# Students' Reactions Toward the Use of an AI-Powered Website for Learning Cardiovascular Biology

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| Article Info | Abstract |
|---|---|
| | Artificial Intelligence-powered websites (AI-PW) leverage artificial intelligence to deliver personalised and adaptive learning experiences, enhancing engagement and accessibility. Despite their potentials, there is a shortage of empirically validated-AI resources for learning Cardiovascular Biology (CVB) in Nigeria. This study investigated students' reactions toward the use of an AI-powered website for learning CVB in Nigeria. The study adopted a research design involving undergraduates from two purposively selected universities in Ilorin metropolis. A total of 68 students participated in the study. Data were collected using the Students' Reaction Questionnaire (SRQ), which demonstrated a high reliability coefficient of 0.94. Descriptive statistics and t-tests were employed to analyze the data at a 0.05 level of significance. Findings revealed that students' reactions toward the use of the AI-powered website for learning CVB were positive ($\bar{x} = 2.86 > 2.50$). Furthermore, there was no significant difference in students' reactions toward the use of the developed AI-powered website for learning CVB based on gender. The study concluded that the use of the BeeNCardiac AI-powered website positively influenced students' learning experiences in cardiovascular biology. It is therefore recommended that students be encouraged to use the BeeNCardiac AI-powered website as a complementary tool for learning CVB in Nigerian universities.<br><br>https://doi.org/10.36312/2e4ngb50<br> |
| **How to Cite** | |

## INTRODUCTION

Students' reactions refer to learners' perceptions, attitudes, and responses to instructional technologies, encompassing aspects such as perceived usefulness, ease of use, engagement, and overall satisfaction with the learning experience. In technology-enhanced learning environments, students' reactions are a critical indicator of acceptance and usability, as they influence continued use and integration of digital tools into educational practice (Basri, 2024; Alyoussef & Omer, 2023; Žerovnik, 2024). Understanding how students respond to AI-powered educational websites is therefore essential for evaluating the practicality and sustainability of such technologies within formal learning contexts.

Artificial Intelligence (AI) has increasingly been integrated into educational platforms to support personalised and adaptive learning experiences (Imamguluyev et al, 2024). AI-

powered websites are designed to analyse user interactions and adjust content delivery, feedback, and pacing to suit individual learner needs. These adaptive features allow students to engage with instructional materials at their own pace and according to their preferred learning pathways, which is particularly relevant for complex and conceptually demanding subjects such as Cardiovascular Biology (Ayeni et al., 2024; El-Sabagh, 2021). Rather than replacing traditional instruction, AI-powered platforms often function as complementary tools that support learning through guided exploration and self-directed engagement.

In addition to personalisation, AI-powered educational websites commonly incorporate interactive elements such as simulations, quizzes, real-time assessments, and visual representations (Cinar et al, 2024). These features can enhance student engagement by transforming abstract concepts into more concrete and accessible learning experiences. Visual aids and interactive assessments, in particular, help sustain learners' attention and encourage active participation, which are important factors in shaping positive student reactions toward digital learning platforms (Verawati et al., 2024). Consequently, students' perceptions of interactivity and usability play a central role in determining how effectively AI-powered platforms are received in educational settings.

Another important consideration in examining students' reactions to AI-powered educational platforms is gender. Gender-based differences in technology use and acceptance have been widely discussed in educational research, especially in relation to digital learning tools (Qazi, 2022). However, recent studies suggest that AI-powered platforms often provide comparable levels of satisfaction and engagement for learners across gender groups, largely due to their adaptive and user-centred design (Dağ et al., 2024). By offering flexible learning pathways and intuitive interfaces, AI-driven systems may help reduce traditional barriers associated with technology use, thereby supporting more inclusive learning environments.

As AI-powered educational platforms continue to gain prominence, it becomes increasingly important to examine students' reactions to their use, particularly in developing educational contexts (Ayeni, 2024). Students' feedback provides valuable insight into how such platforms are perceived in terms of usability, accessibility, and relevance to learning needs. Evaluating these reactions contributes to a deeper understanding of the strengths and limitations of AI-powered learning tools and informs decisions regarding their refinement and broader adoption (Almusharraf, 2024). In this regard, assessing students' reactions offers an important perspective on the role of AI-powered websites in supporting inclusive and learner-centred educational experiences (Anis, 2023).

**Purpose of the Study**

The purpose of this study was to examine students' reactions toward the use of a developed Artificial Intelligence-powered website for learning Cardiovascular Biology, with particular attention to overall reactions and differences based on gender

**Research Questions**

What is the students' reactions toward the use of the developed Artificial Intelligence-powered Website for learning Cardiovascular Biology?

