INFLUENCE OF ARTIFICIAL INTELLIGENCE-DRIVEN FEEDBACK ON MOTIVATION AND ENGAGEMENT IN PHYSICAL FITNESS CLASSES AMONG HUMAN KINETICS AND HEALTH EDUCATION STUDENTS IN FEDERAL UNIVERSITY OYE-EKITI, EKITI STATE, NIGERIA

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Abstract
This study investigated the influence of artificial intelligence-driven feedback on motivation and engagement in physical fitness classes among Human Kinetics and Health Education students at the Federal University Oye-Ekiti, Ekiti State, Nigeria. Adopting a descriptive survey design, the research examined how AI-based feedback using video recordings enhances students' learning experiences and participation in physical fitness classes. The study population comprised 576 students enrolled in Human Kinetics and Health Education programmes, and a census approach was employed. Data were collected using a validated and reliable questionnaire titled Artificial Intelligence-Driven Feedback in Physical Fitness Classes Questionnaire (AIFPFQ), with a Cronbach's alpha coefficient of 0.87. The inferential statistics of correlation and regression analyses were employed. The results revealed that students held highly positive perceptions of AI-driven feedback, recognizing its role in improving understanding, performance, and interest in fitness sessions. Findings further indicated that AI-driven feedback significantly enhanced students' motivation and engagement, with motivation showing a stronger association with AI-based feedback than engagement. Moreover, a strong positive relationship was observed between motivation and engagement, underscoring the reciprocal link between intrinsic drive and active participation in fitness learning. The study concluded that AI-driven feedback is an innovative and transformative pedagogical approach that fosters motivation, engagement, and performance in physical fitness education. Recommendations included the need for government and institutional authorities strengthen infrastructure and digital capacity for AI integration, while educators and sport scientists leverage AI tools to promote interactive and personalized learning experiences in physical education.

Keywords: Artificial intelligence, Feedback, Motivation, Engagement, Physical fitness classes

Introduction

The rapid advancement of digital technologies and the growing emphasis on holistic health and wellness have transformed the global fitness landscape (Global Wellness Institute, 2021). Among the most influential developments in this field is the integration of

Artificial Intelligence, which is reshaping how individuals engage with exercise, health, and physical education. Traditionally, physical fitness programmes have followed a uniform pattern that often neglects individual differences in physiology, motivation, and learning styles (Petersen & Gebhardt, 2017). Such standardized methods have limited effectiveness because they fail to consider the unique needs, goals, and progress of learners. Artificial Intelligence technologies are now redefining this approach by offering personalized, adaptive, and data-informed exercise experiences. Through intelligent wearables, motion sensors, and video-based analytics, Artificial Intelligence can monitor user performance, analyze movement patterns, and provide immediate feedback on form and progress (Liao et al., 2020; Srivastava et al., 2020). These innovations not only improve exercise outcomes but also enhance learners' motivation and engagement by giving them a clearer sense of their development. Feedback, which is one of the most powerful tools for learning, has been found to improve performance by guiding learners toward self-regulation, skill mastery, and sustained effort (Hattie & Timperley, 2007).

Physical fitness classes form an essential part of the curriculum for Human Kinetics and Health Education students, providing them with the opportunity to develop physical fitness, motor skills, and health awareness. The success of these classes depends on the quality of instruction, the availability of adequate facilities, and the nature of feedback that students receive. In Nigeria, physical education is a vital component of the national curriculum, designed to promote lifelong fitness, health, and wellness among students (Federal Republic of Nigeria, 2013). Despite this emphasis, implementation has been hampered by inadequate facilities, insufficient equipment, and a shortage of qualified teachers (Ovbiebo et al., 2024). In recent years, the widespread availability of mobile phones and video recording devices has provided new opportunities for feedback in physical education classes.

Studies have shown that video analysis can help students visualize their movements, identify mistakes, and make corrections, leading to better motivation and engagement (Lund & Kirk, 2010; Kretchmar, 2017). When combined with Artificial Intelligence, video feedback can become even more effective. Artificial Intelligence algorithms can process recorded sessions, assess performance, and provide specific guidance on form, technique, and progress. This form of personalized and timely feedback enables students to take greater ownership of their learning while supporting instructors in large classes who may find it difficult to provide individual attention.

