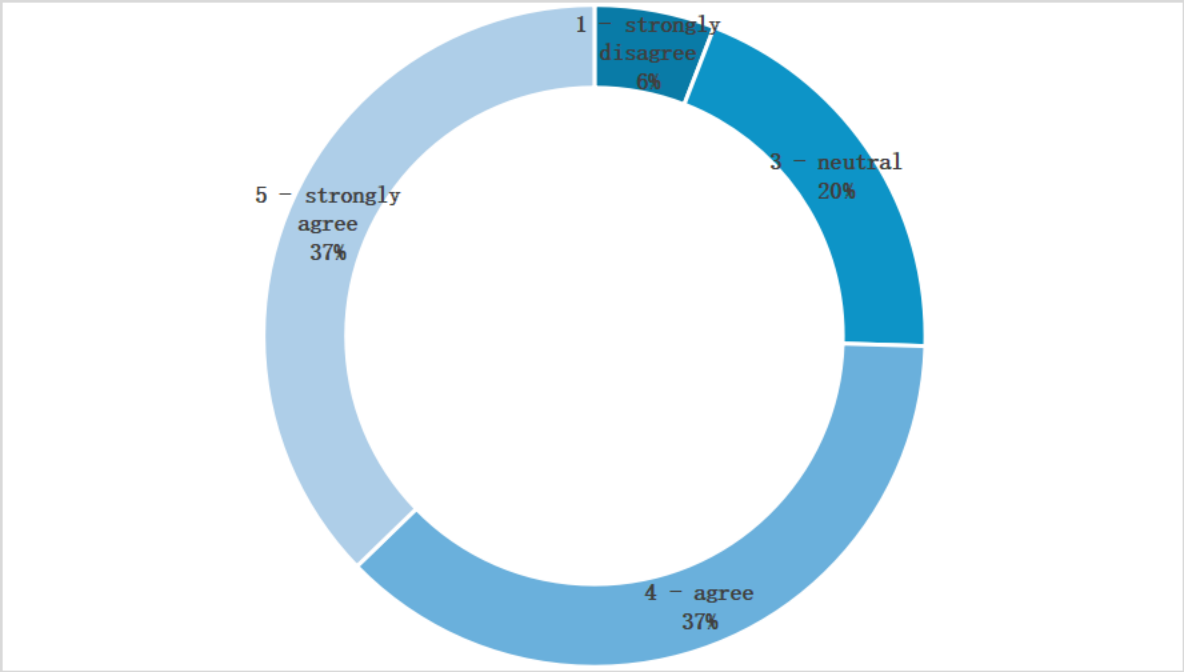


*Figure 9.0: I think the AI study buddy could help me improve my academic performance.*

The sentiment towards AI's potential to improve the learning experience is overwhelmingly positive among respondents, with 82% in agreement (41% strongly agree, 41% agree). A small portion, 8%, remain neutral, and 10% disagree (6% strongly disagree, 4% disagree), reflecting a strong belief in the benefits of AI for educational which is visible in the next graph below, 10.0.

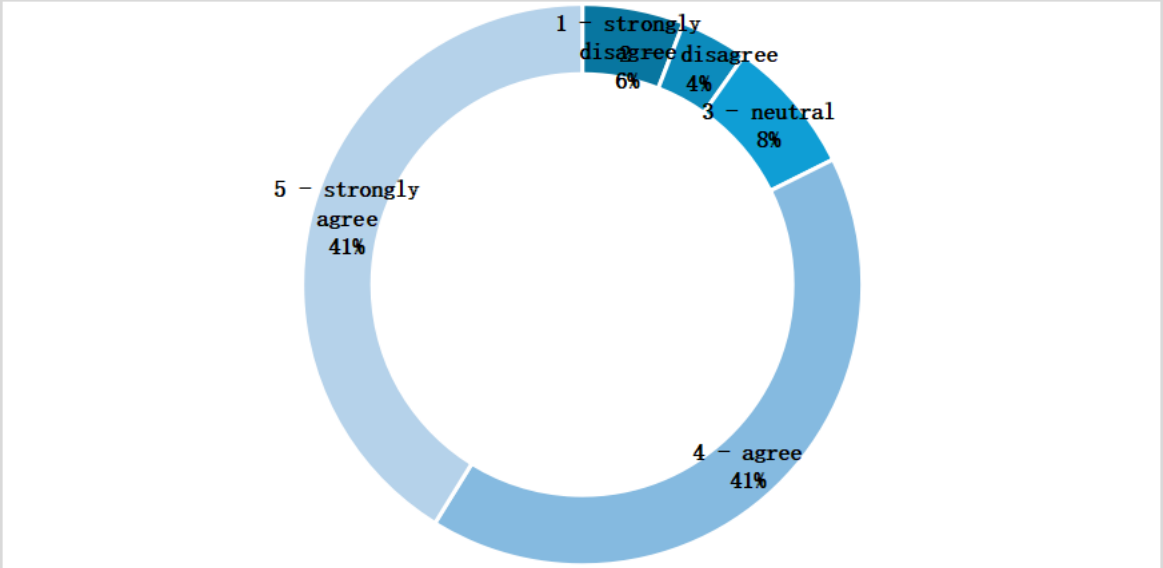


*Figure 10.0: I think AI can improve the learning experience.*

The donut chart below depicts the frequency of technology use for educational purposes among the respondents. It illustrates that a significant majority, 57%, often use technology in their educational activities. A quarter of the participants, 25%, indicated that they always use technology in education, highlighting a consistent and regular integration of technological tools in their learning process. A smaller proportion of the respondents, 14%, sometimes utilise technology for educational purposes, which suggests occasional use. The remaining 4% reported rarely using technology, indicating minimal engagement with technological tools for learning. There is only one mention of a respondent who never use AI technology for educational purposes, implying that technology has some major role and presence in the educational experiences of almost all participants surveyed. This is a significant piece of information clearly shedding light on the significance of AI in current circumstances for learners. Regardless of its presence as part of the of learning and teaching experience at the university, learners rely on AI, which is notably concluding that AI will be used regardless of its provision at university settings.

