

The Application of Information Technology in Physical Education Teaching and Training

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ABSTRACT

This research determined the application strategy of information technology in the learning of physical education, and sports and training of Hunan Institute of Physical Education. The study conducted a parallel analysis of the assessment collected from both sports-student-respondents and physical education teacher-respondents. This research which used a purposive sampling technique adopted the descriptive-comparative-correlational research design. It was conducted during the second semester of school year 2022-2023. The results garnered from both group of respondents were compared, analyzed, and interpreted. Based from the findings, majority of the students are below 18 years old, mostly females, and were from grade 10. majority of the teachers are 31 -40 years and 41-50 years old; are females; and have up to 16-20 years of teaching experience. On the application of information technology in the learning of physical education in terms of learning experience, the assessment showed that the students and teachers agreed, denoting a high level of the use of technology for improved learning experience when it comes to increased flexibility as in virtual learning, providing individual-oriented experience, use of gaming systems in gym classes to enhance learning experience, etc. The assessment scores of the teachers on the use of IT for learning physical education were significantly higher compared to those of the students. From the perspective of the students and teachers, technology was used for analyzing sports performance at a high level because coaches apply information technology for visual feedback and replays, high-definition cameras are used to monitor players in the pitch, data analytics are used to study and understand the team, information technology is applied in sports to provide measurable training routines, for Live-tracking performances, etc. The assessment scores of the teachers on the use of information technology for sports and training were significantly lower compared to those of the students. The negative correlation between the use of information technology for sports and training and the learning experience of the students suggests that a low-level usage of information technology for sports and training was connected to a poor learning experience of the students. Lastly, the researcher proposed a plan to promote the use of information technology in physical education learning and sports training

Keywords. Assessment and Evaluation. Coaching. Health Assessment. Information Technology (IT). Learning Experience, Sports and Training, Sports Performance, Teacher-Student Communication

Introduction

The rapid integration of information technology in the daily lives of people has contributed to an improved ease of performing tasks in many aspects of human life, including the field of education. Based on a study by Hong (2021), it was mentioned that IT is used by colleges to exchange information as well as to engage in the use of diversified teaching, which can ultimately push towards novel teaching processes that are in line with 21st century technology and innovation. It was also said here that using IT in physical education can further stimulate the interest of students to learn as well as improve correct action representation. It was also mentioned that network technology is helpful as it enhances the teaching outcome in physical education, accelerates the use and creation of information, and improves the adaptation of teachers to the changes brought by continuous development in society.

The application of information technology in physical education teaching and training greatly improves the effectiveness of physical education teaching and training and plays an important role in cultivating high-quality sports professionals. Colleges and universities should conform to the development direction of informatization and take the initiative to meet the challenge of informatization. As a special subject, physical education has a strong particularity in its teaching, so information technology should also highlight its particularity in the teaching and training of physical education departments in colleges and universities. And provide some feasible suggestions on the application of information technology in physical education teaching and training. Cushion and Townsend (2019) conducted a review on the role of technology-enhanced learning in coaching and discovered that, despite the intervention of technology, both teaching and learning effectiveness were low. This suggests that more research and evaluation of the functions and application of technology-enhanced learning is required in order to improve and optimize the coaching and learning outcomes of both teachers and students.

This research evaluated the application strategy of information technology in the learning of physical education, sports, and training at the Hunan Institute of Physical Education. The study findings were derived through a parallel analysis of the assessments collected from both sports-student respondents and physical education teacher respondents. Although there is a deluge of literature that addresses the application of information technology in physical education, only a few studies have addressed this issue in China, and out of the few, none of the studies used the parallel analysis method to compare responses from the perspectives of both teachers and students. This research bridged that gap.

Statement of the Problem

This research determined the application strategy of information technology in the learning of physical education, sports, and training at the Hunan Institute of Physical Education. The study conducted a parallel analysis of the assessments collected from both sports-student respondents and physical education teacher respondents. The results garnered from both groups of respondents were compared, analyzed, and interpreted.