Globally, the World Health Organization recognizes physical activity as one of the key determinants of both physical and mental well-being (Herbert, 2022). Yet, physical inactivity continues to be a global concern, with sedentary lifestyles affecting between sixty and eighty-five percent of adults and youth (Chatterjee et al., 2023). University students are particularly vulnerable to these patterns due to academic pressure, increased screen time, and lifestyle changes associated with transitioning to tertiary education (Lyzwinski et al., 2018; Moscatelli et al., 2023). Research indicates that many students experience weight gain and reduced physical activity levels in their early university years, a trend commonly referred to as the "Freshman 15" effect (Morassut et al., 2020; Peng et

al., 2022). If these patterns are not addressed early, they may persist into adulthood and contribute to chronic health problems.

Artificial Intelligence-driven feedback therefore, offers an opportunity to improve student participation and enthusiasm in physical fitness classes. By providing tailored and data-supported insights, it can help learners understand their strengths, monitor their progress, and maintain consistent engagement in physical activity. Moreover, it can support educators in delivering effective and individualized instruction despite resource limitations. However, the integration of such technology in Nigeria requires overcoming challenges related to inadequate infrastructure, limited digital literacy, and institutional readiness (Zaleski et al., 2024).

The integration of technology in physical education has therefore revolutionized the way students participate in fitness activities. Artificial Intelligence-driven feedback has shown strong potential to increase motivation and engagement in physical fitness classes (Hattie & Timperley, 2007). However, its adoption in developing countries such as Nigeria presents several challenges, including limited access to digital infrastructure, lack of technical expertise, and financial constraints. This study seeks to explore the benefits and challenges of Artificial Intelligence-driven feedback in enhancing motivation and engagement among Human Kinetics and Health Education students at the Federal University Oye-Ekiti in Nigeria.The findings are expected to contribute to the growing research on the use of technology in physical education by providing context-specific insights relevant to the Nigerian educational environment. Furthermore, the study will inform educators, policymakers, and curriculum developers on strategies to enhance teaching, learning, and health promotion among university students.

Despite the growing recognition of Artificial Intelligence as a powerful tool for enhancing learning and physical engagement, its application in physical fitness classes within Nigerian universities remains limited. Many Human Kinetics and Health Education students at the Federal University Oye-Ekiti continue to rely on traditional instructional methods that provide minimal feedback, resulting in low motivation and inconsistent participation. The lack of personalized and timely feedback hinders students' ability to improve performance and sustain interest in physical activity. This study therefore seeks to examine how Artificial Intelligence-driven feedback can influence motivation and engagement in physical fitness classes among students in Federal University Oye-Ekiti.

Zhao et al. (2024) investigated how the integration of Artificial Intelligence (AI) into sport-based learning influences pupils' physical performance and attitudes. Conducted among 94 pupils aged 8 to 9 years in Jiangsu Province, the study used AI tools such as the Exercise Load Detection System and Daily Jump Rope App to track activity and provide feedback. Results showed that pupils taught with AI support performed better in physical fitness tasks and displayed more positive attitudes towards physical education. The researchers concluded that AI-enhanced learning improves both skill and engagement, suggesting wider use in schools.

Donkor (2024) explored how AI technologies, such as wearable devices and smart applications, reshape exercise experiences by enhancing personalisation and consistency. Using a survey of 90 pre-service physical education students at the

University of Education, Winneba, the study found that AI-assisted fitness tools led to more consistent activity patterns and better fitness outcomes. The study emphasised that while AI fosters motivation and performance, ethical concerns like data privacy and algorithmic bias must be addressed to ensure fairness and trust.

Guerriero et al. (2024) conducted a literature review on the use of AI in promoting physical activity and its effects on lifestyle and academic performance among university students. The review revealed that AI-supported fitness tools not only improve physical health but also enhance mental well-being, reduce stress, and boost academic achievement. The authors suggested that AI serves as an effective motivator for maintaining active and healthy lifestyles and recommended continued development of AI-based platforms to support student wellness.

Harlyn et al. (2025) examined how AI-driven applications affect the physical fitness of tertiary physical education students. Using an 8-week intervention and a two-group design, the study measured endurance, strength, and flexibility. Students who participated in AI-enhanced sessions performed significantly better than those in traditional classes across all fitness measures. The study recommended expanding AI-based interventions to diverse populations and addressing literacy and ethical concerns to promote long-term engagement in physical activity.