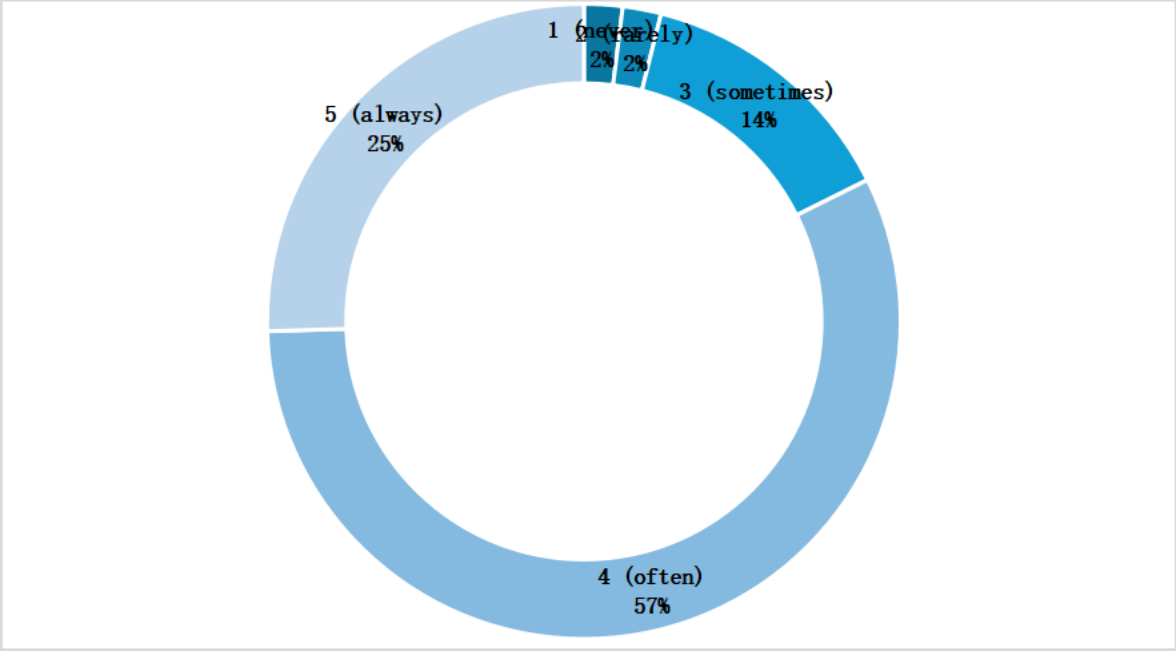


*Figure 11.0: how frequently do you use technology for educational purposes?*

## Open ended questions

To effectively summarise the essence of the pre-survey results based on the open-ended responses about the anticipated utility of an AI study buddy, a thematic content analysis approach was employed. The responses reveal a rich tapestry of expectations, concerns, and hopes for the AI study buddy's role in the educational journey of the respondents. The thematic analysis uncovers the following themes:

- **Personalised learning:** Customised Support On-Demand Assistance:
    - "AI study buddy will help us to connect the concepts with more precise manner."
    - "Explaining complex concepts in an easy manner."
    - "Because it would be available whenever I need a question answered. Meaning 24hrs a day no matter my time zone."
    - "Instant replies to help with answering questions in the moment."
- **Academic Efficiency**:

    - "Fast track my research on the module."
    - "Help in gaining knowledge on the module."
- **Legal Studies Enhancement**:
    - "It will be helpful in terms of making caselist, telling me the ratio of different cases and relevant precedents for specific area of law."
    - "In providing latest information."
- **Intellectual Engagement**:
    - "The AI study buddy may be helpful for brainstorming."
    - "AI study buddy will be most useful for debating a legal issue, to review a legal system and method, a statute, and to discuss on decided cases."
- **Measured Expectations**:
    - "I hope very but am skeptical."
    - "I'm optimistic."
- **Human Element**:
    - "It would be terrible...Please bring back interactions with physical and HUMAN lecturers."
    - "It would be most useful if it is kept at a minimum... However, it is vital that human interactions are retained."

These content analysis from the pre-intervetnion survey open responses highlight the multifaceted expectations students have for AI study buddies, from augmenting their academic workflow to concerns about the potential erosion of human educational interactions.

Limitations and the potential impact on the authenticity of the educational

## Discussion pre-intervention survey results

The pre-survey results draw a vivid landscape of attitudes towards AI in learning environments, revealing a spectrum of responsiveness. A majority show enthusiasm for AI-driven tutoring technologies like the AI study buddy "Walter," suggesting an inclination towards integrating AI to bolster personalised learning experiences. This

stance aligns with the pedagogical viewpoint that underscores the capacity of AI to address challenges within education, such as those articulated by Bloom (1984), emphasising the importance of tailored educational interactions.

The responses suggest students are not just ready but eager to adopt AI to supplement traditional learning, aligning with scholarly insights on AI's evolving role (Zheng et al., 2018). This readiness suggests a significant number of learners are poised to welcome AI as an ally in their educational journey, anticipating more customised and flexible learning models.

The acknowledgment of AI chatbots' potential to provide instant feedback and learning enhancement aligns with the literature advocating for AI's educational benefits (Steenbergen-Hu & Cooper, 2013; Kumar, 2016). These findings underscore AI's capacity for personalisation, addressing individual learning needs, a feature that students welcomed, as reflected in the survey data (Olney et al., 2012).

Simultaneously, the dialogue on pedagogical and ethical considerations reflects the survey participants' expressed concerns, mirroring current academic conversations (Eynon, 2018; Selwyn, 2019). There's a discernible preference for AI's pedagogical advantages, like formative feedback and improved learning outcomes (Buckingham Shum et al., 2016). However, there's also an advocacy within academic discourse for a more measured approach, especially considering AI's limitations in replicating the 'inspiring effect' and socio-emotional support inherent to human tutors (Zhao, 2019).

The survey findings compellingly demonstrate the critical role of AI in education: among 51 students, only one reported not utilising AI for educational purposes. This reflects a robust propensity among learners to engage with AI resources, even beyond the formal university offerings, tapping into any available and relevant platforms.

## Conclusion:

The analysis of the pre-intervention survey responses indicates that while there's a palpable excitement for the promise of AI in enriching the learning experience, there

remains a concurrent need for human touch and mentorship. Students appear ready to integrate AI tools into their learning, provided these tools offer substantial, reliable, and ethically designed support. As AI continues to carve out a space in the educational domain, it must be navigated with an awareness of its capabilities and a commitment to maintaining the human essence at the core of teaching and learning.

## Post survey report results (focusing on experiences)

### Comparing AI and Human Tutoring in Personalized Learning Experiences

This section of the post-intervention survey report will divulge results on the nature of personalised learning experiences provided by AI, in contrast to traditional human tutoring. This section will explore how AI-driven tools have catered to individual student needs, preferences, and learning styles, and compare these aspects to the conventional methods delivered by human tutors. The insights illuminate the effectiveness of AI in creating a tailored educational journey for each learner, assessing aspects such as adaptability, responsiveness, and the ability to facilitate a deeper understanding of the subject matter. Additionally, this section will address the potential for AI to complement or enhance human tutoring, considering the balance between technology and personal interaction in educational settings.

The donut chart in Figure 12.0 presents data on the usage of the AI study buddy during the pilot phase. It indicates that a substantial majority of the participants, 83%, reported using the AI study buddy. This is represented by 29 individuals. In contrast, a smaller fraction of the respondents, 17%, equivalent to 6 individuals, reported that they did not use the AI study buddy during the pilot. This demonstrates a high level of engagement with the AI tool among the participants during the trial period.

