



Evaluating the Effectiveness of a Chatbot-Based Workshop for Experiential Learning and Proposing Applications

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ABSTRACT

Purpose -This study examined the effectiveness of a chatbot workshop conducted at Lovely Professional University, Punjab, in promoting student involvement among undergraduate students taking the elective course "Doing Business with AI." In this course, non-STEM students learn how to create a chatbot prototype using the 'Dialogue' Programme and suggest potential applications for AI chatbots. **Design/methodology/approach** -Students develop a strong understanding of conversational and user-centric design methodologies through engaging workshops and practical learning exercises. The chatbot workshop aims to help inexperienced learners with limited AI knowledge understand and connect the knowledge inputs and outputs of conversational agents driven by NLP, to effectively respond to user inquiries.

Findings - According to the findings, a significant majority of the students (81.3%) who took part in the hands-on workshop showed active involvement. Additionally, a high percentage (90.7%) reported feeling moderately to highly skilled in the experiential learning chatbot session. Most students who were surveyed expressed their agreement that the experiential chatbot workshop successfully achieved its intended learning outcomes. **Practical implications** - The findings of this study can provide valuable insights for practitioners who are developing strategies for chatbot-based workshops focused on experiential learning. **Originality/value** -Through the validation of a conceptual model rooted in learning theories and technology-mediated learning (TML) models, we have put forth two applications pertaining to business game simulation, as well as an additional application focused on outlier detection in data.

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Introduction

Global business executives are incorporating digital transformations into their operations to meet the demands of the market (Masongsong et al., 2024; Ofosu-Ampong et al., 2024). In response to the growing presence of AI technologies in the business sector, higher education institutions are also working to integrate digital technologies, including AI education ecosystems. The implementation of AIED in higher education has the potential to enhance teaching and learning through personalised courses, automated assessments, and 24/7 access to course materials (Augustyniak et al., 2016). The US Education Report projects significant growth in the AIED industry, with a compound annual growth rate of 47.77% from 2018 to 2022.

Many educational institutions utilise AIEDs through chatbots to enhance student engagement and facilitate learning beyond the traditional classroom setting. Through the integration of chatbot prototypes with e-learning platforms, researchers have found that natural language processing (NLP) can effectively analyse student inquiries and provide relevant content from the knowledge base to support review. In today's modern era, educational chatbots that seamlessly connect with social networks and are compatible with mobile devices have proven to be highly effective in capturing and maintaining students' interest (Brynjolfsson & McAfee, 2017). Chatbots play a crucial role in facilitating communication between instructors and students in foreign language education and remote learning. Students can gain knowledge and apply cutting-edge AI technologies in areas such as customer service, sales and marketing, and communication using these resources.

As educators, we understand the impact of engagement and motivation on learning outcomes. Motivation is a powerful force that drives learning and helps us achieve our educational goals (Brynjolfsson & McAfee, 2017; Clarizia et al., 2018). As mentioned, motivation plays a crucial role in student engagement and academic performance. This article presents the findings of a workshop on chatbot implementation in the introductory undergraduate management course 'MGMT240 – Doing Business with AI' at LPU. Students from different academic backgrounds can learn how to create a chatbot prototype using the 'Dialogflow' Programme during the workshop. If the instructional methodology of a cutting-edge, interactive chatbot workshop proves to be successful, it is expected to engage and captivate participants. Finally, to achieve the study objective, this study formulated the following research questions.

1. Does the experiential chatbot workshop motivate and engage students?
2. What is the relationship between experiential chatbot workshops, student motivation, engagement, and intended results like satisfaction and competency acquisition.

Frameworks of Study and Literature Review

Engaging in exploratory learning involves actively acquiring knowledge and skills. Based on careful analysis of past teaching experiences, the instructors of the 'Doing Business with AI' course have concluded that integrating practical elements, like workshops, can significantly improve student learning. Considering the advancements in AIED and TML in the academic realm, the experiential chatbot workshop was influenced by learning

theories like Kolb's experiential learning model and Gagne's nine learning events (Deci & Ryan, 2008). A stimulating, hands-on teaching approach was utilised to offer a fresh and captivating educational experience that promotes active student participation.