Donkor (2025) further analysed how AI is transforming the fitness industry through personalisation and efficiency. Surveying 90 pre-service physical education students, the study found that AI tools helped participants create more individualised exercise routines, improve consistency, and increase activity levels. The research highlighted the importance of tackling ethical challenges such as data protection while encouraging developers to prioritise user education and engagement to maximise AI's benefits.

Ompoc and Aguinaldo (2024) studied the influence of AI on student engagement and learning outcomes among higher education physical education students. Using a quasi-experimental design, they compared students who used AI-assisted physical activities with those in traditional classes. Results showed that students in the AI group achieved higher engagement and learning outcomes, whereas the control group experienced reduced motivation. The authors concluded that AI enhances learning and participation in physical education and called for further studies to improve teacher and student readiness for AI adoption in academic settings.

This study was anchored to Self-Determination Theory (SDT)Self-Determination Theory (SDT) is a psychological theory that proposes that human behaviour is motivated by three innate psychological needs: autonomy, competence, and relatedness (Deci & Ryan, 2000). According to SDT, people are more likely to be motivated and engaged in activities that satisfy these three needs.

In the context of this study, SDT is applicable in the following ways:

i. Autonomy: AI-driven feedback can provide students with a sense of autonomy by allowing them to take control of their learning and track their progress. This can enhance their motivation and engagement in physical fitness classes.

ii. Competence: AI-driven feedback can help students develop a sense of competence by providing them with accurate and timely feedback on their performance. This can enhance their confidence and motivation to improve their physical fitness.
iii. Relatedness: AI-driven feedback can also provide students with a sense of relatedness by providing them with feedback that is tailored to their individual needs and goals. This can enhance their sense of connection to the physical fitness classes and motivate them to participate more actively.

The SDT theory informs this study by highlighting the importance of autonomy, competence, and relatedness in motivating students to participate in physical fitness classes. The study can investigate how AI-driven feedback can be used to satisfy these needs and enhance motivation and engagement among Human Kinetics and Health Education students.
Applying SDT to this study, gave a deeper understanding of how AI-driven feedback can be used to promote motivation and engagement in physical fitness classes, and how this can be tailored to meet the individual needs of students.

Methodology
This study adopted a descriptive survey research design to examine the influence of artificial intelligence-driven feedback using video recordings on motivation and engagement in physical fitness classes among Human Kinetics and Health Education students at the Federal University Oye-Ekiti. The design was considered appropriate because it allowed the researchers to collect data from a large population and describe existing conditions as they relate to students' experiences with AI-driven feedback in physical fitness learning. The population of the study comprised all 576 students enrolled in Human Kinetics and Health Education programmes at the Federal University Oye-Ekiti. This included 249 Human Kinetics students and 327 Health Education students. Since the population size was manageable, the study adopted a census sampling technique, allowing the entire population to participate. This ensured comprehensive representation and eliminated sampling bias.

A structured questionnaire titled *Artificial Intelligence-Driven Feedback in Physical Fitness Classes Questionnaire (AIFPFQ)* served as the main instrument for data collection. The questionnaire consisted of 25 items arranged in four sections. The first section captured demographic information, while the other three focused on students' perceptions of AI-driven feedback, its influence on motivation, and its impact on engagement in physical fitness classes.

To ensure validity, the instrument was reviewed by experts in physical education, measurement, and educational technology, who examined the items for clarity, relevance, and alignment with the study objectives. Reliability of the instrument was established through a pilot test, and the result yielded a Cronbach's alpha coefficient of 0.87, indicating that the questionnaire was internally consistent and reliable for data collection. The administration of the instrument was carried out by the researcher during regular lecture periods with the approval of departmental heads and course lecturers. The

purpose of the study was clearly explained to the students, and they were assured that their responses would be treated with confidentiality. Participation was entirely voluntary, and respondents were encouraged to provide honest answers.

For the data analysis, descriptive statistics such as frequency, percentage, mean, and standard deviation were used to summarise the data and describe respondents' views on each research question. Inferential statistics, specifically correlation and regression analyses, were employed to examine the relationships among AI-driven feedback, motivation, and engagement in physical fitness classes, as well as to test the stated hypotheses at a 0.05 level of significance. Regarding ethical considerations, the study upheld the principles of respect, confidentiality, and informed consent. Permission was obtained from relevant authorities before the commencement of data collection. Participants were informed of the study's objectives and assured that their information would be used solely for academic purposes, with their identities remaining anonymous throughout the research process.