Specifically, it sought answers to the following questions:

1. What is the profile of sports student -respondents in terms of:
 - 1.1 sex;
 - 1.2 age; and
 - 1.3 grade level.
2. What is the profile of the PE teacher-respondents in terms of:
 - 2.1 sex;
 - 2.2 age; and
 - 2.3 length of teaching experience.
3. To what extent is Information Technology (IT) applied in the learning of physical education as assessed by the teacher and student respondents in terms of:
 - 3.1 Teacher-Student Communication;
 - 3.2 Learning Experience; and
 - 3.3 Assessment and Evaluation?
4. Is there a significant difference between the assessment of both groups of respondents on the use of IT for learning PE?
5. To what extent is Information Technology (IT) applied in sports and training as assessed by the teacher and student respondents in terms of:
 - 5.1 Coaching and Learning;
 - 5.2 Health Assessment; and
 - 5.3 Analyzing Sports Performance.
6. Is there a significant difference between the assessment of both groups of respondents on the use of IT for sports and training?
7. Is there a significant relationship between the use of IT for learning, and its use for sports and training?
8. What plan can be proposed to promote the use of IT in PE learning and sports and training of Hunan Institute of Physical Education?

Related Literature

The Concept of IT Usage for Learning

To introduce the concept of information technology (IT), a review written by Olimov and Mamurova (2022), described this as an approach that includes "organizing, storing, processing, restoring, and transmitting information" for the purpose of improving the daily lives of people. Aside from this, IT was also said to be an activity that makes use of numerous processes to complete a certain task or goal, particularly that of users. Furthermore, Ratheeswari (2018), also mentioned that information technology, with an emphasis on information and communication technology (ICT), is widely used in the classroom as it allows students to learn and apply 21st century skills.

The role of IT in physical education

The rapid integration of information technology in the daily lives of people has contributed to an improved ease of performing tasks in many aspects of human life, including the field of education. Based on a study by Hong (2021), it was mentioned that IT is used by colleges to exchange information as well as to engage in the use of diversified teaching, which can ultimately push towards novel teaching processes that are in

line with 21st century technology and innovation. Hai (2021) highlighted the use of network information technology in teaching basketball. It was reported here that using network teaching technology was primarily done for teaching basic courses presented on campus websites, as well as using this as a supplement to following course materials and course content.

Challenges of IT in Physical Education

As mentioned in an earlier portion of this literature review, a study by Krause, O'Neil, and Jones (2020), stated that a challenge faced in physical education is the lack of skills that educators have when using technology for teaching. It was mentioned here that physical education teacher education (PETE) programs need novel strategies and improved training in order to equip teachers with the skills to utilize technology to enhance their teaching and the learning outcomes of students. Lastly, there is also a varying degree of difficulty for students from developing countries, as Kalolo (2019), reported that there is an existing knowledge gap in these nations. Thus, it is recommended that there is a need to implement strategies that may aid students in using technology that are guided by research so as to prevent them from blindly using these.

METHODOLOGY

Research Design

The quantitative approach was used, particularly the descriptive comparative -correlational design utilizing the survey method, which involves quantitative data for student and teacher respondents from the physical education department. This method is used to assess the teachers and students' responses and present the research findings. This study, through a parallel analysis, will compare the results obtained from the student respondents with those of the teacher respondents regarding the use of IT for PE learning and sports and training.

Population and Sampling Technique

The survey object of this study was limited to 50 PE teachers and 50 PE students in 2 grade levels of physical education major at the Hunan Institute of Physical Education, Changsha City, Hunan Province, China. This study adopted a purposive sampling method. The inclusion and exclusion criteria were:

1. The respondents of the study were teachers and students of physical education at the Hunan Institute of Physical Education.
2. They must be willing to participate in the study.
3. Respondents must be legally permitted to be participants in a study of this nature.
4. The teachers must have taught in the institution for a period of at least 2 years.

Summary of Findings

1. Profile of the Student Respondents

With 50 students taking part in the study, 45 of them are below 18 years of age (90%), 4 of them are between 19 and 20 years old, and 1 of them is 21 years old and older. Based on the students' sex, 21 of them are males (42%), while 29 of them are females (58%). Based on their grade level, 21 of the students are from grade 9 (42%), while 29 of them are from grade 10 (58%).

