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UNFOLDING THE BARRIERS TO TEACHING AND LEARNING WITH TECHNOLOGY AMONG UNDERGRADUATE PRE-SERVICE TEACHERS

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Abstract: The main purpose of this study is to determine the main barriers to learning PE with Coach's Eye mobile application [TechSmith Corp.] and mobile device. We used an Interpretive Phenomenological Analysis (IPA) approach and found that undergraduate physical education (PE) pre-service teachers feared failure when learning sports skills with technology after completing the intervention for six weeks. Despite the intervention group improving their sports skills more than the control group, they also reported a higher tendency of bias when learning sports skills with technology. The participants also highlighted reduced practice time and added responsibilities as a hindrance to this method's adoption. Our work answers the questions regarding participants' perceived barriers, technological literacy towards learning sports skills, and motivation to embrace teaching and learning with technology. We also suggested the potential benefits of learning PE with technology for students and educators which warranted future studies to find solutions to mitigate pre-service PE teachers' concerns about using technology in their teaching sessions. Additionally, future studies are needed to expand our understanding of learning with technology in other sports categories (e.g., invasion, target), the context of learning, and the cognitive ability of various populations.

Keywords: Barriers, Coach's Eye application, Physical education, Pre-service teachers

Introduction

Education in the 21st century is becoming more dynamic and challenging as children are nurtured and exposed to various technologies (e.g., smartphones, tablets, voice recognition devices). Thus, millennials are more willing to learn new content using innovative methods than earlier generations. Unfortunately, since the booming of these smart devices, many authors noticed a downward trend of children involved in healthy lifestyles (i.e., low levels of physical activity (PA), not hanging out with friends and sleep deprivation) (Twenge *et al*., 2017; Huang, 2017).

Similarly, a dose-response relationship occurs when more time spent on smart devices will also increase in sedentary lifestyle (e.g., watching TV, playing digital games, and browsing the Internet (Iannotti *et al*., 2009). To make matters worse, Malaysia is currently ranked 1st in Asia for obesity and Malaysian spend an average of nine hours daily using their smart devices for various purposes (e.g., playing games, productivity, networking) (Department of Statistics Malaysia (DOSM), 2019).

Researchers are vigorously and consistently focusing on using various mobile applications in teaching and learning to help students towards behaviour modification, improvement in PA levels, and a healthy lifestyle beyond schools (Dunn & Robertson-Wilson, 2018). Moreover, as children are nurtured along with technology, the younger generations are more likely to start schools with the basic knowledge and skills to successfully utilise the technology around them (Palicka *et al*., 2016). Therefore, the introduction of smart devices in conjunction with mobile applications is timely and capable of helping educators and students improve their teaching and learning experience.

Teaching and Learning with Technology

To understand the relationship between the Coach's Eye movement analysis application towards the movement analysis process, the researcher has looked into the Unified Theory of Acceptance and Use of Technology (UTAUT) as the theoretical framework for this study (Venkatesh *et al*., 2003). Several authors recommended the usage of the above model due to its predictive power as it was constructed from the combination of technology-related models such as (1) the Theory of Reasoned Action (TRA), (2) the Technology Acceptance Model, (3) the Motivational Model, (4) Theory of Planned Behavior (TPB), (5) Combined TAM-TPB, (6) Model of PC Utilisation, (7) Innovation Diffusion theory, and (8) Social Cognitive Theory (Pullen *et al*., 2015).

The UTAUT model (Figure 1) comprises four fundamental components: performance expectancy, effort expectancy, social influence related to behaviour intention, and facilitating conditions as determinants of behaviours towards technology (Pullen *et al*., 2015). Additionally, Marek and Shahibi (2019) have added playfulness and self-management of learning into the present model to strengthen the predictors of mobile learning among participants. The participant's gender, age, experience with Coach's Eye movement analysis application, and voluntariness of use were the co-factors influencing several or specific model components. A combination of components would affect behavioural intention to embrace the concept and utilise technology as learning tools in learning sports skills or other health promotion activities (e.g., mental well-being, engagement with peers, nutritional intake) (Venkatesh *et al*., 2003).

