# INFLUENCE OF CHATGPT FACILITATED PERSONALIZED LEARNING ON ADAPTIVE LEARNING EXPERIENCES AMONG UNDERGRADUATE TEACHER TRAINEES AT THE UNIVERSITY OF NAIROBI, KENYA

[1]Betty Jepkemoi; [2]Peter Kyalo Mulwa
[1-2] University of Nairobi
[1] jepkemoibetty.jb@gmail.com, [2]peter.kyalo@uonbi.ac.ke

*ABSTRACT*

*There has been an escalating demand for personalized learning experiences that make provision for individual learners' unique needs. This trend has spanned Kenya, where the demand for digital personalized learning, which can be attained through the implementation and usage of emerging technologies and tools, has been on the rise. Despite this trend, the area focusing on undergraduate religious education teacher trainees assessing personalized learning on ChatGPT has not been locally documented. In addressing this gap, this study investigated how personalized learning facilitated by ChatGPT influences adaptive learning experiences among undergraduate Religious Education teacher trainees at the University of Nairobi. The study targeted 628 University of Nairobi undergraduate religious education teacher trainees and acquired a sample size of 234 respondents using the purposive sampling technique.*

*A descriptive research design was adopted. A questionnaire and an interview guide were utilized to gather data from the 234 respondents.*

*Descriptive and inferential statistical analyses were conducted to analyze the collected data. The study results revealed that the use of ChatGPT enhanced personalized learning experiences because it enabled undergraduate religious education teacher trainees to engage in self-paced learning, reflecting on the skills learned and learning that fit their learning style.*

*This positively influenced their adaptive learning experiences while using the platform for learning, thus contributing to improved self-efficacy, self-esteem, comprehension, and retention of content learned.*

**Keywords:** Artificial Intelligence, ChatGPT, Personalized Learning, Adaptive Learning

### INTRODUCTION

The contemporary adoption of artificial intelligence (AI) innovations in education including the use of ChatGPT in teaching and learning has contributed significantly changes in instructional approaches. For instance, embracing ChatGPT as an instructional tool has demonstrated how AI-powered virtual instructors can offer learners individualized lessons (Limo, Tiza, Roque, Herrera, Murillo, & Huallpa, 2023).

Bridger & Ford (2019) affirms the role of ChatGPT in education by equating it to a free personal trainer who has infinite access to information and never tires. Multiple studies have been conducted to show how ChatGPT contributes to learning experiences of learners. One such study is by Kasneci et al. (2023) who established that ChatGPT enhanced the overall educational delivery effectiveness and efficiency by creating more personalized learning experiences. The study by Kasneci et al. (2023) associated the ChatGPT with this tool's capacity to generate content that suites the learning style of the individual learner.

Similarly, Firat (2023) observes that ChatGPT's has the capacity to provide learners with tailored feedback, direction, and support as substantially benefiting autodidactic learners within online learning environments, further, personalizing the learning experiences of a learner. In the same vein, Ratnam et al. (2023) opine that ChatGPT may be employed for personalized learning in multiple ways, including tailoring learners' experiences to their abilities and needs. The study by Ratnam, et al. (2023) posits that ChatGPT generative AI (GAI) enhances learners' personalized learning experiences by offering customized recommendations. Further, the study observes that ChatGPT GAI can evaluate an understudy's learning style and advantages and recommend fitting learning activities or resources in this context. Further still, the study asserts that ChatGPT may offer learners adaptive learning experiences by providing customized guidance and individual growth opportunities.

However, the study concluded that there was a need to explore further how ChatGPT creates personalized and adaptive learning opportunities in specific subject areas and levels of study.

Like Ratnam et al. (2023), Zhai (2023) observes that ChatGPT's capacity to offer personalized learning may influence the learning experiences of learners. However, Zhai (2023) recommended that further investigations be carried out to establish how adaptive learning may be influenced by the tool, more so, to establish how it can evaluate a learner's progress and alter the difficulty of the content they are studying in real time to ensure it is suitably challenging. In a related study, Limo et al. (2023) explored how ChatGPT can be utilized as a virtual tutoring tool for personalized learning experiences.