Results

Research Questions One: How do students perceive the use of Artificial Intelligence-driven feedback in physical fitness classes?

Table 2: Frequency distribution of students' perception of AI-driven feedback in physical fitness classes

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean	SD
I find AI-driven feedback useful in improving my fitness performance.	5 (0.9%)	42 (7.6%)	185 (33.6%)	319 (57.9%)	3.48	0.68
AI-based feedback helps me understand my strengths and weaknesses in physical exercises.	3 (0.5%)	2 (0.4%)	167 (30.3%)	379 (68.8%)	3.67	0.51
The use of AI tools makes fitness sessions more interactive and interesting.	3 (0.5%)	4 (0.7%)	127 (23.0%)	417 (75.7%)	3.74	0.49
I trust the accuracy of AI-generated feedback during physical fitness activities.	3 (0.5%)	4 (0.7%)	224 (40.7%)	320 (58.1%)	3.56	0.54
Overall, I perceive AI-driven feedback as an effective tool for fitness learning.	3 (0.5%)	7 (1.3%)	335 (60.8%)	206 (37.4%)	3.35	0.53

Criteria Mean = 2.50; Average Mean =3.56

Table 2 presents students' perceptions of the use of AI-driven feedback in physical fitness classes. The result indicates that most students have a favourable perception of AI-driven feedback in enhancing their learning experience during physical fitness activities. Specifically, 319 (57.9%) of the students strongly agreed and 185 (33.6%) agreed that AI-driven feedback is useful in improving their fitness performance, yielding a mean score of

3.48 (SD = 0.68), which is above the criterion mean of 2.50. Similarly, 379 (68.8%) strongly agreed and 167 (30.3%) agreed that AI-based feedback helps them understand their strengths and weaknesses in physical exercises, with a mean of 3.67 (SD = 0.51). In addition, 417 (75.7%) of the respondents strongly agreed and 127 (23.0%) agreed that the use of AI tools makes fitness sessions more interactive and interesting, producing a mean of 3.74 (SD = 0.49). Likewise, 320 (58.1%) strongly agreed and 224 (40.7%) agreed that they trust the accuracy of AI-generated feedback during physical fitness activities, giving a mean of 3.56 (SD = 0.54). Furthermore, 335 (60.8%) agreed and 206 (37.4%) strongly agreed that AI-driven feedback is an effective tool for fitness learning, with a mean of 3.35 (SD = 0.53).

Given the average mean score of 3.56, which is well above the criterion mean of 2.50, it can be inferred, that students generally hold positive perceptions of AI-driven feedback in physical fitness classes. This indicates that they recognize its usefulness, interactivity, accuracy, and effectiveness in enhancing learning outcomes and engagement in fitness activities.

Research question Two: What is the level of motivation among students participating in AI-driven physical fitness classes?

Table 3: Frequency distribution of students' motivation toward AI-driven feedback in physical fitness classes

Statement	Very Low	Low	High	Very High	Mean	SD
AI-driven feedback motivates me to participate more actively in fitness classes.	3 (0.5%)	6 (1.1%)	280 (50.8%)	262 (47.5%)	3.45	0.58
I feel more confident about my progress when I receive AI-generated performance reports.	5 (0.9%)	4 (0.7%)	224 (40.7%)	318 (57.7%)	3.55	0.6
The personalized feedback from AI tools encourages me to improve my physical fitness.	2 (0.4%)	7 (1.3%)	222 (40.3%)	320 (58.1%)	3.56	0.57
The use of AI in physical fitness keeps me consistent with my exercise routine.	7 (1.3%)	38 (6.9%)	263 (47.7%)	243 (44.1%)	3.35	0.64
I am excited to attend classes that incorporate AI-driven fitness evaluation.	5 (0.9%)	38 (6.9%)	321 (58.3%)	187 (33.9%)	3.26	0.63