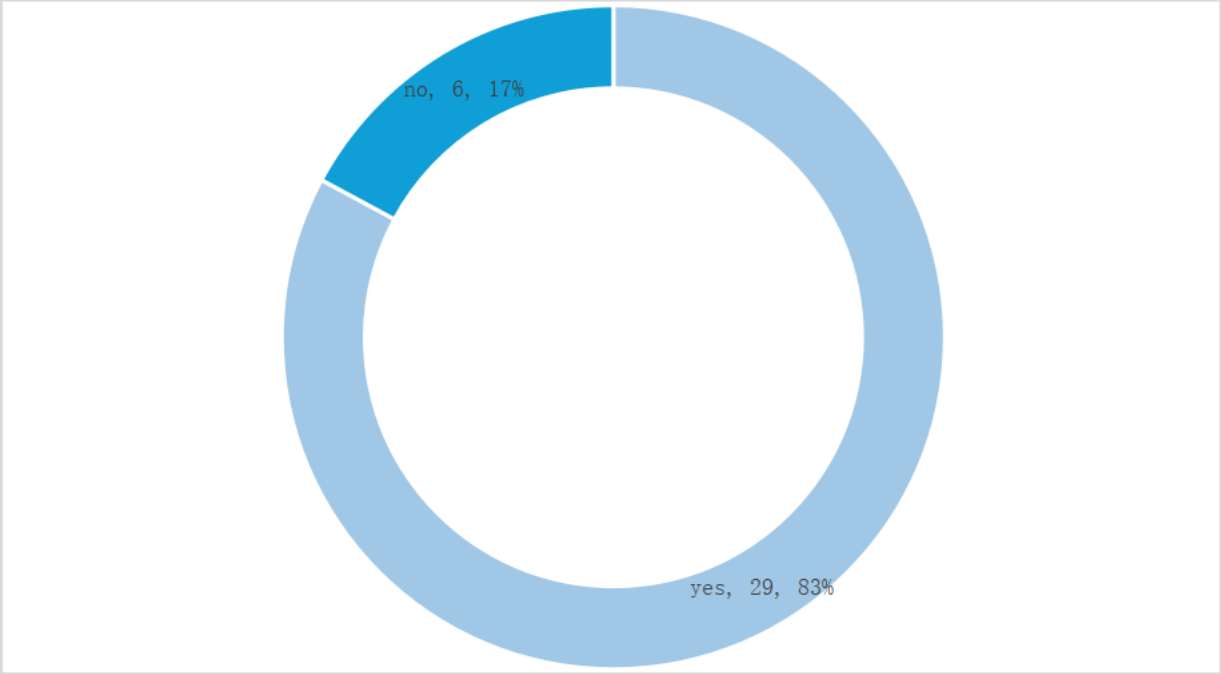


*Figure 12.0: Did you use the AI study buddy during the pilot. Yes 1, No 2.*

*If you did use the AI study buddy, please provide information why you did not.*

Content analysis with the main themes identified from the respondents' reasons for not using AI:

- **Concern Over Accuracy:**
  - "I am not sure whether the answer provided by AI is accurate."
- **Lack of Understanding:**
  - "I am yet to comprehend AI better."
- **Awareness Issues:**
  - "I was not aware of it."
  - "I wasn’t aware about it."
- **Dissatisfaction with Existing AI Tools:**

- "I've experimented with ChatGPT and found it to be not much good. For all its flaws, however, it remains the gold standard making Londy even less interesting."

- **Preference for Human Study Partners**:
  - "Because, I have a friend who studied with me at local institute and we studied together."

These themes reflect the underlying reasons for some students' reluctance or inability to adopt AI tools like ChatGPT and Walter in their studies. Concerns over the reliability of AI responses and a lack of familiarity with the technology suggest that educational institutions might need to focus on building trust in AI systems and educating students on how to effectively use them. Moreover, the preference for human interaction points to the enduring value of collaborative learning with peers.

The donut chart in Figure 13.0 illustrates the participants' perceptions of the AI study buddy's ability to understand their questions. The majority of respondents, 42%, agree that the AI study buddy understood their questions, while a substantial 36% strongly agree, indicating a high level of comprehension by the AI. A minority of respondents feel differently, with 13% remaining neutral, 6% disagreeing, and 3% strongly disagreeing with the statement. This suggests that, overall, the AI study buddy was seen as effective in understanding user queries by a significant portion of the participants.

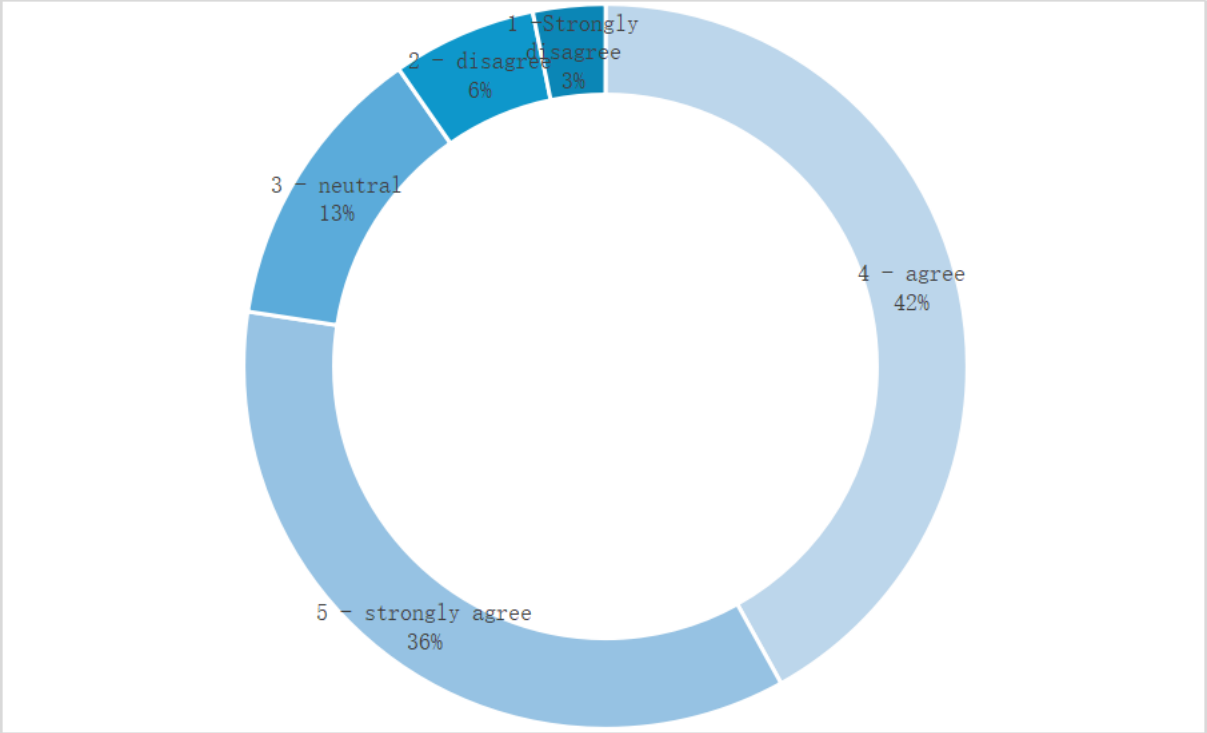


*Figure 13.0: The AI study buddy understood my questions*

The next donut chart for Figure 14.0 conveys the participants' assessments of the AI study buddy's understanding of their questions. A combined 78% of respondents affirm the AI's capability, with 42% agreeing and 36% strongly agreeing. A minority of 13% remain neutral, while a smaller segment of respondents' express dissent, with 6% disagreeing and 3% strongly disagreeing. This data indicates a predominant confidence among participants in the AI study buddy's ability to comprehend their inquiries.