The results from the study by Limo et al. (2023) revealed that most undergraduate students utilized ChatGPT for personalized tutoring. While Limo et al. (2023) recognizes that ChatGPT may offer learners personalized practice problems customized to their proficiency level to help them comprehend concepts and subjects that they find difficult, as well as prompt feedback to enhance their learning outcomes, there is need for further studies to be carried out to establish how the how the personalized learning offered by the tool influence adaptive learning experiences of learners.

This reviewed literature revealed several knowledge gaps on the influence of learner engagement, personalized learning and learner perception of ChatGPT on adaptive learning experiences. Notably, despite finding numerous studies on personalized learning on ChatGPT (Firat, 2023; Kasneci et al., 2023) and its impact on adaptive learning experiences (Limo et al., 2023; Ratnam et al., 2023; Zhai, 2023), none of the studies had been conducted locally or focused on university undergraduate religious education teacher trainees, among whom heavily use the tool in their studies. Therefore, this study sought to address this literature gap.

**OBJECTIVE**

The specific objective of the study was to examine how ChatGPT-facilitated personalized learning influence adaptive learning experiences among undergraduate Religious Education teacher trainees.

**METHODOLOGY**

The descriptive research design was implemented in this study to investigate the influence of ChatGPT-facilitated personalized learning on adaptive learning experiences among undergraduate Religious Education teacher trainees at the University of Nairobi. The study's target population entailed 628 University of Nairobi undergraduate religious education teacher trainees and a sample size of 234 was used. A five-point Likert scale questionnaire was used to gather qualitative and quantitative data to answer the posited research question.

An interview guide was employed to amass the respondents' insights concerning the influence of personalized learning on ChatGPT on adaptive learning experiences of undergraduate religious education teacher trainees. The qualitative data gathered through the guide was used to complement data collected using the questionnaire.

**RESULTS AND FINDINGS**

The objective was to examine how ChatGPT-facilitated personalized learning influenced adaptive learning experiences among undergraduate religious education teacher trainees at the University of Nairobi. Using a five-point Likert scale, the respondents were asked to state the extent to which they agreed with the statements in Table 1.

**Table 1**

**Personalized Learning on ChatGPT and Adaptive Learning Experiences**

| Statements | Mean | SDV |
|---|---|---|
| I can select experiences and activities that match my level of understanding when using ChatGPT in learning tasks. | 4.49 | 0.86 |
| I work at my own time without feeling rushed when using ChatGPT in learning tasks | 4.21 | 0.80 |
| I can get suggestions to improve my understanding when using ChatGPT for my learning | 4.19 | 1.06 |
| I can critically reflect on ways to improve my learning tasks and assignments when using ChatGPT | 4.12 | 1.06 |
| I can seek additional knowledge independently when using ChatGPT in my assignments and learning tasks | 4.07 | 1.07 |
| I can focus on the study areas I need the most help when using ChatGPT in my learning tasks | 4.07 | 0.93 |

| | | |
|---|---|---|
| I am unable to improve my progress in my learning tasks when using ChatGPT | 2.98 | 1.76 |
| I rarely receive relevant feedback when using ChatGPT during my learning tasks | 2.09 | 0.78 |
| Using ChatGPT does not allow me to learn different skills as I wish | 1.92 | 1.06 |
| I am unable to find content tailored to my learning preferences and needs when using ChatGPT in my assignments and learning tasks | 1.90 | 1.04 |
| I feel that ChatGPT does not meet the standard of my learning style | 1.84 | 1.09 |
| I am unable to learn at my own pace when conducting learning tasks on ChatGPT | 1.74 | 0.94 |

Table 1 shows the means and standard deviation (SDV) of the teacher trainees' responses to the questionnaire items presented. The trainees' responses signified that ChatGPT enabled learners to select experiences and activities that matched their level of understanding, work on their own time without feeling rushed, get suggestions to improve their understanding, and critically reflect on ways to improve their learning tasks.