In MGMT240, students will explore the application of artificial intelligence in various business functions such as supply chain management, manufacturing, customer service, finance, and marketing. Students will gain a comprehensive understanding of how organisations can enhance their competitiveness and efficiency by leveraging cutting-edge technologies such as machine learning, deep learning, neural networks, and image analysis. The course curriculum guides students in creating a chatbot prototype using the 'Dialogflow' software, a product of Google-owned Dialogflow, as illustrated in Figure 1. By becoming proficient in Dialogflow and NLP skills, students will easily be able to use other chatbot platforms or applications in the future. We aim to teach students valuable skills like user-centric design and conversation design through the workshop and practical learning activity, which they can apply in various contexts beyond the course.

Part I: Introduction (Warm-Up)		Duration: 30-45 min
<ul style="list-style-type: none"> Introducing chatbots Types of chatbots Introduction to Dialogflow, NLP Dialogflow demonstration (using freshman orientation as case study) 	Content covered: <ul style="list-style-type: none"> Types of chatbots How to select chatbots Technology involved (NLP) Dialogflow functions Conversation design User requirements, user-centric design, needs assessment 	Teaching Objectives: <ul style="list-style-type: none"> Overview on chatbot options and technology powering its capabilities. Demonstrate real-life application of chatbots using case studies.
Part II: Class Activities		Duration: 45 min
Activity 1 (25 min) <ul style="list-style-type: none"> Create conversational agent on Dialogflow. Test chatbot prototype Volunteers to present In-class discussion Activity 2 (20 min) <ul style="list-style-type: none"> Discussion: Implementing chatbot in the workplace 	Content covered: <ul style="list-style-type: none"> Design of conversation flow on chatbot. Step-by-step process of creating chatbot on Dialogflow (coding not required for workshop) User-centric design 	Teaching Objectives: <ul style="list-style-type: none"> "Hands on" segment on Dialogflow to practice conversation design. Create a complete set of ('Intents', 'Entities', 'Response', 'Fallback') Students to test their chatbot agent Critical thinking: application of chatbots in different contexts (beyond example given in class)

Figure 1: Experiential Chatbot Workshop Lesson Plan and Lesson Template.

According to Han (2021), student engagement in meaningful projects and collaboration with others is crucial for effective learning and strongly correlates with learning outcomes. Enhanced outcomes often arise from heightened levels of dedication, as exemplary students are characterised by their active participation in assignments and the investment of mental and physical effort (Handelsman et al., 2005). Various factors, including the teacher's involvement and effectiveness, the use of relevant concepts, the implementation of challenging assignments and skill-building exercises, support, and constructive feedback, can all influence a student's level of engagement. Our goal during the cooperative chatbot studio was to foster an environment conducive to learning that was both safe and user-friendly. Students were encouraged to engage in discussion with the teacher or their peers during the class to respond to any inquiries or comments related to the subject, as well as to present their own questions. In addition, students were encouraged to actively

engage in the educational journey through the positive outlook of constructive feedback and the voluntary presentation of their work to the class.

In addition, the studio organised consideration screens to allow participants to demonstrate their level of understanding through a step-by-step presentation. Users can utilise the audio/video or text (chat box) features to seek guidance or request assistance from the instructor. To effectively analyse and evaluate student engagement, which is a multifaceted concept, it is crucial to select a research instrument that is appropriate for the specific research environment being studied (Heindl, 2020). The research utilised the Student Course Engagement Questionnaire (SCEQ), consisting of 23 items, as the primary instrument for data collection. It was chosen for its dependable nature and ease of management. The items cover four important dimensions of engagement that have been identified: (i) skills engagement, (ii) participation/interaction, (iii) affective engagement, and (iv) performance engagement. Modifications were made to certain aspects of the SCEQ to better suit the unique circumstances of the Chatbot workshop. Based on the research conducted by Jung and Lee (2018), the SCEQ offers educators a comprehensive understanding of student engagement and its impact on learning. This goes beyond the insights gained from student feedback in the classroom and assessments based on grades.