Using this model as their studies foundation, many authors have found variables such as perceived helpfulness, orientation towards computer use, computer self-efficacy (Teo, 2007), easiness of performance, technological complexity and facilitating conditions (e.g., availability of resources, internet connectivity) (Al-Ruz & Khasawneh, 2011) as the direct or indirect factors to influence participants' technology acceptance.

The addition of technology into PE has also been found to improve the teaching and learning process (Elly *et al*., 2014). Besides that, many authors have associated technological-assisted learning with higher linkages between formal and informal learning. Therefore, learning with technology provides higher learning ownership, develops more independent learners and realisation learning beyond classroom settings (Lindberg *et al*., 2016).

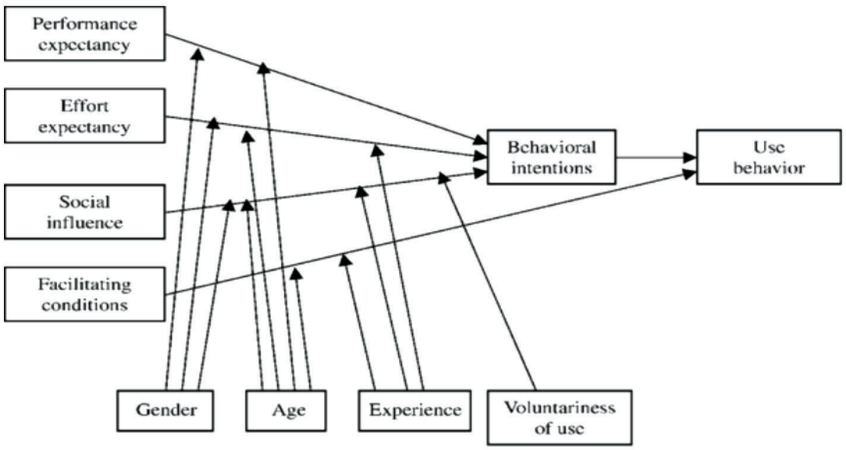

Figure 1: The UTAUT Model (Venkatesh *et al*., 2003)

Challenges in Learning Content with Technology

Learning content with technology (e.g., video equipment, computers) was less accessible and expensive for practitioners to utilise in their teaching and learning sessions. For instance, in the late 20th and early 21st centuries, video cameras could be as expensive as USD 400. Many of the established scientific videography software (e.g., Siliconcoach, The SIMI, Dartfish) would also require high-specification computers and a high cost of an annual subscription (e.g., Siliconcoach charges USD 50 annually to gain all access to all its features).

Besides that, the lack of technologically skilled teachers has also contributed to challenges in adopting the innovative approach to learning PE. Often, learning with technology in Malaysia was considered a mere "add-on" or "tick boxing" practice as the approach was often due to school policies and government expectations (Palao *et al*., 2015). Nonetheless, fundamental issues such as school-based restrictions (e.g., Internet connection, expenses) and educators' lack of willingness to teach with technology always undermined the potential of technology to support the teaching and learning process (Bodsworth & Goodyear, 2017).

Apart from students, educators also had issues with digital competencies, such as manipulating the device features (e.g., camera, password) and specific applications (e.g., Coach's Eye, Dartfish). Time was deemed to have a direct relationship with interest and competency; higher practice time will likely result in higher appreciation and competencies in learning with technology and vice versa (Casey *et al*., 2017).

Apart from educators, the learners encountered issues that hindered interest and adoption of technology integration into learning PE. Bodsworth and Goodyear (2017) have found that unfamiliarity with the technology and cooperative learning has resulted in more time spent organising group work and technology rather than the learning content. Their participants comprise 36 mix-gender students aged between 11-12 learning various sports for 55 minutes/lesson for five weeks, were observed to engage in more conversation rather than engaging in physical tasks, an argument with each other on organisational aspects of group work and involved in more off-task behaviour during the lesson (e.g., taking selfies, videoing everything) (Bodsworth & Goodyear, 2017). Hence, the combination of low knowledge, skills, and logistics difficulties has led to the slow adoption of learning PE with technology (Knudson, 2013; Casey *et al*., 2017).