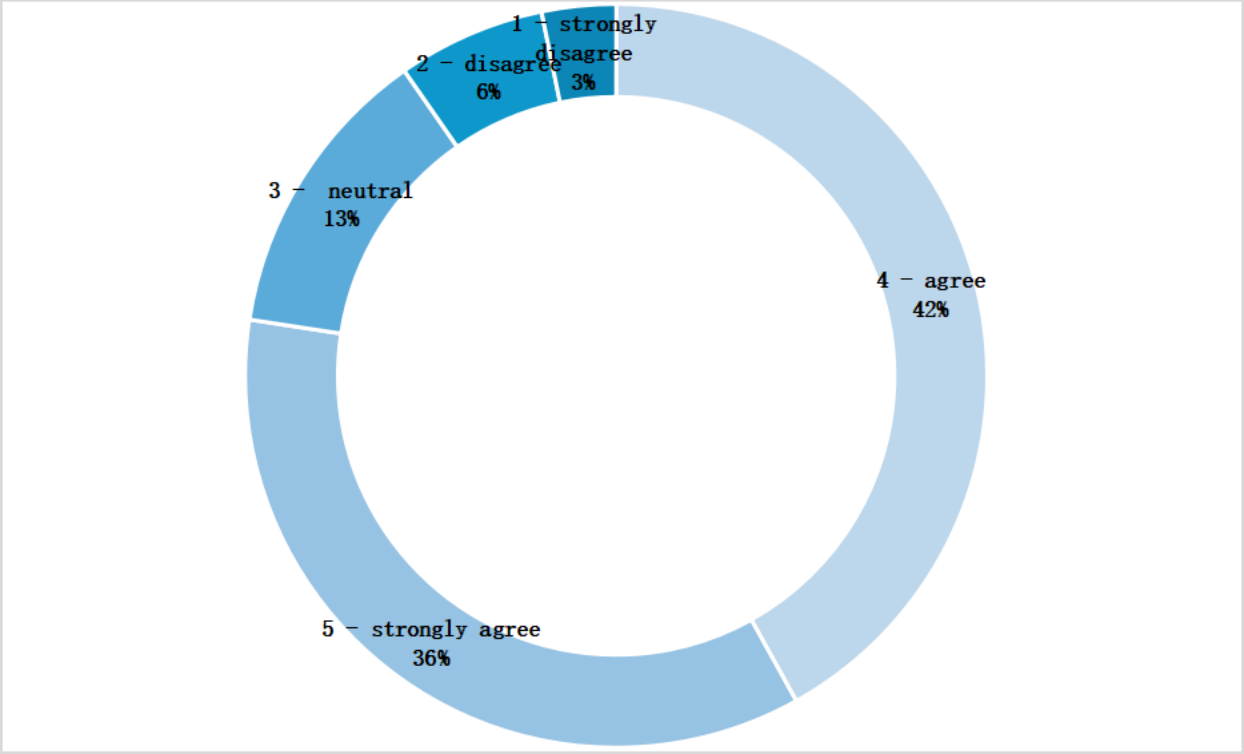


*Figure 14.0: The AI study buddy understood my questions.*

In Figure 15.0, the distribution of responses about the impact of the AI study buddy on the participants' learning experience is presented. The majority, which sums to 84%, perceived a positive effect, with 42% of respondents strongly agreeing and another 42% agreeing that the AI study buddy improved their learning experience. A small portion, 10%, remained neutral, and an even smaller percentage, 6%, disagreed with the statement. This indicates that the AI study buddy was widely regarded as beneficial to the learning experience by most of the participants.

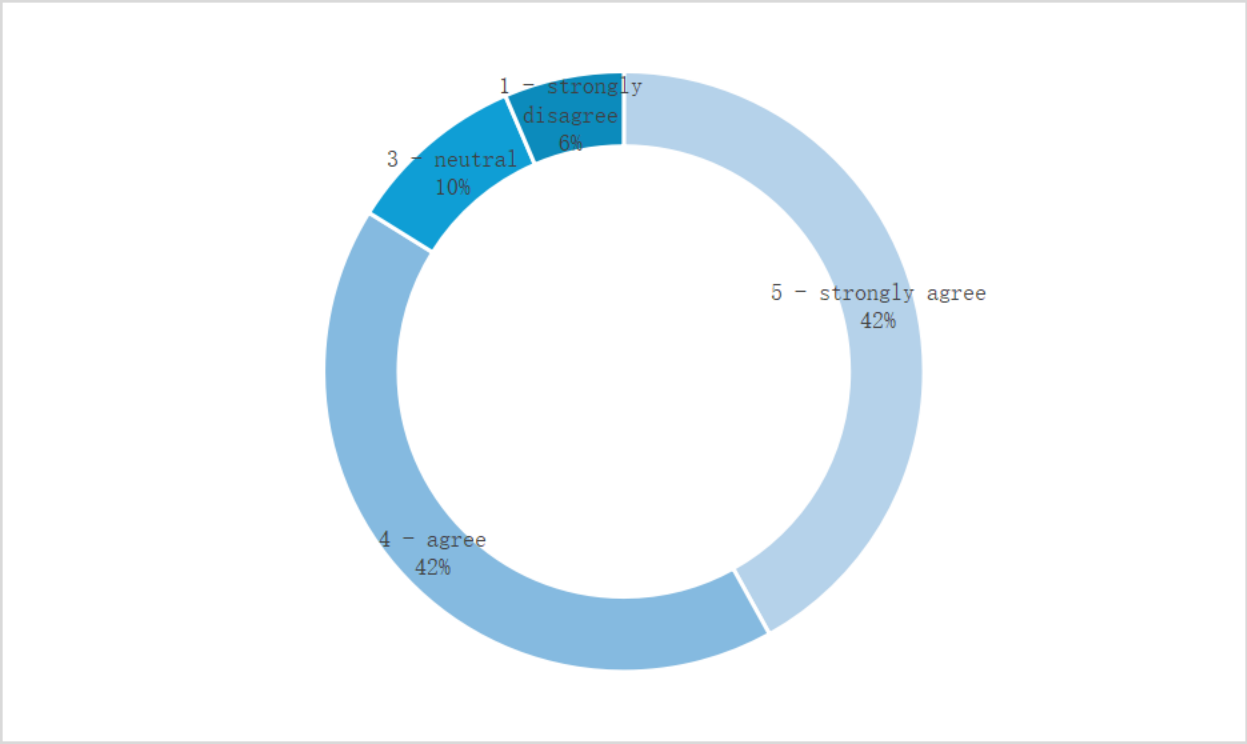


*Figure 15.0: The AI study buddy improved my learning experience*

Figure 16.0 displays the levels of satisfaction among participants regarding the performance of the AI study buddy. The majority of respondents report positive experiences, with 44% feeling satisfied and 41% very satisfied with its performance. A small group, 6%, remained neutral about their experience, while dissatisfaction was reported by 9% of the participants, with 6% feeling very dissatisfied and 3% dissatisfied. These figures suggest that the AI study buddy was generally well-received by the majority of users.