Our model, depicted in Figure 2, is one that we aim to enhance through a quantitative analysis using a larger sample size. The progress of this field relies on the latest learning theories and TML models to examine the potential connections between various model factors. These factors explore the potential effects of the chatbot studio on students' motivation and engagement, which are crucial for acquiring artificial intelligence-related skills such as natural language processing (NLP).

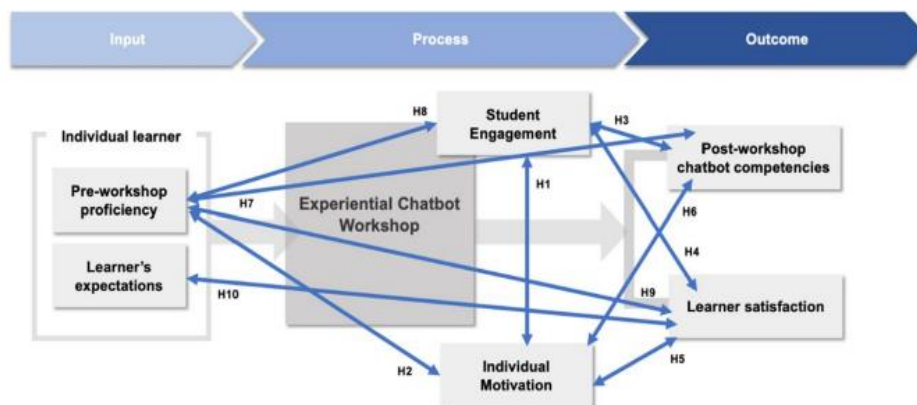


Figure 2: Conceptual Model.

A study conducted by Kaiss et al. (2023) highlighted the importance of adaptive learning chatbots for student engagement and learning. Their findings emphasise the significant role these chatbots play in keeping students actively involved in educational activities. Engaging students in educational activities is a positive step towards progress. In addition,

the research conducted by [Ait Baha et al. \(2023\)](#) highlights the significant impact of artificial intelligence chatbots on the education sector. These chatbots have revolutionised the way students learn by strategically enhancing the learning process. As noted by [Kuhail et al. \(2023b\)](#), the use of learning chatbots offers novel experiences for both students and teachers. Transformation in the education sector is achievable through enhanced learning and performance.

According to [Zhang et al. \(2023\)](#), motivated students can benefit from the support of AI chatbots to enhance their critical understanding of concepts. This development in the education sector has the potential to significantly impact student learning. As stated by [Chang et al. \(2023\)](#), teachers' high motivation is crucial for providing effective educational support to students. Advancements in teaching methodology aid students in advancing their learning. [Mageira et al. \(2022\)](#) suggested that when teachers use generative chatbots to motivate students to excel.

The advent of information technology has revolutionised traditional learning methods ([Wu & Yu, 2024](#)). The human personality is significantly affected by it. The use of language learning tools can enhance students' strategic performance ([Huang et al., 2022](#)). The dissemination of information through learning tools and online platforms enables students to enhance their learning modules ([Yin et al., 2021](#)). Hence, it is imperative to strategically advance learning by incorporating classroom discussions with learning chatbots to assist students. [Hwang and Chang \(2023\)](#) found that developed nations have implemented learning modules and chatbots to enhance student learning.

[Kuhail et al. \(2023a\)](#) noted that the use of generative chatbots in educational settings can be beneficial for students in improving their learning outcomes. The students must undergo training to enhance their level of understanding. According to [Chamorro-Atalaya et al. \(2023\)](#), using chatbots to create lecture material provides students with learning flexibility and diverse perspectives. Organising students to learn chatbot material can improve their critical performance ([Malik et al., 2021](#)). The strategic approach of teachers in delivering chatbot-related information to students is crucial for influencing students to adopt chatbots as a learning tool ([Smutny & Schreiberova, 2020](#)).

According to [Sandu and Gide \(2019\)](#), chatbot-based learning is essential for enhancing students' academic performance. Students can customise and process information in a timely manner. [Hobert et al. \(2023\)](#) found that students need to be trained before they can effectively use digital learning tools. Guidelines for students to use chatbots ethically and appropriately are necessary to ensure effective learning ([Alemdag, 2023](#)). [Mendoza et al. \(2022\)](#) found that providing students with helpful information and ensuring their understanding is crucial for enhancing learning outcomes. Additionally, students should possess reliable reasoning skills to improve their performance.