Therefore, the main aim of this study was to determine the main barriers to learning PE with Coach's Eye movement analysis mobile application [TechSmith Corp.] and smart device. Specifically, participants' perceptions, knowledge, and motivation were analysed through IPA to investigate potential barriers influencing participants' adoption of technology during PE. Thus, this study addressed the following research objectives: (1) to explore participants' perceived barriers to learning PE with a mobile application and smart device, (2) to investigate participants' levels of knowledge in learning tennis and badminton sports skills with technology throughout the intervention and (3) to explore participants' motivation to adopt learning PE with technology.

Materials and Methods

Research Design

This study has adopted the phenomenological research approach, emphasising the wholeness of experiences and how they may influence an individual's behaviours (Moustakas, 1994). Specifically, Creswell (2012) defined the approach as a study to describe individuals' lived experiences of a concept or phenomenon. Previous studies on body image, gender, sexual orientation (Morgan & Arcelus, 2009) and patients with multiple sclerosis thoughts of exercise (Barkoles *et al*., 2008) have also used the phenomenological approach better to understand the issues from the participants'

perspectives. Using this approach, the researcher would focus more on participants' perceptions and knowledge about learning sports skills with technology rather than describing phenomena based on categorical systems and conceptual or scientific criteria (Pietkiewicz & Smith, 2014).

This study used instruments such as focus group discussion to extract qualitative data using the Interpretive Phenomenological Analysis (IPA) (Pietkiewicz & Smith, 2014). The process involved several steps: (1) observing phenomena, (2) questioning, (3) collecting data, (4) linking concepts with data, and (5) communicating (Pietkiewicz & Smith, 2014). The IPA promotes an individual's ideas as "self-interpreting beings" who constantly interpret the events, objects, and people in their lives. Thus, the approach required a dual interpretation process that prioritises the participants' perceptions of their world before the researcher's analysis and findings (Smith, 2011).

Settings

The university's outdoor field and multi-purpose hall were chosen as the main areas to implement this study. Each PE session would last 3 hours and involved participants learning various sports (e.g., tennis, badminton). The main researcher assumed the role of an active observer throughout the study. The role allows the researcher to observe the participants without being directly responsible for the teaching and learning sessions. The data collection was completed between October and December 2020.

Participants

The participants comprised undergraduate physical education pre-service teachers recruited via students' enrolment in the individual sports subject between October - February 2021. All participants studied at the Faculty of Education in a local university in central Selangor, Malaysia. All participants, aged between 20 and 25 years old, were currently undergoing pre-service teachers training and would receive a degree in education after completing their four-year program at the university. As many as 50 PE students (18 males and 32 females; 10% (5) from East Malaysia and 90% (45) from West Malaysia students) participated in this study. Contents of the subject and assignment (e.g., rubrics, time, goals) were consistent throughout each session and the intervention was conducted from October - February 2021.

Procedures

This study intervention involved several phases: (1) preparation, (2) implementation, and (3) data processes. For the primary phases, the researcher has taken the opportunity to observe and engage with students teaching and learning in several sports courses around the campus. Both researcher's notes and student's feedback on their classes have helped the researcher to identify issues (i.e., students depending solely on the lecturer's feedback, inaccurate feedback, absence of feedback, lack of engagement between lecturer and students, and teacher-centred approach). Additionally, the researcher has spent considerable time exploring literature on learning PE with technology, mobile application to support learning skills, and mobile device roles to promote teaching and learning in and out of the classroom.

Meanwhile, the material involved in this study was the Coach's Eye movement analysis application by TechSmith Corp. The researcher decided to use the application in this study because it provides meaningful information on movements. Subscribing the full application (essential + precision pack) (cost of RM 55.43) allows the researcher to: (1) create an analysis video, (2) side-by-side video comparison, (3) organised video library, (4) export the video to different platforms via USB or clouds, (5) utilised the standard drawing tools such as the freehand arrow, line, circle, square, (6) precision measurement tools such as angle, timer, and spotlight, and (7) share the videos with students via email, text messages, and social media, and (8) gain access to all the videos everywhere on any smart devices.