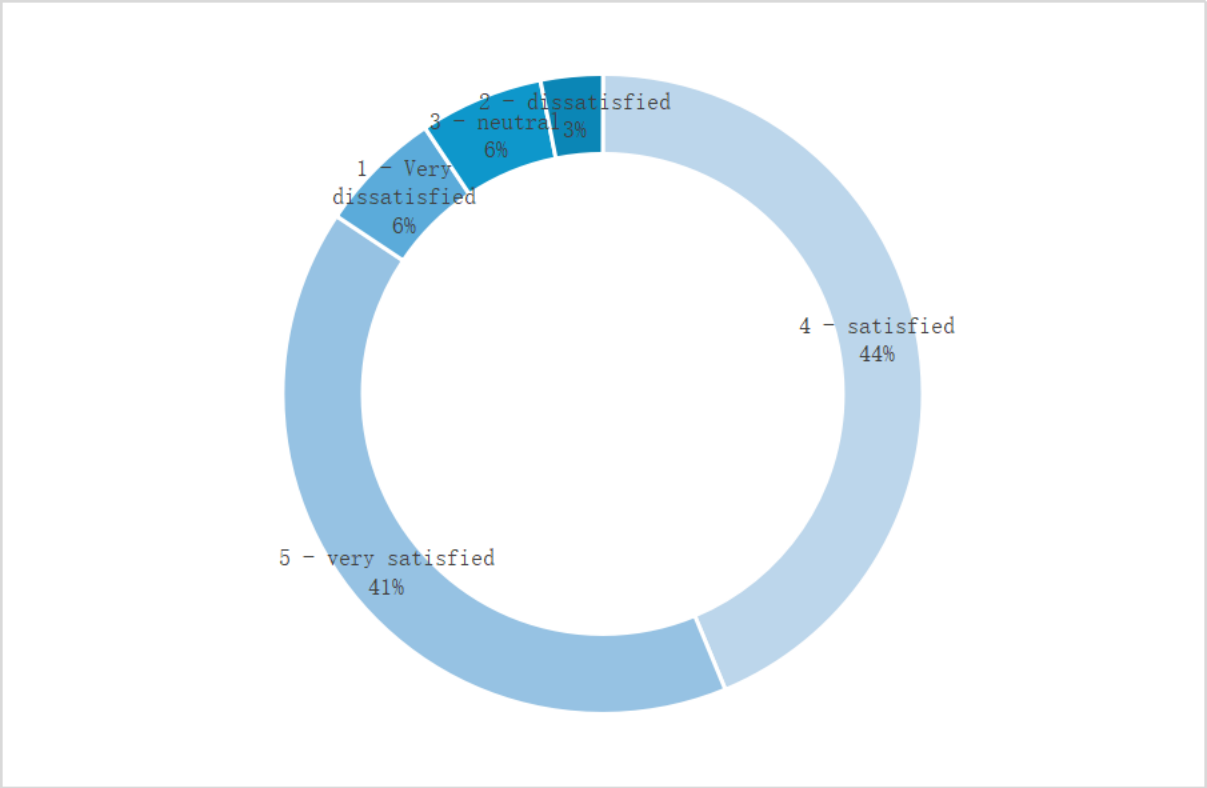


*Figure 16.0: How satisfied were you with the AI study buddy performance?*

In questions 6. in the survey, students were asked if they experienced specific challenges they while using the AI study buddy to which via content analysis are summarised by themes and bullet points the following topics:

**Challenges and Issues with AI Study Buddy:**

- **Repetition and Lack of Explanation:**
  - "it did not understand my questions properly and was also just giving answers from the guide."
  - "The AI Study buddy just repeated my questions and offered no easy breakdown or help of any of my property law topics."
- **Inconvenience in Usage:**
  - "The fact that you were required to say whether you wanted to refresh the session each time was a minor inconvenience."
- **Accuracy and Relevance of Answers:**
  - "Sometimes it lacked to give an accurate answer."

    - "In one question it gave me a less accurate answer."
    - "It gives false and half info about the cases."
- **Understanding and Interpreting Questions**:
    - "There were some questions it did not understand."
    - "Sometimes, AI Buddy would not be able to interpret the question...When the question is rephrased or simplified, the AI Buddy could provide some kind of an answer."
- **Limited Resource Base**:
    - "Its resources are limited..."
    - "Several that there was no answer to on the database."
- **Positive Overall Experience Despite Challenges**:
    - "But overall the experience was great."
    - "No. It worked so well."
- **Miscellaneous Technical Issues**:
    - "None in particular that are especially notable, but I do recall having some difficulty with it. I do recall it repeating information verbatim a couple of times."

These themes indicate that while some participants encountered specific challenges related to the AI's understanding and response capabilities, the overall experience was viewed positively by some users. The feedback points to areas where the AI tool could be improved, such as enhancing the accuracy of information, broadening the resource database, and refining the AI's ability to understand and interpret user questions. Altogether those comments were made by thirteen individuals which is nearly 41% of the respondents which is a significant number nearing almost half of the respondents.

Further below in the donut chart is shown the frequency of usage of the AI study buddy by participants during the pilot programme. The majority of users, 45%, reported using the AI study buddy on a weekly basis. A significant portion, 26%, used it daily, indicating a regular interaction with the AI tool. Meanwhile, 19% of the participants used it rarely,

and a smaller group, 10%, engaged with the AI study buddy monthly. This data suggests that the AI study buddy was integrated into the routine study practices of a majority of the participants, with a particular emphasis on weekly use.