[Hwang and Chang \(2023\)](#) have affirmed the importance of integrating AI chatbots into the modern education system. Chatbots can be a valuable resource for students in organising their learning materials to improve their performance. According to [Kim et al. \(2019\)](#), chatbots have been found to be beneficial for students in the intelligent analysis of various types of data. In addition, [Hwang and Chang \(2023\)](#) have found that incorporating chatbots into educational training can effectively address students' less productive approach. [Kuhail](#)

et al. (2023b) also highlighted the reliability of integrating chatbots to enhance student performance.

H1: Student engagement will be greater for those with a high level of intrinsic motivation as opposed to those with a low level of intrinsic motivation.

H2: The motivation of students will be greater for those with a low level of pre-workshop proficiency in functionality-related matters as opposed to those with a high level of pre-workshop proficiency in the same matters.

H3: Students who exhibit a greater degree of engagement during the chatbot workshop will demonstrate a greater proficiency in chatbot-related competencies compared to those who demonstrate a lower degree of engagement.

H4: Students who exhibit a greater degree of engagement will experience greater satisfaction with the workshop in comparison to those who do not.

H5: Those students who possess a high degree of intrinsic motivation will exhibit greater contentment with the Chatbot workshop in comparison to those students who possess a low degree of intrinsic motivation.

H6: There is a positive correlation between intrinsic motivation and the level of chatbot-related competencies reported by students, as compared to learners with low intrinsic motivation.

H7: Students who possess a higher level of pre-workshop proficiency in functionality-related skills will exhibit greater post-workshop competencies in comparison to those who have a lower level of pre-workshop proficiency in functionality-related skills.

H8: students with lower levels of functionality-related proficiency prior to the workshop will demonstrate greater engagement, as opposed to those with a high level of proficiency in this regard.

H9: Students who possess a lower level of pre-workshop proficiency in functionality-related matters will experience greater contentment with the chatbot workshop, in comparison to those who possess a higher level of pre-workshop proficiency in the same areas.

H10: Students will be more satisfied with the Chatbot-based learning approach if they perceive a robust correlation between their expectations and the practical workshop experience, as opposed to students who perceive a feeble correlation.

Methodology

The methodology plays a crucial role in every research study, as highlighted by various scholars (Basias & Pollalis, 2018; Gunasekaran et al., 2008; Scandura & Williams, 2000; Sekaran, 2000). Hence, it is crucial to choose the most appropriate research methodology to accomplish the study objective. Typically, the methodology is based on the nature of the study. It is crucial to prioritise the research objectives or research questions when determining the appropriate method for conducting the entire study. The nature of research objectives or research questions can assist in choosing a suitable methodology.

The study employed a quantitative research method. Quantitative research involves collecting data from participants using sampling techniques and online surveys, polls, and questionnaires (Jain et al., 2021; Strijker et al., 2020). Quantitative research is highly effective when testing study hypotheses and analysing the relationship between variables. This study put forward ten hypotheses that were examined using a quantitative research method. Data was collected directly from the participants. Students who participated in the chatbot workshops were chosen as participants for the study. Thus, in this study,

students develop expertise in conversational and user-centric design methodologies through engaging workshops and practical learning exercises. The chatbot workshop aims to help inexperienced learners with limited AI knowledge understand and connect the knowledge inputs and outputs of conversational agents driven by NLP, to effectively respond to user inquiries.

Results

Most of the participants, 60.5% (n=26), expressed their satisfaction with the experiential learning chatbot workshop. Additionally, a significant portion, 30.2% (n=13), reported high levels of satisfaction. This is illustrated in Figure 3, which indicates that a significant majority of respondents (90.7%, n=39) expressed satisfaction with the workshop. All students responded positively to the experiential learning session, except for one student who voiced their dissatisfaction with it. Based on the provided data, it can be observed that the average satisfaction score for the workshop is 4.2, with both the mode and median values being 4.0. From the data provided, it is evident that a significant portion of the participants held positive views about the workshop.