2. Profile of the Teacher-Respondents

There are a total of 50 teachers. 9 of them are between 20 and 30 years old (18%), 14 teachers are between

31 and 40 years old (28%), and another set of 14 teachers are between 41 and 50 years old (28%). 13 of the teachers are over 50 years old (26%). According to the teachers' sex, 22 of them are males (44%), while 28 of them are females (56%). Based on their years of teaching experience, 8 of the teachers have been teaching for 1–5 years (16%), 16 of them have been teaching for 6–10 years (32%), 7 of them have been teaching for 11–15 years (14), 17 of them have been teaching for 16–20 years (34%), and 2 of the teachers have more than 20 years of teaching experience (4%).

3. Assessment of the Application of Information Technology (IT) in the Learning of Physical Education as Assessed by the Teacher and Student Respondents

The highest assessed dimension is teacher-student communication, where the students agreed with a mean of 3.01 and the teachers strongly agreed with a mean of 3.46. This shows that based on the perspective of the teachers, IT is used for teacher-student communication at a very high level, while the students believe it is used at a high level.

4. Significant Difference Between the Assessment of Both Groups of Respondents on the Use of Information Technology for Learning Physical Education.

There are significant differences in the overall assessment of the use of IT for learning PE ($p < 0.001$) and in terms of teacher-student communication ($p < 0.001$) between students and teachers. There are no significant differences between the students' and teachers' assessments of the use of IT for learning PE in terms of learning experience ($p = 0.189$) or assessment and evaluation ($p = 0.654$).

5. Extent of Application of Information Technology (IT) in Sports and Training as Assessed by the Teacher and Student Respondents

The highest assessed dimension for the students is health assessment, where the students agreed with a mean of 2.96, suggesting that from the students' perspective, IT is mostly used in the school for health assessment. However, the highest assessed dimension for the teachers is analyzing sports performance, where the teachers agreed with a mean of 2.95, suggesting that from the teachers' perspective, IT is mostly used for analyzing sports performance.

6. Significant Difference Between the Assessment of Both Groups of Respondents on the Use of IT for Sports and Training

There are significant differences in the overall assessment of the application of IT in sports and training ($p < 0.001$), coaching and learning ($p < 0.001$), and health assessment ($p < 0.001$) between students and teachers. There is no significant difference between the assessments of students and teachers in the application of IT in sports and training in terms of analyzing sports performance ($p = 0.127$).

7. Significant Relationship Between the Use of IT for Learning, and its Use for Sports and Training

Based on Table 13, the application of IT in sports and training in terms of coaching and learning is negatively correlated with learning experience ($r = -0.28$, $p = 0.005$), teacher-student communication ($r = -0.43$, $p < 0.001$), and the overall assessment of the use of IT for learning PE ($r = -0.49$, $p < 0.001$). In contrast, there is a positive correlation between analyzing sports performance and learning experience ($r = 0.21$, $p = 0.036$). The overall assessment of the application of IT in sports and training is also negatively correlated with teacher-student communication ($r = -0.40$, $p < 0.001$) and the overall assessment of the use of IT for learning PE ($r = -0.42$, $p < 0.001$).

Conclusions

Based on the study's findings, the following conclusions were drawn:

1. The results show that the majority of the students are under 18 years old. This is because the participants are grade school students. Also, most of them are female and are in grade 10.
2. Based on the findings, the majority of the teachers are 31–40 years old and 41–50 years old, are female, and have up to 16–20 years of teaching experience.
3. On the application of information technology in the learning of physical education in terms of learning experience, the assessment shows that the students and teachers agreed, denoting a high level of the use of technology for improved learning experience when it comes to increased flexibility as in virtual learning, providing individual-oriented experience, use of gaming systems in gym classes to enhance learning experience, use of physical education apps and websites for learning, and empowering students by giving them ownership of how they learn.
4. The assessment scores of the teachers on the use of IT for learning physical education are significantly higher compared to those of the students.
5. From the perspective of the students and teachers, technology is used for analyzing sports performance at a high level because coaches apply IT for visual feedback and replays, high-definition cameras are used to monitor players on the pitch, data analytics are used to study and understand the team, IT is applied in sports to provide measurable training routines, for live-tracking performances, for assisting referees during games like the video assistant referee, and for coaches to watch their players' current form, mistakes, crucial decision-making, and evolution to decide on what improvements need to be made.
6. The assessment scores of the teachers on the use of IT for sports and training are significantly lower compared to those of the students.
7. The negative correlation between the use of IT for sports and training and the learning experience of the students suggests that a low-level usage of information technology for sports and training is connected to a poor learning experience for the students.
8. The researcher proposed a plan to promote the use of IT in PE learning, sports, and training at the Hunan Institute of Physical Education.