**Research Hypothesis**

There is no significant difference in the students' reactions toward the use of the developed Artificial Intelligence-powered Website for learning Cardiovascular Biology based on gender.

**Novelty of the Study**

The novelty of this study lies in its empirical evaluation of a specifically developed Artificial Intelligence-powered website for learning Cardiovascular Biology—an area with limited digital instructional resources in the Nigerian higher education context. Unlike previous studies that broadly assess educational technologies, this research offers a focused analysis of student reactions across four key dimensions: user satisfaction, learning impact, usability, and engagement, using a validated and highly reliable instrument.

**METHOD**

This study adopted a descriptive survey research design to investigate students' reactions toward the use of an Artificial Intelligence-powered website (AI-PW) for learning Cardiovascular Biology (CVB) in Nigeria. The design was considered appropriate because it enabled the researcher to obtain detailed information on students' experiences, attitudes, and perceptions regarding the AI-powered learning platform without manipulating any variables. The population of the study comprised undergraduate students offering Anatomy and Physiology courses in Nigerian Universities. The target population included students from two purposively selected Universities in Ilorin metropolis, Kwara State one federal and one private institution. A total of sixty-eight (68) students who had used the AI-powered website and were willing to provide feedback participated in the study.

Data were collected using a researcher-designed instrument titled Students' Reaction Questionnaire (SRQ). The questionnaire contained twenty (20) Likert-type items designed to measure students' perceptions of the website's usability, interactivity, content quality, user interface design, and overall learning effectiveness. The instrument was validated by three senior lecturers from the Departments of Anatomy and Physiology at the University of Ilorin to ensure face and content validity. Reliability of the SRQ was established using Cronbach's alpha, which yielded a coefficient of 0.94, indicating a high level of internal consistency.

Ethical approval for the study was obtained from the Postgraduate School, University of Ilorin, Nigeria, while permission was sought from the authorities of the participating Universities prior to data collection. Data were collected through both face-to-face administration and online distribution using Google Forms. Research assistants facilitated physical administration, while online links were shared through institutional WhatsApp groups. Participants were fully informed of the purpose of the research and gave their consent before completing the questionnaire.

Data collected were analysed using descriptive and inferential statistics. Mean scores and standard deviations were used to describe students' reactions to the use of the AI-powered website for learning cardiovascular biology. An independent samples t-test was employed to determine whether there was a significant difference in students' reactions based on gender. All analyses were conducted at a 0.05 level of significance using the Statistical Package for the Social Sciences (SPSS).

**RESULTS AND DISCUSSION**
**Results**

**Table 1:** Distribution of students by gender

| Gender | Frequency | Percentage |
|--------|-----------|------------|
| Male | 25 | 36.8 |
| Female | 43 | 63.2 |

| Gender | Frequency | Percentage |
|--------|-----------|------------|
| Total | 68 | 100.0 |

Table 1 shows that 68 students were used in this study. Out of the 68 respondents, 25(36.8%) were male while the remaining 43(63.2%) were female. The result from this table implies that the female students' participants were more than the male ones in this study. Figure 1 presents the distribution of students by gender in the bar chart.
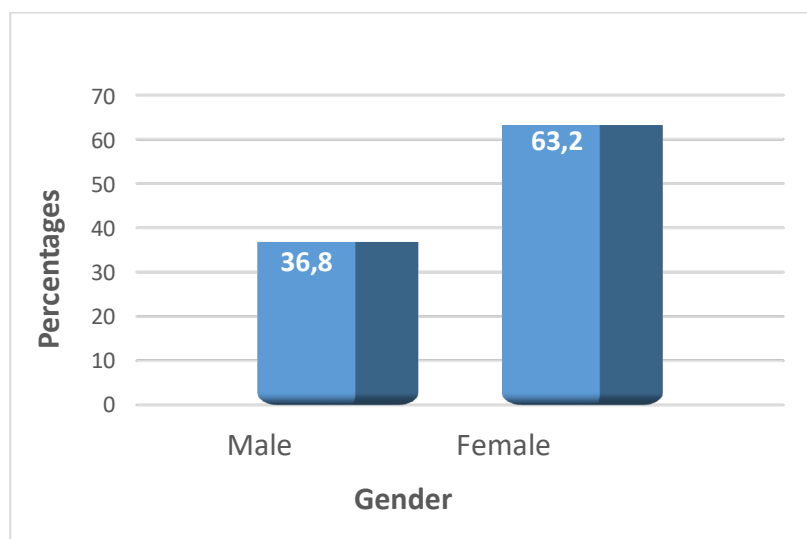