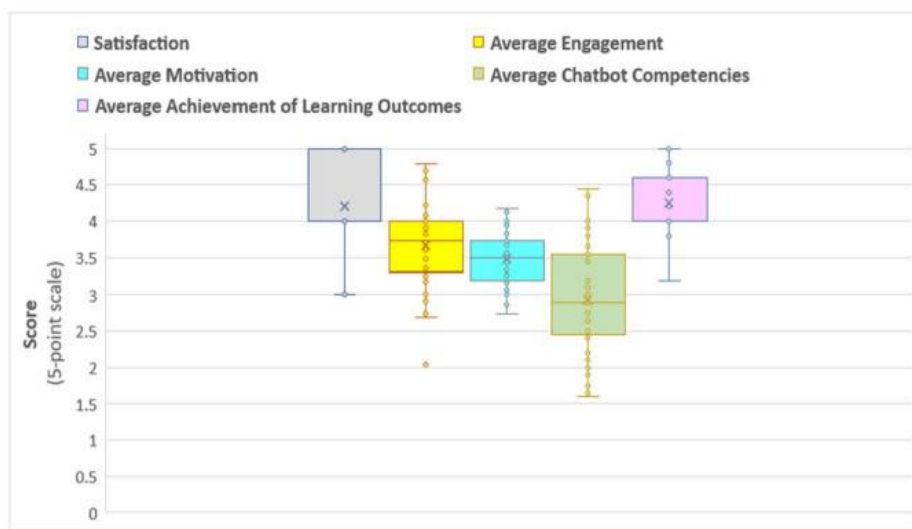


Figure 3: Learning Outcome Accomplishment on an Average Basis.

Out of the participants surveyed about the chatbot workshop, a significant majority of 81.41 percent (n=35) expressed high levels of engagement. Additionally, 18.6 percent (n=8) reported being exceptionally engaged, as shown in the accompanying figure. The data presented in Figure 4 shows that a significant majority of students who participated in the experiential learning process reported feeling motivated. Two students in the group stood out for their exceptional motivation. The motivation score's average has a mean of 3.5, a mode of 3.7, and a median of 3.5. Based on this finding, it appears that students generally display a moderate level of motivation.

Based on the data, it is evident that the selected method of teaching and learning with chatbots is indeed motivational.

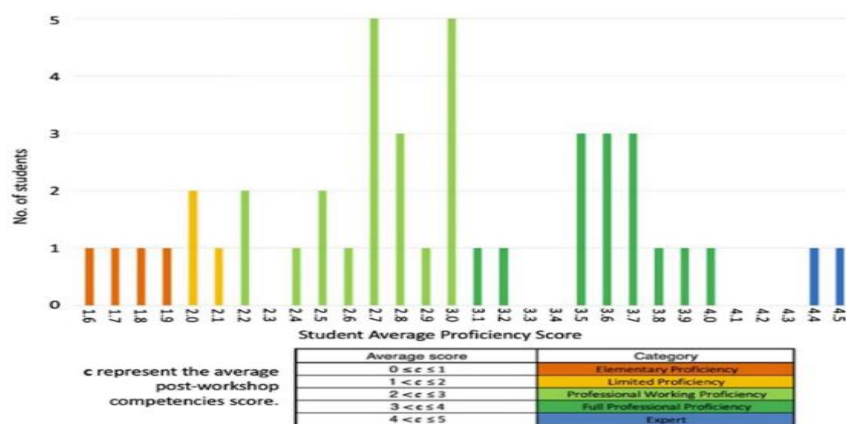


Figure 4: Scores on Average for Competencies.

Due to the variability in students' self-reported proficiency levels, the average score for chatbot-related skills is 2.9. Due to the bimodal conveyance shown in Figure 5, the scores for the comparing mode are 2.7 and 3.0. Additionally, Figure 6 displays the business simulation.

Discussion

The relationship between intrinsic motivation and student engagement is significant. Encouraging students to find their own motivation can greatly increase their level of engagement. Prior research has examined the correlation between intrinsic motivation and student engagement, emphasising the beneficial impact of intrinsic motivation on students' level of engagement (Cents-Boonstra et al., 2021; Shin & Bolkan, 2021; Xiao & Hew, 2024). In addition, the level of student engagement is influenced by their proficiency in chatbot-related competencies. It has been noticed that students who excel in chatbot-related skills show more enthusiasm for workshops of this nature, in contrast to those with a lower level of proficiency in chatbot-related competencies. Past research has highlighted the strong correlation between student engagement and competencies (Aldhaen, 2024; Sun et al., 2021; Trinh, 2024).