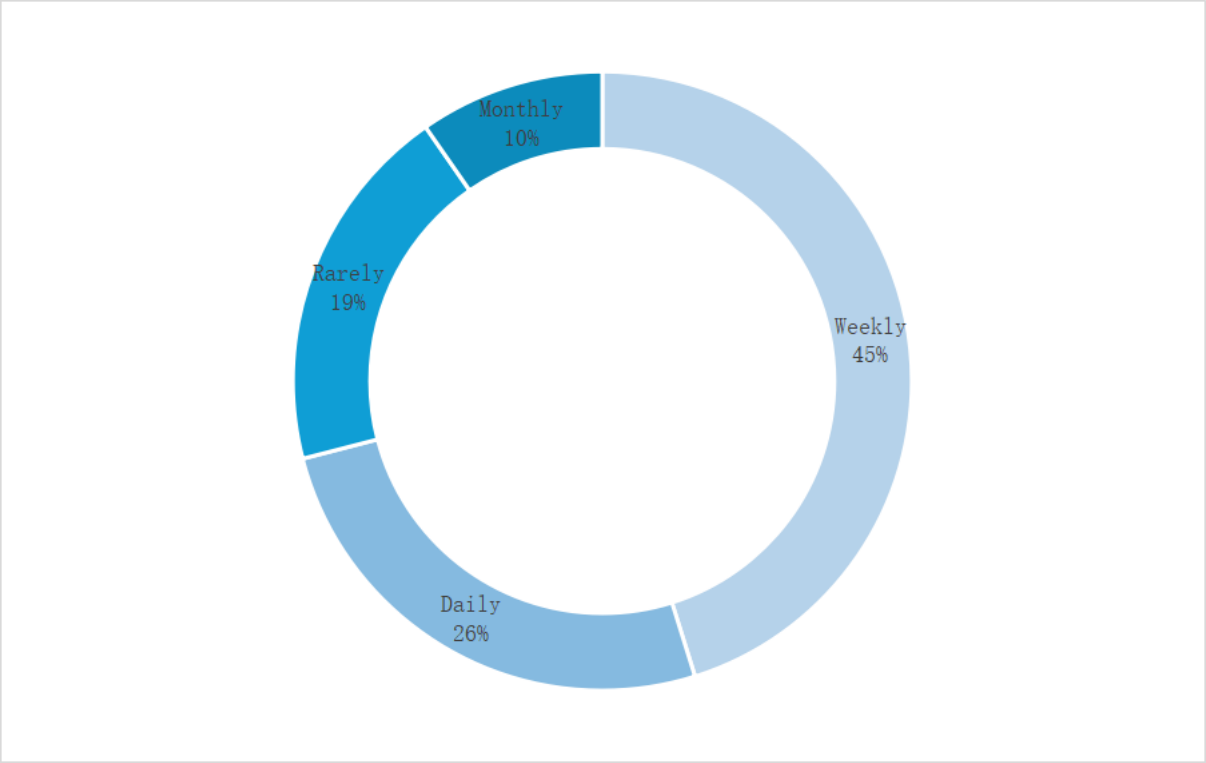


*Figure 17.0: How frequently on average did you use the AI study buddy during the pilot programme?*

Open ended question “What additional features or improvements would you like to see in the AI study buddy for future versions”?

The content analysis of the suggestions for enhancing the AI study buddy reveals several themes indicating users' desires for future versions:

- **Information Accuracy and Depth**:
  - "Provide more accurate information."
  - "The answers should be more accurate."
- **Access to Legal Resources**:
  - "Widening of case law knowledge."

    - "Case law to topics for modules I believe is critical."
    - "Correct cases details and full information."
- **Technological Features and Interface**:
    - "Ability to dictate questions and buddy to read aloud the answers."
    - "Maybe if it could create a mind map flowchart for topics that would be related to the question you ask."
- **Source Citing and Referencing**:
    - "To cite the sources it got the information from."
    - "Referencing should be improved."
- **Expanded Knowledge Base**:
    - "Perhaps just an improvement on the database/what information it has access to."
    - "In my opinion, add law journals and books of various writers."
- **Interactive Learning Tools**:
    - "I think being able to provide more information on a topic. You can only go to tell me more three times and sometimes the answer would be truncated."
- **Content Adaptability**:
    - "I am not sure because AI is an upcoming technological feature...it works effectively depending on the data fed into it."
- **Satisfaction with Current Offering**:
    - "I am satisfied at this time."
    - "Nil."

These themes suggest users are looking for enhancements in the AI study buddy that focus on improving the precision of information, expanding the breadth of legal content available, refining interaction capabilities, and ensuring accurate referencing. Additionally, users are interested in more dynamic and visually oriented learning tools to aid in their understanding of complex topics. Some respondents express satisfaction with the current system, indicating that any perceived shortcomings are not universal. Overall, these insights provide a clear direction for the development of future iterations

of the AI study buddy, with a focus on accuracy, resource expansion, and advanced functionalities.

## Evaluating Pedagogical and Ethical Views on AI Tutoring Engagement

When students were asked about “Did you have any concerns about the privacy and security of your data when using the AI study buddy? Please explain:” The content analysis for responses concerning data privacy and security when using the AI study buddy shows a strong theme of trust and lack of concern:

- **General Trust in Privacy and Security**:
  - A majority of responses explicitly indicate no concern regarding data privacy and security issues: "No," "None," "No I am not concerned about privacy issues," "N/A," "Nil," "Not at all!"
- **Confidence in Institutional Measures**:
  - Trust is placed in the institution providing the AI study buddy: "It is after all a part of the Virtual Learning Environment provided by the University of London. I trust the University."
- **Satisfaction with Current Functionality**:
  - Users expressed contentment with the AI study buddy's current stance on privacy: "Ai Study buddy is good in this manner."
- **Lack of Technical Understanding**:
  - Some users acknowledge their limited understanding but still do not express concern: "No but I don't know enough about AI."
- **Educational Process and Policy Awareness**:
  - One respondent refers to existing policies about the use of AI tools in assessments, showing awareness and agreement with the institution's approach: "Well I know you'll explained in the Admissions Notice about Chat GPT and not allowing it to write or solve problems for exams. I fully agree..."

These responses overwhelmingly suggest that the users did not have significant concerns about the privacy and security of their data while using the AI study buddy.

Trust in the educational institution's safeguards appears to be a significant factor contributing to this lack of concern. There are no responses that indicate a distinct unease or issue with data privacy or security, highlighting an area where users feel secure within the existing framework and measures.

Continuing with further perception of AI, the donut chart 18.0 below for the question on whether participants would recommend the AI study buddy to peers or colleagues shows strong positive responses. A majority, 53%, responded with 'definitely yes', indicating strong positive feedback. A further 35% of participants responded with 'probably yes', suggesting a favorable but less certain stance. Neutral responses account for 3% of participants, indicating neither a clear endorsement nor opposition. There are participants who are less inclined to recommend the AI study buddy, with 6% answering 'definitely not' and another 3% answering 'probably not', reflecting some level of reservation or dissatisfaction with the AI study buddy.