Their responses also showed that ChatGPT enabled them to seek additional knowledge independently and focus on the study areas where they needed the most help. These findings suggested that ChatGPT enabled self-paced learning, permitted learners to reflect on the skills learned, and facilitated their learning based on their individual learning styles. The findings also suggested that ChatGPT-facilitated personalized learning positively influenced adaptive learning experiences among undergraduate Religious Education teacher trainees at the University of Nairobi by improving their self-esteem, self-efficacy, and comprehension of concepts learned.

These findings were complemented by the feedback obtained through the interview schedule. For instance, when the researcher enquired whether ChatGPT facilitated personalized learning, all the interviewed respondents affirmed with a yes signifying that ChatGPT enabled personalized learning among undergraduate religious education teacher trainees at the University of Nairobi. On the interviewer enquiring about whether they found ChatGPT features user-friendly, three themes arose from the responses. The first theme was "ease of use", The second theme encompassed "ease of navigation" and thirdly "relevant of the tool in providing personalized learning".

The respondents indicated that ChatGPT offered learners easy-to-use features, was an easy to navigate application and was relevant in providing personalized learning which contributed immensely to their adaptive learning experiences. This was exemplified by these verbatims selected from some of the respondents:

*RES001: "I find ChatGPT user-friendly. It is easy to navigate its use without prior technical training."*

*RES005: "ChatGPT features are unique and user-friendly, thereby enabling one to navigate easily."*

*RES014: "It has boosted my attitude towards education since the knowledge acquired from it combined with the one acquired from class; it makes it more knowledgeable."*

*RES017: "Using ChatGPT has facilitated mobile learning, and it has enabled online learning to become easier, reliable, and very cheap by reducing costs incurred when we compare it to physical or face-to-face learning."*

*RES018: "It is user-friendly. It is easy to use ChatGPT and easy to understand the lessons."*

*RES020: "They are relevant, very user-friendly, and any prompted question from the AI makes one learn more."*

These responses confirmed the earlier descriptive findings by demonstrating that ChatGPT had easy-to-use and interpret, easy-to-navigate, and relevant features and content that facilitated personalized learning among the undergraduate religious education teacher trainees at the University of Nairobi.

To examine the relationship between personalized learning on ChatGPT and adaptive learning experiences among undergraduate teacher trainees, a simple linear regression model was developed as shown in Table 2. In this context, personalized learning on ChatGPT formed the independent variable, whereas adaptive learning experiences were the dependent variable.

**Table 2**

**Regression Model Summary (Adaptive Learning Experiences)**

|  |  | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|
|  |  | .80 | .70 | .66 | .20 |

### A. PREDICTORS: PERSONALIZED LEARNING

Table 2 shows the R, R-Square, Adjusted R-Square, and standard error of the estimate output. The 0.80 R value indicated a significant correlation between the independent variable (personalized learning on ChatGPT) and the dependent variable (adaptive learning experiences). The 0.70 R-Square value meant that 70 percent of the variance in the dependent variable (adaptive learning experiences) was explained by personalized learning on ChatGPT. The 0.66 Adjusted R-Square value confirmed that the regression model was a good fit for the data.

To further establish whether the overall regression model fit the collected data, the F-test analysis was computed as shown in Table 3.

**Table 3**

**Summary of F-test analysis (Adaptive Learning Experiences)**

|  | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| **Regression** | 6.29 | 12 | .52 | 13.73 | .000 |
| **Residual** | 6.45 | 169 | .04 |  |  |
| **Total** | 12.74 | 181 |  |  |  |

a. Dependent Variable: Adaptive Learning Experiences
b. Predictors: (Constant), Personalized Learning

Table 3 shows the sum of squares, degrees of freedom, mean square, F and significance values. The F-ratio value evaluated whether the overall regression model fit the collected data. The F-value of 13.73 exceeded the calculated 1.895 F-critical value, which meant that the independent variable was a good predictor of the dependent variable (adaptive learning experiences). The 0.000 F-value that was below the 0.05 significance level suggested a statistically significant relationship between the independent variable (personalized learning on ChatGPT) and the dependent variable (adaptive learning experiences), thus inferring that personalized learning on ChatGPT influenced the adaptive learning experiences of religious education teacher trainees.