Recommendations

1. There is a need for information technology to track students' progress; hence, the school should purchase the lacking technological tools in order to track students' performance and evaluate them efficiently based on their attendance, grades, and overall contributions in physical education classes.
2. The school should prioritize the improvement of sports coaching technologies and the adoption of these technologies in the classroom so as to enhance the learning experience of students and student-athletes.
3. Aside from purchasing new technologies, maintenance of existing software and hardware should also be prioritized by the school.
4. The school should prioritize technological assessment and evaluation over the traditional manual assessment and evaluation system, which takes time and energy.
5. Training programs should be organized so as to teach and equip teachers on how to use this software, as this will ease the transformative process from manual evaluation to technological assessment and evaluation.
6. Data should be stored using information technology so as to monitor the health records of students and athletes for easier reference during emergency situations.

7. Finally, the school should adopt the strategic plan that was proposed based on the findings of this research to promote the use of IT in PE learning.

PROPOSED PROGRAM

Strategic Plan to Promote the Use of IT in PE Learning and Sports and Training at the Hunan Institute of Physical Education.

Based on the study findings, a strategic plan was developed by the researcher to promote the use of IT in PE learning and sports training at the Hunan Institute of Physical Education. The following are the core objectives of the plan.

Objectives:

1. To increase the extent of the usage of IT for tracking students' progress
2. Improve the usage of technology for assigning and completing homework online, encoding grades, checking attendance, and tracking deadlines.
3. To make more use of the learning management system
4. To use IT for coaching and learning, and
5. To use IT for health assessment.

Area of Concern	Rationale/ Objectives	Activity/ Strategy	Target Schedule	People Involved	Budget	Expected Outcome
Use of IT for Assessment and Evaluation	<p>To increase the extent of usage of IT for tracking students' progress</p> <p>To improve the usage of IT for assigning and completing assignments online</p> <p>To use IT for encoding of grades</p> <p>To make more use of</p>	<p>A training program for the teachers to educate them on the operationalization of the learning management system and the e-learning so as to effectively use it for assignments, grading, checking attendance, and performing other student assessment procedures that are currently being done manually.</p>	<p>2023/2024 Academic Year</p>	<p>School administrator, academic leaders, teachers, students.</p>	<p>Professional Fee =5,000 RMB</p>	<p>Complete and consistent use of technology for the assessment and evaluation of the students in the school.</p>

	<p>the learning management system of the school</p> <p>To use digital software in checking attendance and tracking submission deadlines.</p>					
Use of IT for coaching and learning	<p>To digitize games and training sessions in order to enhance the experiences of athletes in coaching and training; and to use IT for tracking performance.</p>	<p>Utilize virtual reality for coaching, implement the use of gaming systems, use monitors and trackers, make use of smartwatches</p>	<p>2023/2024 Academic Year</p>	<p>School administrators, academic leaders, teachers, students.</p>	<p>Digital Tools Purchase 15,000 RMB</p>	<p>Efficient use of technology for coaching and training</p>
Use of IT for health assessment	<p>To make use of information technology for assessment of the health of students and athletes</p>	<p>Use wearable techs for the protection of the student-athletes</p> <p>Use scanners and Xrays for immediate checkup</p>	<p>2023/2024 Academic Year</p>	<p>School administrators, academic leaders, teachers, students.</p>	<p>Technical Fees =5,000 RMB</p>	<p>Available of wearable techs, scanners, and xrays which will be used consistently</p>

	in the school	Store data which may be assessed to check students' health history.				y in the school.
TOTAL					25,000 RMB	

Some of the activities that will be used in addressing the objectives of the strategic plan are to utilize virtual reality for coaching, implement the use of gaming systems, use monitors and trackers, make use of smartwatches, use wearable technology for the protection of student-athletes, use scanners and X-rays for immediate checkups, and store data that may be assessed to check students' health histories, etc. The program cost is estimated to be around 25,000 RMB, including the costs for training and the purchase of technological equipment that were listed in the plan.

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