The next step involved the researcher planning for suitable instruments (i.e., focus group discussion) that could provide the necessary data for this study. The researcher worked on preparing the materials that were appropriate for the participants based on their current knowledge about the topic, strengths, weaknesses, and interests. Each draft completed by the researcher was referred to several colleagues as they were content experts and more experienced researchers. The final draft was accepted once all the issues were satisfied, and questions were deemed sufficient to achieve this study's aims and objectives. Before data collection, the researcher obtained approval from the university's research ethics committee (REC/07/2020 MR/170) to ensure all processes involved in this study followed the university's standards and regulations.

The second phase involved the researcher approaching the potential participants for this study to explain the aims, objectives, benefits, and risks (if any) of participating in this study. The students needed to understand this study before fully participating in the research. Only students who provide their consent (i.e., signing the consent form) to participate and have their actions during teaching and learning video recorded and taken pictures would be considered for this study. Nonetheless, the participants were free to withdraw from the study at any time they wished without any consequences. To increase study rigour, the researchers have adopted the single-blind intervention, which approaches the study as normally as possible and spends considerable time in training to collect data (e.g., observation, focus group) non-judgmentally. Throughout the study, most information (e.g., hypotheses, goals) was withheld from the participants to reduce the chances of bias which might lead to reactivity.

The specific sports chosen include tennis and badminton. The sports were chosen as it was part of the syllabus of the Individual Sports (SED521) course offered to first-year PHE students. The technicality of each sport also makes it difficult to learn by depending solely on verbal feedback. Therefore, the addition of intervention may help the participants to develop interest and skills in tennis and badminton. Furthermore, only two sports allowed participants to explore and practice their skills. Besides that, time limitation (i.e., eight weeks of intervention) and participants' availability on campus (i.e., return to campus in the middle of the semester due to the recent pandemic) also influence the selection of both sports.

As the session lasted for three hours, the researcher randomly selected five participants from the intervention groups to be observed and receive feedback (e.g., verbal, video analysis, physical demonstration) every 30 minutes per feedback session. The feedback given was based on credible rubrics or checklists rather than the researcher's experience to ensure the accuracy and effectiveness of feedback. Next, the feedback was given to a single participant at one time to ensure minimal interruption to the teaching and learning process. Additionally, the researcher always strived for short, concise, and minimal feedback or correction at one time to avoid information overload and provide time for participants' self-reflections. Participants can request to replay the video, play the video in slow motion, and ask any questions throughout each session (Trout, 2013; Mahoney *et al*., 2018).

The researcher conducted the focus group discussions among participants in the intervention group in the eighth week of the study. Regarding focus group discussion, there were five groups (i.e., five persons/group) involved in the series of discussions (one group/session) held in February 2021 to gain participants' perceptions of the intervention and the potential barriers in learning sports skills (i.e., tennis, badminton) with technology. Each session lasted between 30 – and 45 minutes and was held at the researcher's office.

Data Collection and Measurement

Focus Group Discussion

The focus group discussions were conducted with five participants in each session towards the end of this study to explore the potential barriers to learning PE with technology. This qualitative approach would help the researcher to compile shared understanding and opinions from the participants (Creswell, 2012). The discussion sessions were held on the eighth week with the participants to assess changes in knowledge levels of the sports and barriers to learning sports skills with technology. The researcher established a set of protocols (e.g., set of questions, number of participants/sessions, time duration) and informed the participants of the objectives and confidentiality of the study before each session started. To maintain this study's rigour, the questions were simplified and specific to minimise ambiguity. Additionally, the main researcher has shared samples of instruments with several colleagues for peer-reviewed purposes. As a result, we were more certain that the contents of the instruments were clear, easy to understand, and relevant to the participants.

Additionally, all participants were allowed to share their thoughts about the issues. The researcher has assumed the role of moderator, which involves giving pre-designed questions, eliciting a response, and prompting the others to be involved in the conversation (Mills, 2014). Each session would have a consistent number of participants (five participants/session), lasting for a maximum of 60 minutes/session, and strive for a safe and comfortable environment throughout each session. A time delay was added during focus group discussions by adding introductions and cover stories occasionally during the sessions. Adding time and cover stories helps the researcher deemphasise variables and reduces participants' likelihood of using previous answers to answer the next questions (Schaller, Patil, & Malhotra, 2015). Each of the sessions was audio-recorded and transcribed for meaningful information.