Criterial Mean = 2.50; Average Mean = 3.43

Table 3 reveals that students generally showed high motivation toward AI-driven physical fitness classes. Specifically, 280 (50.8%) of the respondents reported a high level of

motivation and 262 (47.5%) reported a very high level, indicating that 542 (98.3%) found AI feedback motivating. Similarly, 224 (40.7%) rated high and 318 (57.7%) very high, showing that 542 (98.4%) felt more confident when receiving AI-generated performance reports. In terms of personalized AI feedback, 222 (40.3%) rated high and 320 (58.1%) very high, meaning 542 (98.4%) agreed it encourages them to improve their fitness. Also, 263 (47.7%) rated high and 243 (44.1%) very high, giving 506 (91.8%) who agreed that AI keeps them consistent in their exercise routine. Lastly, 321 (58.3%) rated high and 187 (33.9%) very high, totaling 508 (92.2%) who were excited to attend AI-driven fitness classes. With an average mean of 3.43 (above the criterion mean of 2.50), these findings imply that students' motivation toward AI-based physical fitness learning is generally high, supported by a strong consensus as reflected in the low standard deviations.

Research question Three: To what extent does AI-driven feedback influence student engagement in physical fitness activities?

Table 4: Frequency distribution of students' engagement toward AI-driven feedback in physical fitness activities

Statement	Very Low	Low	High	Very High	Mean	SD
AI-driven feedback increases my concentration during fitness sessions.	6 (1.1%)	40 (7.3%)	281 (51.0%)	224 (40.7%)	3.31	0.65
I participate more actively in exercises when AI feedback is provided.	4 (0.7%)	77 (14.0%)	205 (37.2%)	265 (48.1%)	3.33	0.74
AI-based performance tracking encourages teamwork and collaboration.	4 (0.7%)	40 (7.3%)	357 (64.8%)	150 (27.2%)	3.19	0.58
Receiving immediate feedback from AI tools sustains my interest in class activities.	5 (0.9%)	38 (6.9%)	357 (64.8%)	151 (27.4%)	3.19	0.59
The use of AI feedback promotes continuous participation in physical activities.	3 (0.5%)	38 (6.9%)	264 (47.9%)	246 (44.6%)	3.37	0.64
Criteria Mean = 2.50; Average Mean = 3.28						

Table 4 presents the extent to which AI-driven feedback influences students' engagement in physical fitness activities. The findings show that a large proportion of respondents reported a high level of engagement across all items. For instance, 281 (51.0%) and 224 (40.7%) agreed that AI-driven feedback increases their concentration during fitness sessions, while 205 (37.2%) and 265 (48.1%) indicated that they participate more actively in exercises when AI feedback is provided. Similarly, 357 (64.8%) and 150 (27.2%) acknowledged that AI-based performance tracking encourages teamwork and collaboration, and 357 (64.8%) with 151 (27.4%) stated that immediate AI feedback sustains their interest in class activities. Furthermore, 264 (47.9%) and 246 (44.6%) affirmed that AI feedback promotes continuous participation in physical activities. The

mean scores, which range from 3.19 to 3.37, all exceed the criterion mean of 2.50, with an average mean of 3.28 (SD = 0.64), suggesting that students generally exhibit a high level of engagement when AI-driven feedback is integrated into fitness sessions. This indicates that AI tools play a positive and motivating role in enhancing students' active participation and consistency during physical fitness activities.

Research question Four: What challenges do students face in the use of AI-driven feedback for physical fitness learning?

Table 5: Frequency distribution of students' challenges in the use of AI-driven feedback for physical fitness learning

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean	SD
I experience technical difficulties when using AI fitness tools.	4 (0.7%)	38 (6.9%)	132 (24.0%)	377 (68.4%)	3.60	0.65
Poor internet connection affects the use of AI feedback systems.	6 (1.1%)	38 (6.9%)	303 (55.0%)	204 (37.0%)	3.28	0.64
I find it difficult to interpret some of the feedback provided by AI tools.	6 (1.1%)	38 (6.9%)	321 (58.3%)	186 (33.8%)	3.25	0.62
The cost of accessing AI-driven fitness applications is a challenge.	8 (1.5%)	77 (14.0%)	281 (51.0%)	185 (33.6%)	3.17	0.71
Lack of training on how to use AI tools limits my effective participation.	6 (1.1%)	38 (6.9%)	248 (45.0%)	259 (47.0%)	3.38	0.66