**Figure 1.** Bar Chart showing students' gender

**Research Question:** *What is the students' reaction toward the use of the developed Artificial Intelligence-powered Website for learning Cardiovascular Biology?*

**Table 2:** Students' reaction toward the use of the developed Artificial Intelligence-powered website for learning cardiovascular biology

| Item | SA | A | D | SD | Mean | Std. D |
|------|----|----|----|----|------|--------|
| **User Satisfaction:** | | | | | | |
| I find the AI-powered website user-friendly. | 1 | 48 | 17 | 2 | 2.71 | .55 |
| The visual design of the website enhances my learning experience. | 1 | 60 | 5 | 2 | 2.88 | .44 |
| I am satisfied with the overall quality of the educational content. | 10 | 35 | 21 | 2 | 2.78 | .73 |
| I am confident in the website's consistent performance | 0 | 45 | 12 | 11 | 2.50 | .76 |
| I enjoy the interactive features (such as quizzes and simulations). | 6 | 37 | 23 | 2 | 2.69 | .67 |
| **Learning Impact:** | | | | | | |
| The AI-powered website has helped me understand cardiovascular biology better. | 18 | 31 | 8 | 11 | 2.82 | 1.01 |
| The personalized feedback provided by the website enhances my learning. | 19 | 18 | 23 | 8 | 2.71 | 1.01 |
| I find the website's content relevant to my course needs. | 16 | 49 | 1 | 2 | 3.16 | .59 |

| Item | SA | A | D | SD | Mean | Std. D |
|---|---|---|---|---|---|---|
| Using the website has made it easier for me to recall information about the cardiovascular system. | 19 | 25 | 22 | 2 | 2.90 | .85 |
| I am more confident in my knowledge of cardiovascular biology after using the website. | 27 | 27 | 12 | 2 | 3.16 | .82 |
| **Reaction to Usability:** | | | | | | |
| I feel that the website is intuitive to use. | 16 | 34 | 17 | 1 | 2.96 | .82 |
| The instructions provided for using the website are clear and helpful. | 23 | 22 | 22 | 1 | 2.99 | .74 |
| I am confident navigating the website on my own. | 17 | 33 | 11 | 7 | 2.88 | 91 |
| The AI-powered features (e.g., adaptive learning paths) are user-friendly. | 21 | 45 | 1 | 1 | 3.26 | .56 |
| I am satisfied with the ease of accessing different sections of the website. | 17 | 42 | 8 | 1 | 3.10 | .65 |
| **Engagement and Motivation:** | | | | | | |
| I prefer using this website over traditional textbooks for learning cardiovascular biology | 14 | 31 | 18 | 5 | 2.79 | .86 |
| The website makes learning cardiovascular biology more interesting for me. | 26 | 28 | 12 | 2 | 3.15 | .81 |
| I am more motivated to study cardiovascular biology using the website. | 11 | 27 | 22 | 8 | 2.60 | .90 |
| The interactive elements of the website keep me engaged in learning. | 15 | 23 | 22 | 8 | 2.66 | .96 |
| I would recommend this AI-powered website to other students. | 11 | 20 | 29 | 8 | 2.50 | .90 |
| **Average Mean** | | | | | **2.86** | |

**Key;** *SA=* Strongly Agree, **A =** Agree, **D =** Disagree, **SD =** Strongly Disagree, **Benchmark:** 0.00-2.49 = *Negative,* 2.50-4.00 **= Positive**

Table 2 shows the students' reaction toward the use of the developed Artificial Intelligence-powered Website for learning Cardiovascular Biology categorised into four domains: User Satisfaction, Learning Impact, Reaction to Usability, and Engagement and Motivation.

*User Satisfaction:*

Students' satisfaction with the website's usability, visual design, and content quality received mixed reactions. The item "The visual design of the website enhances my learning experience" had the highest mean score of 2.88. However, confidence in the website's consistent performance had a lower mean score of 2.50.

*Learning Impact:*

The students rated the website positively in terms of understanding cardiovascular biology better, with a mean score of 2.82, and felt that the content was relevant to their course needs, reflected by a mean score of 3.16. Additionally, students expressed confidence in their knowledge of cardiovascular biology after using the website, with the item "I am more

confident in my knowledge of cardiovascular biology after using the website" also scoring 3.16.