Data Analysis

The qualitative data collection involved the researchers compiling non-numerical information (e.g., opinions, perceptions, behaviours) from participants related to the issues. Specifically, qualitative data were compiled to achieve objectives such as (1) identification of attitudes and opinions shared by participants, (2) obtaining insights on participants' barriers to learning sports skills with technology, and (3) determining the variables of interest for future studies (Awang, 2011).

The questioning process involves the creation of an interview plan to facilitate the natural flow of conversation and appropriate questions to achieve the study's objectives. Next, specific questions focused on exploring sensory perceptions and mental phenomena (e.g., thoughts, memories, associations) (Pietkiewicz & Smith, 2014).

Occasionally, participants were also prompted to reflect on their thoughts and experiences through specific situations during the intervention (e.g., learning tennis strokes with technology). A moment of silence was allowed to provide some time for participants to reflect upon their thoughts on the intervention. Importantly, the researcher also pays close attention to participants' verbal, non-verbal, and non-behavioural communication to ensure they stay comfortable throughout the data collection process. The participants were never forced to answer any questions if they wished not to or avoid talking about certain issues.

Next, the data collection process involves multiple readings and making notes from the focus group sessions. Audio recordings and transcripts have been reviewed a minimum of two times to allow the researcher better to understand the data and atmosphere during each interview session. The researcher focused on the contents, language use (e.g., metaphors, repetitions, pauses), context, and initial interpretive comments (Pietkiewicz & Smith, 2014). Distinctive phrases and emotional

responses were also highlighted to clarify the issues discussed. Subsequently, the data collected were compiled into emergent themes. Based on the transcriptions, the researcher attempted to formulate a concise phrase and develop thinking concepts. Nonetheless, the participants' accounts and context remain essential data in developing themes and concepts (Pietkiewicz & Smith, 2014).

Besides that, the next process involves the connection of emerging themes, grouping them based on conceptual similarities and giving a label to each cluster. Eventually, the final list was created based on numerous superordinate themes and subthemes. NVivo (version 14.0) software [QSR International Inc.] was helpful as it allows smoother data input and description and more systematic access to the list of themes, subthemes, and links to appropriate passages in the transcript.

The last process in IPA involves communicating data for a meaningful study understanding. Each theme was described in this process with examples taken from the focus group discussion session extracts. The researchers also attempted to provide analytic comments to explain important findings during the data analysis. Using participants' extracts to maintain their personal experiences and better represent their internal perspectives was crucial. Besides that, using participants' own words also allows readers to assess the relevance of the data interpretations and thus develop a meaningful understanding of the content and context of this study (Pietkiewicz & Smith, 2014).

To analyse qualitative data, the audio records from each session (i.e., nine sessions) were imported from the researcher's device into NVivo (version 14.0) software [QSR International Inc.]. The data were carefully transcribed using the software using various functions (e.g., pause, slow-motion, rewind) available in the software. The researcher took extra effort to listen to the audio records and review the raw transcript minimum of two times to ensure no important points were left out during the process.

The coding process produces six emerging themes: (1) knowledge levels, (2) motivation to learn, (3) learning sports skills, (4) engagement with peers and lecturer, (5) practice time, and (6) size of smart device. Completion of the coding process allows the researcher to begin the analysis process via chart document coding (i.e., compare each coding to percentage coverage) and word frequency query group into exact word matches. The word cloud format was chosen due to its clarity and ease of readers' understanding of data results. The word cloud also highlighted the result keywords to support the study's findings and promote thorough discussion on the topic.

Results and Discussion

Fear of Failure of Learning Sports Skills with Technology (Perceive Barriers)

There were 7.1% of 25 participants (i.e., intervention group) who discussed issues on learning with technology and how it may affect students' teaching and learning of sports skills. Some of the main concern includes fear of failure, bias, and practice time. Some participants were more nervous and embarrassed when learning sports skills since the introduction of interventions. For instance, "I never played a tennis game in my life, never entered a competition before and not sure about the rules and regulations in tennis" (Fad). Hence, "I feel a bit nervous, when I see someone record, I feel nervous and might lose focus, and all my skills seem to be incorrect." (Ik)