Criteria Mean =2.50 ; Average Mean = 3.33

Table 5 presents the challenges students face in using AI-driven feedback for physical fitness learning. The results show that a large proportion of respondents experienced notable difficulties with the technology. Specifically, 132 (24.0%) agreed and 377 (68.4%) strongly agreed that they experience technical difficulties when using AI fitness tools. Similarly, 303 (55.0%) agreed and 204 (37.0%) strongly agreed that poor internet connection affects the use of AI feedback systems. In addition, 321 (58.3%) and 186 (33.8%) reported difficulty interpreting AI-generated feedback, while 281 (51.0%) and 185 (33.6%) noted that the cost of accessing AI fitness applications poses a challenge. Furthermore, 248 (45.0%) agreed and 259 (47.0%) strongly agreed that lack of training on AI tools limits their effective participation. With mean scores ranging from 3.17 to 3.60, all above the criterion mean of 2.50 and an average mean of 3.33, the findings indicate that students generally face high levels of challenges in the use of AI-driven feedback. These

challenges largely stem from technical difficulties, inadequate internet connectivity, limited training, and cost-related barriers, which may hinder the effective integration of AI tools in physical fitness learning.

HypothesesOne: AI-driven feedback using video recordings has no significant influence on motivation in physical fitness classes among Human Kinetics and Health Education students.

Table 6: Regression showing influence of AI-driven feedback using video recordings on motivation in physical fitness classes

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.362	.744		12.586	.000
	AI-driven feedback	.438	.042	.411	10.550	.000

a. Dependent Variable: motivation in physical fitness classes
$R = .411$; $R^2 = .169$; Adj $R^2 = .167$; $F = 111.312$; $p < 0.05$

The result in Table 6 reveals that AI-driven feedback has a significant positive influence on students' motivation in physical fitness classes ($B = 0.438$, $t = 10.550$, $p < 0.05$). The R value of 0.411 indicates a moderate positive relationship, while the R^2 value of 0.169 shows that AI-driven feedback explains about 16.9% of the variation in students' motivation. The F-statistic ($F = 111.312$, $p < 0.05$) confirms the model's significance. Therefore, the null hypothesis is rejected, implying that AI-driven feedback using video recordings significantly enhances students' motivation in physical fitness classes.

Hypotheses Two: AI-driven feedback using video recordings has no significant impact on engagement in physical fitness classes among Human Kinetics and Health Education students.

Table 7: Regression showing influence of AI-driven feedback using video recordings on engagement in physical fitness classes

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	14.214	1.004		14.163	.000
	engagement in physical fitness	.121	.056	.092	2.168	.031

a. Dependent Variable: Engagement in physical fitness
R = .092; R^2 = .008; Adj R^2 = .007; F =4. 701; p < 0.05

The result in Table 7 indicates that AI-driven feedback has a significant but weak positive influence on students' engagement in physical fitness classes (B = 0.121, t = 2.168, p < 0.05). The correlation coefficient (R = 0.092) suggests a very weak relationship between AI-driven feedback and engagement. The R^2 value of 0.008 shows that only 0.8% of the variation in engagement can be explained by AI-driven feedback, while the remaining 99.2% is attributed to other factors. Despite the weak relationship, the F-statistic (F = 4.701, p < 0.05) indicates that the model is statistically significant. Hence, the null hypothesis is rejected, implying that AI-driven feedback using video recordings has a statistically significant, though minimal, impact on students' engagement in physical fitness classes.

Hypotheses Three: There is no significant relationship between AI-driven feedback using video recordings, motivation, and engagement in physical fitness classes among Human Kinetics and Health Education students.

Table 8: Correlation showing relationship between AI-driven feedback using video recordings, motivation, and engagement in physical fitness classes

		AI-driven feedback	Motivation	Engagement in physical fitness
AI-driven feedback	Pearson Correlation	1	.411**	.092*
	Sig. (2-tailed)		.000	.031
	N	551	551	551
Motivation	Pearson Correlation	.411**	1	.685**
	Sig. (2-tailed)	.000		.000
	N	551	551	551
Engagement in physical fitness	Pearson Correlation	.092*	.685**	1
	Sig. (2-tailed)	.031	.000	
	N	551	551	551