The r-squared value for natural inspiration and commitment is 0.471, indicating a significant level of correlation. In the studio setting, the results indicate a moderate level of support for the hypothesis that students with higher motivation scores show greater interest in chatbot studios compared to those with lower motivation. Typically, the outcomes of the social examination loan support investment 1. It suggests that students who achieve lower scores on the motivation scale are more likely to experience reduced levels of engagement during the experiential learning studio. The r-score for high inspiration and pre-studio (usefulness-related) capability is 0.005. With an r-score of 0.427,

the understudy's engagement in acquiring chatbot-related skills provides moderate support for Speculation 3.

The level of relationship between commitment and visit-related capabilities is moderate. The engagement and studio fulfilment r-score at the learning result level is 0.298. Just to clarify, due to the ongoing coronavirus pandemic, the chatbot studio was exclusively focused on web-based projects. According to the studio, interviews with understudies revealed that those who reported feeling less satisfied preferred receiving instruction through physical or in-person methods. The potential consequences of delayed reluctance to embrace visual enhancements on student performance during Zoom meetings cannot be ignored, given that most sessions were conducted online due to the pandemic.

Practical Implications: Ai-Generated Applications

Based on the research findings, two chatbot apps have been developed. These programmes are designed to assist academics and students in analysing data within their specific fields of study. Implementing ChatGPT into the higher education management sciences curriculum can open numerous opportunities for enhancing learning, problem-solving, and research in the field. It offers a promising avenue for students to explore and apply their knowledge. Case study analysis is a fundamental aspect of management education, involving the evaluation and examination of actual company scenarios. ChatGPT offers a wide range of case studies to assist students in identifying problems, formulating solutions, and making strategic choices. These case studies serve as a valuable resource for students seeking support in these areas.

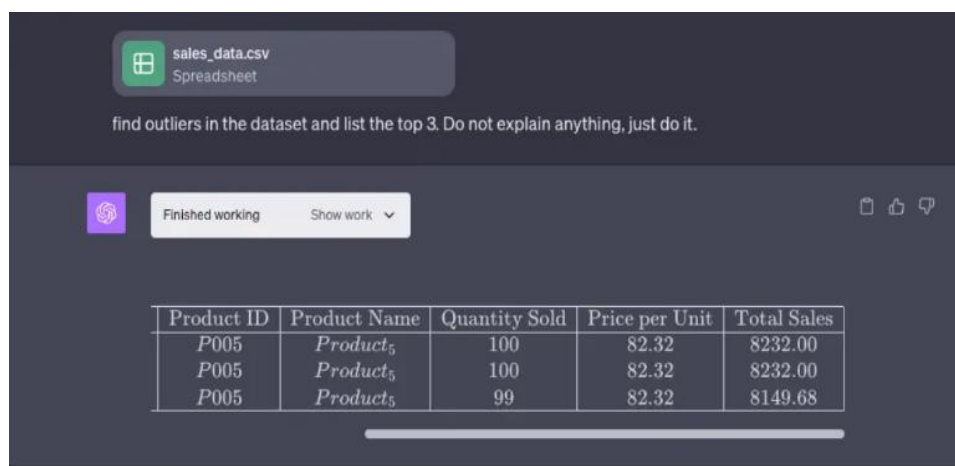


Figure 5: Error Checking and Outlier Detection.

Secondly, ChatGPT offers business simulations that enable students to simulate running fictional organisations, make managerial decisions, and learn from the outcomes of their choices within a secure environment. ChatGPT has the capability to provide business simulations as well.