Additionally, "especially in the sport, I am less familiar (referring to tennis), when people record, I can be nervous, sometimes miss smash or hit and over sweating." (Ik) More worriedly, "I am a bit embarrassed, sometimes I get intimidated or peer pressured. My friends would say "you always do wrong, even with the simplest technique." (Jan) Related to pressure, "the nervousness makes me feel more pressured to be honest" (Fat) and feeling a sense of guilt, "when I was recorded, I was having feelings such as "do I make any mistake?" (Jan)

Related to the UTAUT model, many authors have found variables such as perceived helpfulness, orientation towards computer use, computer self-efficacy (Teo, 2007), easiness of performance, technological complexity and facilitating conditions (e.g., availability of resources, internet connectivity) (Al-Ruz & Khasawneh, 2011) as the direct or indirect factors to influence participants' technology acceptance. These findings were also reflected in this study, where many participants tend to be reluctant due to difficulty navigating the Coach's Eye application and facilitating conditions such as peer support and the educator's role during learning sessions. Factors such as limited time and lack of mastery may also have caused some participants to perceive the intervention as intimidating and fear failure.

One participant relates additional pressure with failure with his own experience "I feel uncomfortable being watched by others, I use to have the same experience with Silat when my parent come and see me, normally I would not be able to perform well." (Ik) Another participant shared, "I am normally okay during practice sessions, but every time there is competition, I will not participate as I feel like I am not ready." (Is) Other participants also voice their concerns about students' learning with technology. For instance, "I think it depends on students, some students might be motivated while some may not. For example, if the student is keen to learn, he would take time to review the video and do self-reading on the sport." (Ikh) Another participant shared, "I have mix-feelings when I was recorded, I always wanted to do the sports skills my best, but at the same time, I was nervous about being judged by others if they saw my videos." (Jan)

A previous study demonstrated that unstructured video replay might harm learning, particularly among beginner learners (Kenwright, 2017). In his review on video games in learning and education, he suggested the video game as a tool rather than a replacement for teaching and learning due to limitations to discussing real-world experiences as well as social aspects development (e.g., body language, environment, eye contact) important in real-world interaction (Kenwright, 2017). Similarly, in this study, solely dependent on technology for learning will lead to confusion, anxiety, and minimal improvement in participants' learning sports skills.

The Tendency of Bias When Learning Sports Skills (Knowledge of Learning Sport Skills)

Regarding bias, few participants suggest that "according to the videos, we tend to focus more on the technique but less on gameplay. For example, how do we recover after doing forehand stroke?" (Afi) and "students might have difficulty to count the game points due to higher focus on technique" (Far). Additionally, "because not everybody knows how to learn sports skills with technology, and technology can be unpredictable, for example, when we record and it goes missing, it will disturb the student's teaching and learning process." (Jan) As the participants were not allowed to explore the Coach's Eye application and solely learn about it through the researcher's feedback and demonstration, it might contribute to assumption and hindrance to embracing learning PE with technology.

Similarly, a previous study on flipped classroom approach via an online-learning platform among fourth-year medical students found that the participants felt overloaded with additional tasks, and the flipped classroom might not help them achieve their learning goals (Kenwright *et al*., 2017). Therefore, they recommended (1) the instructions and learning activities should be age-appropriate to allow more working memory for the meaningful learning process (Van Merrienboer & Sweller, 2010), (2) changing participants' perceptions by adopting the concept of "learning by doing" (Kenwright *et al*., 2017), and that (3) learning goals should be clearly stated for students before the learning session to help manage their expectations and demonstrate how Coach's Eye application with smart devices can support them in achieving their learning goals (Amara *et al*., 2015).

Reduce Practice Time Due to Added Responsibilities (Motivation to Use Technology During PE)

The practice time was highlighted as one factor contributing to the participant's willingness to learn PE with technology. A few participants suggested that "we need a partner in using the analysis application during physical education." (Emi) They added "If I am alone teaching (i.e., after finishing school), I think Coach's Eye application will hinder my teaching due to extra responsibilities during teaching and learning process." (Ikh) They explained "I am bit disturb because I need to see the students while recording the video simultaneously." (Sah) Another study on video feedback of learning hurdles in track and field also found that some educators might feel overwhelmed by the demand for technology due to their current commitments and technology competencies (Palao *et al*., 2015).