*Reaction to Usability:*

The usability of the AI-powered features, such as adaptive learning paths, was rated the highest, with a mean score of 3.26, indicating that students found these features user-friendly and effective. Overall, the website's intuitiveness and clarity of instructions received favorable ratings, with the item "The instructions provided for using the website are clear and helpful" having the mean score of 2.99.

*Engagement and Motivation:*

Students showed a preference for the website over traditional textbooks, with the item "The website makes learning cardiovascular biology more interesting for me" receiving a mean score of 3.15. However, the overall motivation to study cardiovascular biology using the website was moderate, with the item "I am more motivated to study cardiovascular biology using the website" receiving a mean score of 2.60. Similarly, the willingness to recommend the website to others was also moderate, scoring 2.50.

Meanwhile, based on the value of the average mean (2.86 out of 4.00 maximum value obtainable) which falls, within the decision value for positive, it can be inferred that the students' reaction toward the use of the developed Artificial Intelligence-powered Website for learning Cardiovascular Biology is positive.

User Satisfaction, Learning Impact, Reaction to Usability, and Engagement and Motivation are the four dimensions in which the students' responses to the AI-powered website for studying cardiovascular biology are examined in Research Question 7. Important details on the consistency or variability of the students' replies are provided by the standard deviations (SD) in Table 2. The standard deviation helps to comprehend the ratings in the following ways: Low Standard Deviation in the Items such as "the AI-powered features (e.g., adaptive learning paths) are user-friendly" (SD = 0.56). In the Reaction to Usability domain, this item had the highest mean score of (3.26). The low standard deviation suggests that there was minimal disagreement among students on how easy and efficient the AI features were to utilise. "I find the visual design of the website enhances my learning experience." (SD = 0.44). With a mean score of 2.88 for this item, many students believed that the visual design improved their educational experience. There appears to be a great degree of student agreement on this point, as indicated by the low standard deviation.

Items with Moderate Standard Deviation: "I am confident in the website's consistent performance." (SD = 0.76). This item's mean score of 2.50 indicates that students' opinions on the website's functionality were not entirely unanimous. There was some variation in the replies, as indicated by the moderate standard deviation, which suggests that some students were confident in the website's consistency while others were not. "I am satisfied with the overall quality of the educational content." (SD = 0.73): Although the standard deviation indicates that students' judgements on the quality of the content varied, with some feeling less satisfied than others, the mean score of 2.78 indicates that students' responses were relatively favourable. The mean score of 2.69 indicates a favourable response, while the standard deviation indicates some variations in the students' perceptions of the enjoyment of the interactive elements. "The interactive features (such as quizzes and simulations) are enjoyable." (SD = 0.67).

Items with Higher Standard Deviation: "I am more motivated to study cardiovascular biology using the website." (SD = 0.90): A moderate reaction is indicated by the mean score of 2.60, with some students showing higher levels of motivation than others. Greater variety in

the pupils' replies, which reflects varying degrees of motivation within the group, is indicated by a higher standard deviation. I would advise other students to visit this AI-powered website. (SD = 0.90): A significant standard deviation and a mean score of 2.50 indicate that although some students were more hesitant to promote the website, others were. The variation suggests a range of opinions on the website's overall recommendation.

Similarly, items with a Higher Standard Deviation: "The website's personalised feedback improves my learning." (SD = 1.01): The larger standard deviation and mean score of 2.71 indicate that students' opinions on the usefulness of tailored feedback varied. Some people thought it was helpful, while others didn't feel the same way. "The AI-powered website has helped me understand cardiovascular biology better." (SD = 1.01): Although the greater standard deviation suggests that students' impressions of the website's influence on their comprehension varied, with some perceiving a big advantage and others not so much, the mean score of 2.82 indicates a somewhat good reaction.

Overall Standard Deviation Contribution: The standard deviations among the questions reveal how consistently students' responses were given. Strong student agreement is indicated by items with low standard deviations, especially when it comes to elements that are easy to use, including the website's visual design and AI-powered learning pathways. Nonetheless, the moderate and greater standard deviations for statements such as "I am more motivated to study" and "I would recommend this AI-powered website" indicate a wider range of perspectives, indicating that although many students had favourable experiences, others were not as persuaded.

Grand Mean and Standard Deviation: A positive average mean of 2.86 out of 4.00 suggests that people are generally responding favourably to the AI-powered website. The standard deviations of the questions indicate the areas in which students' opinions diverged the most, particularly regarding motivation and suggestion. Further research on these subjects may be necessary to identify the factors influencing students' varying levels of engagement and satisfaction. The standard deviations make it simpler to understand the range of student replies to the AI-powered website. Higher standard deviations show areas where students had different experiences, especially with the website's influence on motivation, study habits, and overall recommendation, whereas lower standard deviations show agreement on specific features, such as the website's design and AI-powered features. These observations can direct future enhancements to better meet the needs and preferences of a larger group of pupils.