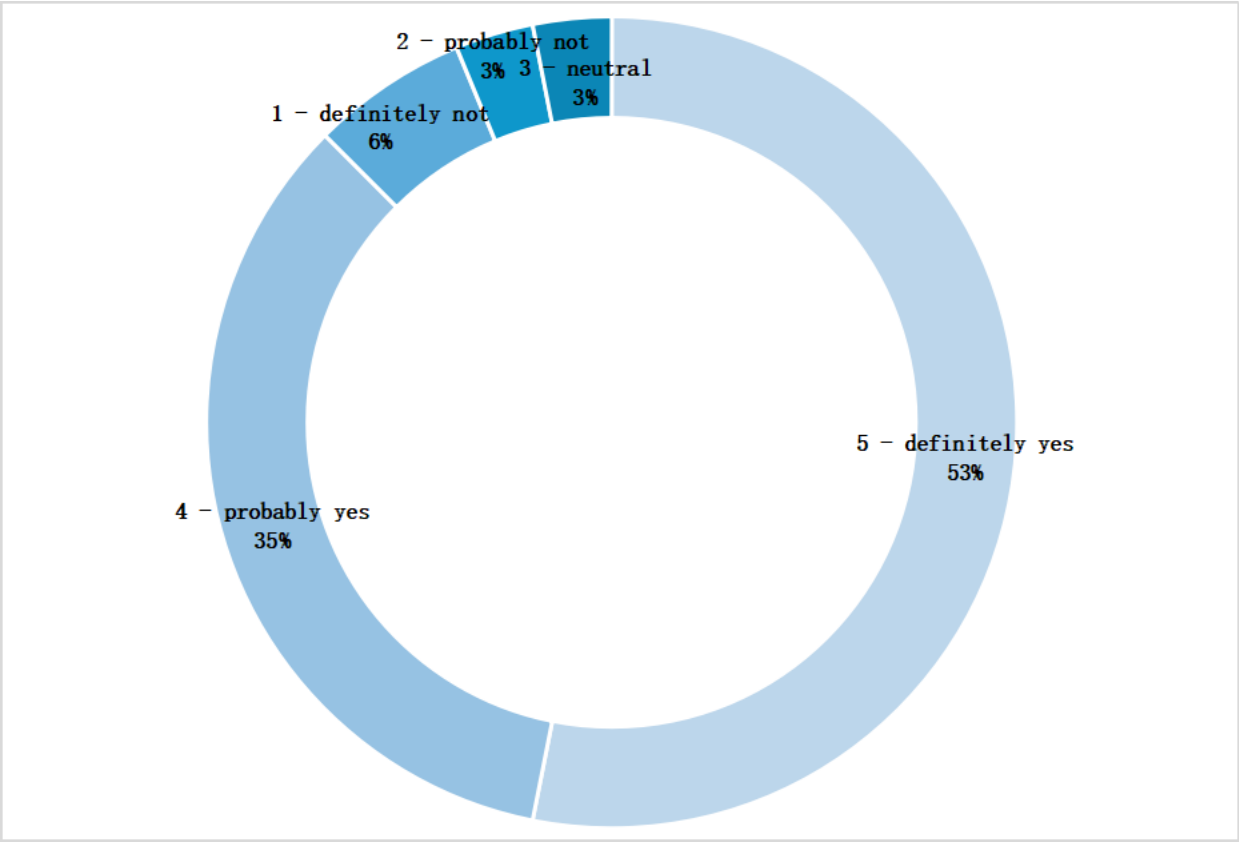


*Figure 18.0: Would you recommend the AI study buddy to your peers or colleagues?*

The content analysis of the last survey question prompting students to add anything they feel or like to share have resulted to 16 individual comments and number of respondents, forming following themes:

- **Potential for Audio Interaction**:
  - Interest in features that allow the AI to read out information: "If it can read out."
- **Views on Necessity and Preference for Human Interaction**:
  - Some believe that an AI study buddy is unnecessary: "There is no need for an AI study buddy at all."
  - A preference for better human support over AI assistance is expressed: "Students would instead benefit from better (human) support and improved resources."
- **Positive Feedback and User Satisfaction**:
  - Users express contentment and find the tool helpful: "The app helped me a lot. I have no comment."
  - Positive remarks on its usefulness: "I like it and very useful."
- **Content and Knowledge Enhancement**:
  - Requests for more comprehensive and current legal knowledge: "to have more and up to date knowledge about legal concepts."
  - Suggestions for the AI to provide more than just module guide excerpts: "That the answers are not just extracts of the module guide."
- **Expansion to Other Modules**:
  - Desire for the AI study buddy's services across various academic modules: "Kindly introduce for other modules as well."
- **Qualitative Experience with AI Responses**:
  - Recognition of the AI's limitations and intriguing response behavior: "It often tells you good question but says sorry no answer."
  - Requests for improvement in detailing cases: "There is not much detail about all the cases in this Londy buddy."
- **Utility for Exam Preparation**:

- Users report using the AI for exam preparation and express a wish for broader subject coverage: "I hope it becomes available for each subject. It was a great quick reference guide."

- **Feedback on AI's Performance and Reliability**:
  - A mix of praise for its efficiency and critique of its limitations: "It provided cogent and coherent responses to whatever I threw at it about 95% of the time."
- **Tool Enhancement for Problem-Solving**:
  - Suggestions to improve its capability to handle problem questions and its methodology: "I tried throwing problem questions at it to ascertain a clear methodology to answering problem questions and found that it would ignore or not answer some parts."

These themes illustrate a spectrum of user experiences, ranging from requests for enhanced features and broader knowledge bases to a call for expansion into other modules. While some users convey satisfaction and endorse the current utility of the AI study buddy, others highlight areas for improvement and express a preference for human interaction, pointing towards a future where AI assistance may be most effective when working in concert with traditional resources and human support.

## Discussion post-survey results

In the comprehensive analysis of the post-intervention survey report, a detailed examination of the AI study buddy's contribution to personalised learning has emerged, contrasting with traditional human tutoring. With 83% of participants engaging with the AI study buddy during the pilot (Figure 15.0), it is evident that the tool was broadly embraced, suggesting its effectiveness in addressing individual learning needs and styles. This wide acceptance aligns with the pedagogical viewpoint that highlights AI's potential to resolve educational challenges, championing customised learning experiences (Bloom, 1984; Balfour, 2013; O'Neil, 2016; Zheng et al., 2018).

Nevertheless, respondents' feedback illustrates some resistance and challenges associated with AI integration. Concerns regarding accuracy (Figure 16.0) and

comprehension (Figure 17.0) have been flagged, indicating areas for technological refinement. These insights underscore the necessity for further AI development to meet and adapt to diverse student requirements, aligning with current discussions in educational technology literature (Steenbergen-Hu & Cooper, 2013).

The AI study buddy's impact on the learning experience was largely positive, with a majority reporting an enhanced learning journey (Figure 18.0). This demonstrates the AI's potential to facilitate deeper understanding and engagement with subject matter. Yet, the pedagogical efficacy of AI remains an area of ethical debate, as its use in educational settings raises questions about the replacement of human support with technology, a concern that has been echoed in academic discussions (Selwyn, 2019; Zhao, 2019).