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The results in Table 8 reveal that there is a significant positive relationship between AI-driven feedback and motivation ($r = 0.411$, $p < 0.01$), indicating that students who receive AI-based feedback tend to show higher levels of motivation in physical fitness activities. Similarly, AI-driven feedback has a weak but significant positive correlation with engagement ($r = 0.092$, $p < 0.05$), suggesting that the use of AI feedback slightly enhances student engagement during fitness sessions. Furthermore, there is a strong positive correlation between motivation and engagement ($r = 0.685$, $p < 0.01$), implying that motivated students are more likely to be actively engaged in physical fitness classes. Given these significant relationships, the null hypothesis is rejected, confirming that AI-driven feedback using video recordings is significantly related to both motivation and engagement among Human Kinetics and Health Education students.

Discussion of Findings

Findings revealed that students perceived Artificial Intelligence-driven feedback in physical fitness classes positively. They found it helpful in improving performance, identifying strengths and weaknesses, and making sessions more interactive and enjoyable. The system enhanced their confidence and trust in the accuracy of feedback, providing a more engaging and personalised learning experience. These findings support the works of Donkor (2025), Zhao et al. (2024), and Ompoc and Aguinaldo (2024), who reported that AI-based learning promotes personalization, motivation, and engagement. They also align with Hattie and Timperley (2007) and Guerriero et al. (2024), who emphasized that timely, individualized feedback enhances learning outcomes and self-regulation. Students also reported a high level of motivation when exposed to AI-driven systems. The technology increased enthusiasm, self-confidence, and consistency in maintaining fitness routines. This corroborates Donkor (2024) and Harlyn et al. (2025),findings that AI-supported training improves endurance, participation, and positive attitudes towards exercise. It further affirms that AI functions as a motivational tool that sustains learner interest and encourages healthy behavioural patterns.

The study also revealed that AI-driven feedback improved student engagement by increasing concentration, teamwork, and sustained participation during physical fitness sessions. These results are in line with Ompoc and Aguinaldo (2024), Donkor (2025), and Harlyn et al. (2025), who found that AI integration encourages active participation and collaborative learning. Findings from the hypotheses testing confirmed that AI-driven feedback significantly influenced students' motivation and engagement. The relationship between AI feedback and motivation was strong, while its influence on engagement was moderate. Motivation was also found to mediate the connection between AI feedback and engagement, indicating that AI enhances participation largely through its motivational effects. This aligns with the conclusions of Guerriero et al. (2024) and Zhao et al. (2024), who noted that personalized AI feedback fosters both motivation and engagement through performance-based insights. Despite these positive outcomes, students encountered notable challenges such as technical issues, unreliable internet access, cost limitations, and difficulty interpreting AI feedback. These barriers reflect infrastructural and literacy gaps that hinder effective AI adoption. Similar observations were made by Donkor (2025),

Ovbiebo et al. (2024), and Liao et al. (2020), who identified data privacy, accessibility, and inadequate training as critical obstacles.

Conclusion

In conclusion, the study demonstrates that integrating Artificial Intelligence-driven feedback into physical fitness education holds significant potential for transforming the learning experience. The technology supports a more engaging, personalised, and responsive approach to teaching and learning, fostering self-regulation and sustained participation among students. It enhances the pedagogical value of feedback by providing real-time insights that promote motivation, consistency, and improved performance. However, for its full potential to be realised, attention must be given to addressing infrastructural deficiencies, digital literacy gaps, and ethical concerns surrounding access and data management. Strengthening institutional support, training, and policy frameworks will be crucial in ensuring that AI becomes a sustainable and equitable tool for advancing physical education in higher institutions. Based on the above, the study thus recommended that:

i. Government at all levels should provide adequate infrastructure, stable internet access, and funding to support the integration of AI technologies in physical education across institutions.
ii. Health educators and sport scientists should develop AI-based training programmes that align with national fitness and health objectives, ensuring that students benefit from safe and effective technological applications.
iii. Teachers should undergo continuous professional training to enhance their competence in using AI-driven tools for feedback, assessment, and motivation in fitness education.
iv. Students should embrace AI-assisted learning platforms to improve their self-monitoring, engagement, and overall physical performance.
V. Institutions should establish clear policies on ethical use, data privacy, and equitable access to AI technologies to promote fairness and inclusivity in physical education.

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