**Hypothesis Testing**

There is no significant difference in the student reactions towards the use of the developed Artificial Intelligence-powered Website for learning Cardiovascular Biology based on gender.

**Table 3:** Summary of t-test showing difference in male and female students' reaction to the use of the developed Artificial Intelligence-powered website

| Grouping Variable (Gender) | N | Mean | Std. D | Df | T | Sig. | Remark |
|---|---|---|---|---|---|---|---|
| Male | 25 | 58.76 | 11.14 | 66 | 1.150 | .254 | Not |
| Female | 43 | 56.30 | 6.52 | | | | Rejected |

Table 3 shows the difference between male and female student reactions towards the use of the developed Artificial Intelligence-powered Website for learning Cardiovascular Biology. The table shows that the mean score for male students is 58.76 while that of female students is 56.30. The values of the mean scores revealed a small difference though not

significant. Therefore, there was no significant difference in the student reactions towards the use of the developed Artificial Intelligence-powered Website for learning Cardiovascular Biology based on gender (df = 66; t = 1.150; p > 0.05). Hence, the null hypothesis was not rejected. This result indicates that students' reactions toward the use of the developed Artificial Intelligence-powered website for learning Cardiovascular Biology did not differ significantly.

**Discussions**

Research question one investigated the students' reactions toward the use of the developed Artificial Intelligence-powered Website for learning Cardiovascular Biology. The result shows that students' reaction toward the use of the developed Artificial Intelligence-powered Website for learning Cardiovascular Biology is positive. The positive student reaction indicates that the AI-powered website is well-received and likely to engage students effectively in learning Cardiovascular Biology, and this suggests its potential for educational adoption. This finding consistent with the study of Adams and Thompson (2025), who explored student reactions to AI-based learning platforms. The research indicated that positive student feedback towards educational technology can significantly enhance user engagement and satisfaction, reinforcing the effectiveness of AI-driven educational tools (Yu, & Yao, 2024). The positive reaction of students toward the AI-powered website aligns with Huang (2018), who found that individuals open to new experiences are more likely to embrace new technology. This suggests that the website's user-friendly design and alignment with user needs contributed to its acceptance and effectiveness. However, the study of Khan and Javed (2025) argues against this finding, indicating that students' engagement with AI-powered learning tools can be inconsistent, and positive reactions do not always translate into improved learning outcomes.

The results highlight how AI-powered platforms have the potential to revolutionise biology teaching by offering personalised engagement and adaptive learning opportunities that encourage active involvement. The good responses from the students indicate that the BeeNCardiac AI-PW was successful in creating an engaging and easily accessible learning environment. This lends credence to the idea that incorporating AI into education might improve students' enthusiasm, understanding, and retention especially in challenging courses like cardiovascular biology. These results corroborate previous findings that AI-assisted learning environments foster individualized learning pathways and immediate feedback, which improve student satisfaction and learning outcomes. The absence of gender differences further implies that AI-powered learning tools can promote equity in science education, offering all learners similar opportunities to interact with digital resources. Based on these findings, it can be inferred that the BeeNCardiac AI-PW effectively enhanced students' engagement and confidence in learning cardiovascular biology concepts.

**CONCLUSION**

This study examined students' reactions toward the use of an Artificial Intelligence-powered website for learning Cardiovascular Biology. The findings indicate that students generally responded positively to the platform, reflecting favourable perceptions of its usability, accessibility, and learning support. These reactions suggest that the AI-powered website was well received as a digital instructional resource suitable for a complex scientific subject. The analysis further revealed no significant difference in students' reactions based on gender, indicating that the platform provided an inclusive learning environment that was equally acceptable to male and female students. This outcome suggests that the design and features of the AI-powered website were not biased toward any gender group. The study

concludes that the developed AI-powered website elicited positive and consistent reactions from students, supporting its suitability as a complementary digital learning tool for Cardiovascular Biology.

## RECOMMENDATION

Based on the findings of this study, the Artificial Intelligence-powered website is recommended as a complementary digital learning resource for students studying Cardiovascular Biology. Educators are encouraged to incorporate the platform alongside conventional instructional methods to support learner engagement and accessibility. Institutions should also provide orientation or guidance to help students effectively navigate AI-powered learning platforms. Further studies are recommended to explore the long-term use of the platform and to examine its impact on learning outcomes in Cardiovascular Biology.

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