Similarly in this study, some participants suggest that learning with technology represents added responsibilities and is time-consuming. They felt it was burdensome to observe the students while reviewing their performance on the smart device. Therefore, it hinders the whole teaching and learning process. In contrast, other studies suggest that adding technology into teaching and learning liberalised the educator from the less engaging long-explanation to students while reducing students' dependency on the teacher's feedback to learn content (Bice *et al*., 2016).

Nonetheless, they suggested that the timing to integrate technology into PE may reduce some of the mentioned issues. For instance, "probably we should use the devices in the middle or end of the class rather than the beginning of the class. The gradual introduction of technology into class can reduce shock and promote higher reception among the students." (Ikh) Besides that, the teaching approach was also crucial in determining the successful integration of technology into PE, "if the class was conducted through student-centred approach, so the teacher can have more time to observe and analysed student performance. However, if the class was teacher-centred, then I think it will be difficult for the teacher to handle everything and may disrupt the class time." (Tash) Another participant echoed this statement, "the way the teacher teaches might influence if using technology in class would be effective or not effective." (Meg)

Similarly, personalised teaching would improve student interest, engagement, and enjoyment in learning the contents (Mosston & Ashworth, 1990; Castelli & Valley, 2007; Gu & Salmon, 2016). The practice time element also provides more learning ownership, peer-teaching opportunities, and higher engagement between the students and teacher (Mosston & Ashworth, 1990; Gu & Salmon, 2016). These results suggest that the educator must have the knowledge and skills to operate the Coach's Eye application and a smart device to utilise technology during PE. The mere use of technology might not be effective in promoting teaching and, in worst-case scenarios, hinder the whole learning process.

One participant attempted to summarise learning sports skills with technology "I think the gadget helps us to know what correct and incorrect technique is, but if we do not practice still, we would not be able to improve our overall skills." (Jan) Her statement was consistent with the previous study, which suggests that higher learning options would also reduce students' dependency on educators thus, encouraging them to develop higher motivation to be active and physically competent (Wattelez *et al*., 2019). The participants in this study might feel overwhelmed or hesitant to adopt learning PE with technology due to a lack of practice time, engagement with educators and options given to them during practice sessions.

Implication for Practice

Results from this study are valuable for educators who intend to integrate technology into physical education teaching and learning. Focus on students' learning as the primary goal, educators should consider using technology to complement lesson plans and modifications made to aspects such as rules, playing areas,

and equipment to accommodate students' needs, interests, and capabilities. Technology can enhance the learning process through higher engagement between peers and educators, broadening learning perspectives, and effective practice while preserving the authenticity of students' learning experiences.

Additionally, embracing learning with technology allows educators to focus more on teaching and giving meaningful feedback as they could have more time and resources to observe and evaluate their students' learning. Moreover, students will also benefit from the new approach as they could receive more accurate feedback and options for learning and promote self-reflection from the learning session. Consequently, the students will develop a higher interest in learning content and become independent learners. A couple of limitations to the study included a short study duration, focus on specific categories of sport (i.e., net games), and lack of opportunity for participants to experiment with hands-on learning with the Coach's Eye application.

Conclusion

This study provides educators with insight into learners' perceived barriers to learning with technology, how it influences participants' knowledge of learning tennis and badminton sports skills, and their motivation when learning with technology. This study demonstrated that undergraduate physical education pre-service teachers were reluctant to adopt learning with technology due to factors such as fear of failure, the tendency of bias (i.e., focus on specific aspects), and perception of reduced practice time due to added responsibilities (e.g., handling equipment, navigate technology, divert attention from students) during teaching and learning process. Educators should improve content knowledge on sports and use technology to learn PE.

Besides that, the gradual introduction of technology and promoting higher involvement of students to explore the application and smart device would help mitigate their feelings of uncertainties, resistance to changes, and assumptions made towards learning with technology. Additionally, future studies are needed to expand our understanding of learning with technology with other sports categories (e.g., invasion, target), the context of learning, and the cognitive ability of various populations (e.g., children, older adults, and people with disabilities).

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