To affirm this, the Beta Coefficient value ($\beta$) computed using unstandardized and standardized coefficients as shown in Table 4.

**Table 4**

**Coefficients (Adaptive Learning Experiences)**

|  | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|
|  | β | Std. Error | β | T | Sig. |
| **Constant** | 3.39 | .27 | .00 | 12.37 | .000 |
| **Personalized Learning** | .12 | .03 | .40 | 4.34 | .000 |

Table 4 presents the obtained unstandardized and standardized coefficients. The β values demonstrate a relative influence of the independent variables on the dependent variable. The 0.12 β - value showed that personalized learning on ChatGPT had a positive influence on the undergraduate teacher trainees' adaptive learning experiences. Additionally, the obtained β – values of 0.12 (unstandardized coefficient) and 0.40 (standardized coefficient) are positive which indicated that there was positive correlation between the independent variable (personalized learning on ChatGPT) and the dependent variable (adaptive learning experiences). This implies that adaptive learning increased as personalized learning on ChatGPT increased.

**DISCUSSION**

The findings from this study demonstrated that personalized learning on ChatGPT positively influenced the adaptive learning experiences of undergraduate religious education teacher trainees by facilitating ease of learning, boosting their attitude towards learning and enabling mobile learning. These findings in this study could be attributed to the platform's ability to facilitate learners to access subject content in small chunks based on their learning capabilities and needs, thus

making it an effective tool to support personalized learning which in turn influences the adaptive learning experiences. The findings were in line with the Chunking theory (Chase & Simon, 1973) and the cognitive load theory (Sweller, 1988) whose proponents argue that presentation of content to learners in small portions (chunks) enhance active learning and content acquisition, resulting in effective learning. These findings are further supported by Zhai (2023) whose study on ChatGPT's user experiences and their implications for education revealed that the platform enabled personalized learning by offering individualized instruction to learners.

The findings of this study were corroborated with the findings of the study by Ratnam et al. (2023) which sought to determine the implications ChatGPT in education. Ratnam et al. (2023) concluded that the ChatGPT offers learners adaptive learning experiences by providing customized guidance and individual growth opportunities.

**CONCLUSION AND RECOMMENDATIONS**

The study examined how personalized learning on ChatGPT influenced adaptive learning experiences among undergraduate religious education teacher trainees. In line with this objective, the study concluded that the use of ChatGPT enhanced personalized learning experiences because it enabled undergraduate religious education teacher trainees to self-paced learning, reflect on the skills learned, and learn in a way that fits their learning style.

This positively influenced their adaptive learning experiences while using the platform for learning, thus contributing to improved self-efficacy, self-esteem, comprehension, and retention of content learned.

**REFERENCES**

1. Bridger, A.E. and Ford, R.M. (2019). *Undergraduate student research engagement through the open laboratory model.* New Directions for Higher Education, *185*, 57-69. https://doi.org/10.1002/he.20312
2. Firat, M. (2023). *How can ChatGPT transform autodidactic experiences and open education?* OSF Preprints, 1–5, https://doi.org/10.31219/osf.io/9ge8m
3. Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günnemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., . . . Kasneci, G. (2023). *ChatGPT for good? On opportunities and challenges of large language models for education.* Learning and Individual Differences, 103, 102274. https://doi.org/10.1016/j.lindif.2023.102274
4. Limo, F.A.F., Tiza, D.R.H., Roque, M.M., Herrera, E.E., Murillo, J.P.M. and Huallpa, J.J. (2023). *Personalized tutoring: ChatGPT as a virtual tutor for personalized learning experiences.* Social Space, 23(1), 293-312.
5. Ratnam, M., Sharma, B. and Tomer, A. (2023). *ChatGPT: Educational Artificial Intelligence.* International Journal of Advanced Trends in Computer Science and Engineering, 12(2), 84-91. https://doi.org/10.30534/ijatcse/2023/091222023
6. Zhai, X. (2023). *ChatGPT User Experience: Implications for Education*. axXiv (pre-print), 1-18. https://orcid.org/0000-0003-4519-193