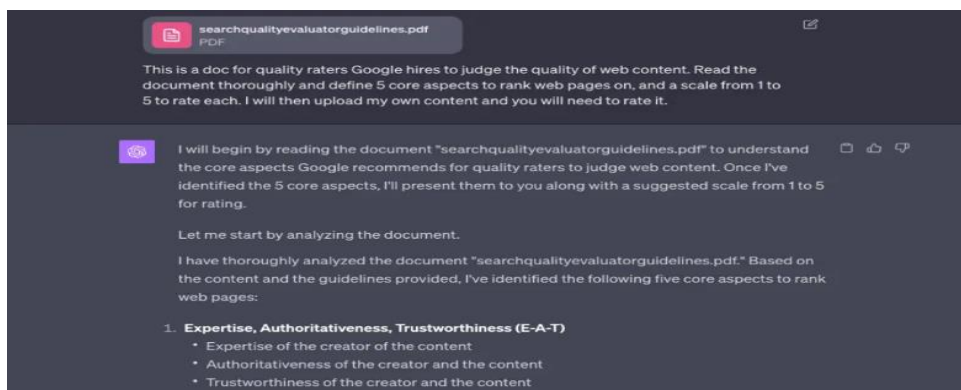


Figure 6: Business Simulation.

The results of the correlation analysis indicate that individuals who have low intrinsic motivation may not benefit as much from a hands-on Chatbot workshop compared to those with high intrinsic motivation (H1). Based on our observations, it appears that participants who actively participated in the chatbot workshop demonstrated a greater level of proficiency in chatbot-related skills compared to those who did not take part. Students who had a stronger internal drive expressed higher levels of satisfaction with the Chatbot workshop (H5) compared to those who had a weaker drive. Students who have similar expectations to the goals of the Chatbot workshop tend to report higher levels of satisfaction with the seminar compared to those who have different expectations (H10).

It is important to consider the small sample size and the limitation of all respondents being enrolled at the same institution (LKCSB) when interpreting our study, as these factors may impact the generalizability of the model. The limited range of participants in the sample, despite their enrolment in different academic years, course disciplines, and subject specialisations (i.e., course levels), may pose a challenge to the generalizability of the findings. However, as previously stated, we believe that our findings can be applied to areas beyond information and communication technology (ICT), including marketing. Our research findings may be of interest to educators who are considering incorporating NLP-powered bots into their classrooms (Shim et al., 2023).

Conclusion

This article presents the findings of a continuous empirical investigation that focuses on students who are currently enrolled in the elective course "Doing Business with AI." This study assessed the educational impact of a Chatbot workshop aimed at engaging and motivating students. Simultaneously, they acquire fundamental AI skills, especially in the field of NLP. The findings of the empirical study suggest that implementing a practical teaching and learning method, like organising a hands-on Chatbot workshop, can successfully engage students in acquiring fundamental bot skills. In summarising a number of notable survey findings, it is worth noting that an overwhelming majority of respondents, 90.7%, expressed their satisfaction with the experiential learning chatbot workshop. Among the workshop participants, a significant majority reported feeling

motivated, while a high percentage of students displayed engagement. Most students (81.3%) reported a significant improvement in their proficiency levels after attending the experiential learning workshop. A large majority of the participants (97.7%) expressed satisfaction with the experiential chatbot workshop, confirming that it successfully achieved the intended educational objectives.

Limitations and Future Research Direction

This study investigated the role of a chatbot-based workshop for experiential learning. However, it is important to note that the chatbot is considered a general variable in this context. There are various types of chatbots, including rule-based, keyword recognition-based, menu-based, hybrid, and predictive chatbots. However, the study did not specify the specific type of chatbot. Examining a particular chatbot can yield more favourable outcomes when it comes to elucidating the connection between workshops centred around chatbots and experiential learning. Hence, it is crucial for future research to explore different types of chatbots and their impact on workshops focused on experiential learning. In addition, this study did not take into account the use of more sophisticated statistical methods to analyse the data that was collected. Future research on the connection between chatbot-based workshops and experiential learning should consider advanced data analysis tools like RStudio and Partial Least Square (PLS). In addition, this study is based on a survey approach, which does have a few limitations. When it comes to using a survey questionnaire-based approach, it's important to note that it may not provide a comprehensive understanding of the phenomenon. Therefore, it is recommended that future studies adopt a mixed method approach, combining surveys and interviews, to gain more comprehensive insights.

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