Furthermore, the survey revealed a desire for future iterations of AI study buddies to have expanded knowledge bases and interactive functionalities. Users articulated a need for the AI to provide more than just text extracts, suggesting enhancements that include the capability to engage with audio interaction and improved referencing (Figure 20.0). Such developments could potentially address the ethical and pedagogical implications of AI in education by ensuring that AI support remains supplementary and does not diminish the role of human educators (Eynon, 2018).

Finally, the participants' trust in the AI study buddy, underpinned by a lack of concern for data privacy and security (Figure 19.0), indicates a foundational confidence in the institutional safeguards put in place by educational providers. This trust is crucial for the continued integration of AI in education, as it assures students that their personal information remains protected, an aspect that has been increasingly prioritised in recent technological discourse (Figure 21.0; Olney et al., 2012).

In sum, while the post-survey report depicts a robust engagement with the AI study buddy and a general optimism about its role in personalised learning, it also advocates for a judicious balance between AI tools and human teaching practices. This balanced approach, as recommended by academic literature, suggests that the full potential of AI in education can be realised when it functions as a complement to, rather than a

replacement for, traditional human tutoring (Bloom, 1984; Steenbergen-Hu & Cooper, 2013; Kumar, 2016; Eynon, 2018; Selwyn, 2019; Zhao, 2019).

## Bridging Insights from Pre and Post-Intervention Surveys on AI in Education

The shift from initial beliefs to real-world experiences with AI-driven tutoring technologies presents an opportunity to explore changes in student attitudes and the educational implications of integrating AI into learning environments. This transition was challenging to assess in this pilot study due to methodological limitations. Despite these limitations, including discontinuities between the pre- and post-intervention survey questions and the lack of demographic data about the respondents, this section endeavors to provide collective insights from both survey phases. By comparing anticipated outcomes with actual experiences, it aims to shed light on the complex relationship students have with AI as a tool for learning.

## Anticipation vs. Experience: A Comparative Overview

The pre-intervention survey data elucidated a largely optimistic view among students regarding AI's potential to enhance learning experiences. A substantial majority expressed positive attitudes towards AI, underpinned by expectations of personalized learning, academic efficiency, and enhanced intellectual engagement. These anticipations were mirrored against the backdrop of high technology usage for educational purposes, suggesting a readiness to embrace AI-driven innovations.

In contrast, the post-survey outcomes reveal a nuanced picture of acceptance and identified areas for improvement. While the engagement with the AI study buddy was high (83%), reflecting an eagerness to explore AI's educational potentials, students' experiences brought to light specific challenges, such as issues with accuracy, understanding, and a desire for more interactive features.

**Personalized Learning Realized**: Both surveys underscore the high value placed on personalized learning experiences. The anticipation of AI facilitating customized support was largely met, as evidenced by the positive reception towards the AI study buddy's ability to understand user queries and adapt to learning styles. However,

suggestions for further enhancing the depth and accuracy of information point towards an evolving expectation of personalization, extending beyond the initial engagement.

**Technological Familiarity vs. Pedagogical Satisfaction**: The initial comfort with technology did not unequivocally translate into complete satisfaction with AI's pedagogical role. While the majority reported improved learning experiences post-intervention, there remained a contingent that articulated a preference for human interaction, highlighting an area where AI needs to complement rather than replace traditional educational methods.

**Ethical Considerations and Trust**: It is noteworthy that concerns regarding data privacy and security, potential significant deterrents, were minimally expressed during the post-survey phase. This minimal expression of concern implies a fundamental trust in institutional safeguards, crucial for the widespread acceptance and integration of AI technologies in education. This aspect warrants further investigation, especially in comparing the trust students place in universities versus AI corporations. Additionally, policies must be established to safeguard this trust.

**Recommendations and Future Directions**: The collective feedback points towards a desire for AI tools that are not only technologically advanced but also pedagogically sensitive and ethically responsible. Enhancements in AI's ability to provide deeper, more accurate content, coupled with features that foster interactive learning, could bridge the gap between anticipation and experience, thus enriching the educational landscape.

## Conclusion

The exploration of Artificial Intelligence (AI) in educational settings, as outlined in the literature and demonstrated through the pilot study of the AI study buddy "Walter," has significant pedagogical and ethical implications. Bloom's Two Sigma Problem suggests AI’s potential to customize education for one-to-one tuition benefits at scale (Bloom, 1984). The findings from pre and post-surveys reveal a cautiously optimistic reception

towards AI applications in learning environments, highlighting both enthusiasm for AI integration and a noted need for human presence in education. Ethical considerations, particularly around data privacy and AI transparency, are emphasized as essential, with the responsibility on institutions to establish trust through clear data governance.

The study's results with Walter present a snapshot of the broader discourse in educational technology. An engagement rate of 83% among participants indicates a significant interest in AI tools, balanced by feedback calling for improved accuracy and handling of complex academic content. This feedback underscores a growing trust in institutional data security measures and highlights the evolving landscape of digital learning where ethical concerns are progressively addressed. The pedagogical necessity for AI to complement human instruction underscores the vision for AI as a supportive tool, enhancing rather than replacing the irreplaceable expertise of educators.

Given the insights from this pilot study, the following detailed recommendations are offered to advance the integration of AI-driven tutoring in the UG and PG Law curriculum at the University of London Worldwide:

- **Enhance AI Responsiveness and Comprehension:** Upgrade Walter's natural language processing to more accurately interpret complex legal terms and concepts, ensuring contextually relevant responses (Figures 16.0, 17.0).
- **Expand the Knowledge Base:** Continuously update Walter with the latest case law, statutes, and legal scholarship for up-to-date and comprehensive information (Figure 20.0). Include a broad spectrum of legal sources to offer a holistic learning resource.
- **Develop Interactive Learning Tools:** Integrate interactive aids like mind maps or flowcharts to help students grasp complex legal principles and their interconnections (Figure 20.0).
- **Improve Personalised Feedback:** Incorporate adaptive learning algorithms in Walter to provide nuanced feedback based on individual student performance and progress.

- **Bolster Data Security and Transparency:** Implement stringent data privacy and security measures, clearly communicating these to students to mitigate data usage concerns (Figure 19.0).
- **Augment Human-AI Interaction:** Design Walter to flag complex or unresolved queries for human tutor follow-up, ensuring comprehensive support for students.
- **Conduct Continuous Improvement Cycles:** Establish a feedback loop for regular review and refinement of Walter's performance based on student interactions.
- **Facilitate Accessibility and Inclusivity:** Make Walter accessible to all students, including those with disabilities, by incorporating assistive technologies.
- **Promote AI Literacy:** Develop programs to enhance the understanding of AI's capabilities and limitations among students and faculty, fostering a conducive environment for AI's educational use (Figure 15.0).
- **Strategic Integration Across Curricula:** Thoughtfully extend Walter's application across various law modules and programs, ensuring consistency and quality in learning experiences.
- **Address Ethical Considerations:** Engage in continuous dialogue with all stakeholders to navigate the ethical use of AI in education, focusing on bias, fairness, and the implications of AI dependency (Ethical Issues section).

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