

# Personalized System of Instruction (PSI) Models: Using Digital Teaching Materials on Learning

Silvy Juditya<sup>a\*</sup>, Adang Suherman<sup>b</sup>, Amung Ma'mun<sup>c</sup>, Agus Rusdiana<sup>d</sup>,  
<sup>a</sup>Ph.D Candidate Of Graduate School Of Universitas Pendidikan Indonesia  
And Lecturer at STKIP Pasundan, Indonesia, <sup>b,c,d</sup>Universitas Pendidikan  
Indonesia, Indonesia, Email: <sup>a\*</sup>[sjuditya@gmail.com](mailto:sjuditya@gmail.com)

The development of technology has had an impact on the world of education, demanding the learning process to utilize the technology in it. The use of digital teaching materials in physical education learning is one of them. Digital teaching material is one of the breakthroughs in the use of technology in learning that illustrates the changing traditional paradigm, limited to using teaching materials in the form of paper-based books, to the modern paradigm, with the use of digital teaching materials. In their implementation, digital teaching materials require alignment with the learning model. The personalised system of instruction (PSI) model is one model that can support the use of digital teaching materials in physical education. The purpose of this study is to provide an overview of the application of digital teaching materials, accomplished by the application of a personalized system of instruction (PSI) model in physical education learning.

**Keywords:** *Digital teaching materials; personalized system of instruction, physical education, technology.*

## Introduction

The influence of technology on daily life in society is very significant, especially in children. Today, children are described as digital natives and are considered competent in using technology (Rivera, Mason, Moser, & Ahlgrim-Delzell, 2015). The term refers to the generation of children born surrounded by technology (Rosen 2010: 3). The development of 'mobile' (portable) devices and increased use and accessibility of tablet computers have been suggested to provide new opportunities for teachers and students to use technology in physical education (Armor et al. 2016; Chambers et al. 2016). There is an increasing interest

among physical education teachers in the inclusion of digital technology in their teaching (Juniu, 2013; Thomas & Stratton, 2006). In addition, digital technology has been reported to increase students' motivation (Bodsworth & Goodyear, 2017) and engagement (Casey, Goodyear, & Armour, 2017), improve students' cognitive understanding (Casey & Jones, 2011; Palao, Hastie, Cruz, & Ortega, 2015), facilitate assessment of support (Penney, Jones, Newhouse, & Cambell, 2012), and assist in learning and performing motor skills (O'Loughlin, Chróinín, & O'Grady, 2013) and dance movements (Öhman, Almqvist, Meckbach, & Quennerstedt, 2014). However, while these benefits exist, there are also many obstacles to the use of technology for teachers, including time (Palao et al., 2015), costs (Orlando, 2014), teacher burden (Pyle and Esslinger 2014), teacher competence (Plomp & Voogt, 2009), and the level of barriers faced by the teachers in changing and using technology (Kretschmann, 2015). In addition, technology is predominantly used as an 'additional' lesson (Palao et al., 2015), thus the use of technology in learning is not optimal (Enright et al. 2016; Hastie, Casey, and Tarter 2010). As a result, although there is a range of technology that can facilitate learning, limited use of technology in schools and the teachers' willingness to use technology are repelling factors. Use of technology is often not motivated by the awareness of the potential for technology to support student learning. Moreover, the use of learning models has not been appropriate with the use of available technology.

The functions and features of digital teaching material applications are not always suitable for the physical education context. Therefore, the technology of digital teaching materials must be adapted to the demands of physical education teachers. Apart from that, the use of digital teaching materials in physical education learning requires students to have high independence. Consequently, it is also necessary to align learning models that develop students' independence. A learning model that has the potential to develop students' learning independence in physical education is the personalised system of instruction (PSI) model.

The purpose of the PSI design is to enable students to learn independently so that teachers are able to interact with students who need help the most (Metzler, 2005). The PSI model recognizes that not all students have the same interests and abilities. This allows students to progress at the appropriate level with their individual abilities (Tousignant, 1983). Students with higher skills are permitted to progress at a faster rate, while other students can take additional time to adequately complete each activity (Metzler, 2005). In applying the PSI model, it is important to provide reinforcement in the learning process in order to maintain students' interest and motivation. Keller and Sherman (1974) showed that the PSI model must be based on four different features: 1) the ability to see creative and engaging learning material; 2) regular and real progress towards learning goals; 3) direct assessment of learning; and 4) teacher's attention to individuals. These features provide reinforcement that is not often available in other learning models. Taking into account these features and

characteristics, the design of the PSI unit requires the teacher's careful planning and creativity.

One important conditions for the integration of digital teaching materials technology with the PSI model perfectly in physical education lessons is the application of digital teaching materials with a focus on learning that is immediately accessed by both teachers and students. To achieve this, an application is available at the Google Store. Digital teaching materials that have been created have features for teachers and students. The use of the Pojok Guru (Teacher's Corner) feature in the digital teaching materials is intended to provide access for teachers to receive student learning outcomes directly, evaluate learning, and provide recommendations for students. On the other hand, students can use the Pojok Siswa (Student's Corner) feature to independently learn the materials they are about to learn. In addition, students can report learning outcomes directly to the teacher, as well as any difficulties they experience during learning. This can support the development of students' ability to recognise important events during physical education learning (Koekoek, van der Mars, van der Kamp, Walinga, & van Hilvoorde, 2018).

The use of digital technology in physical education is fundamentally different from its use in other school subjects. This is because the students' learning process in the psychomotor domain can be observed directly by teachers and peers (Koekoek et al., 2018). Thus digital technology can be utilised to help bring the learning process to life for students (Casey & Jones, 2011). However, what remains unclear is how the application of technology, such as digital teaching materials, can be aligned with the use of the learning model (PSI). This article explains the process of innovating and introducing the application of digital teaching materials for learning physical education. In addition, it explains how digital teaching materials, align with the use of a personalised system of instruction (PSI) model, can support physical education teachers during physical education classes.

### Digital Teaching Materials in Physical Education

Technology in physical education is very important, considering the special focus of technology in learning still needs development (Enright et al. 2016). Products of technology, for example, sports-specific software, video analysis, and health-related applications, cameras, and interactive video games, are devices that can be used to record and track gestures and learning teaching materials (Casey et al., 2017; McCaughtry et al. 2008). Nonetheless, most teachers still use paper-based teaching materials. This section explains the design of innovative digital teaching materials in physical education learning.

An application of digital teaching materials, POJOK PJOK, has been developed to help teachers and students benefit from the technology in physical education learning. This

application is designed to suit the needs of physical education teachers. In digital material teaching, there are several displays. Three such displays are display of POJOK PEMBELAJARAN as in figure 1, POJOK SISWA as in figure 2, and the display of learning material as in figure 3. Figure 1, in the form of POJOK PEMBELAJARAN, displays teaching material concerning various types of sports that are classified based on basic competencies in the learning curriculum in Indonesia. This includes sports that fall into the big ball game family, consisting of basketball games, soccer games and volleyball games. In addition, there are small ball games, such as baseball, table tennis, and badminton. Then there are aquatic activities and rhythmic activities, as well as martial and athletic activities. POJOK PEMBELAJARAN contains teaching materials that can later be used by students during physical education learning in schools. The teaching material contains the material stages of motion and video learning that can be seen by students as information reinforcement of motion material. The addition of student learning videos aids the absorption of motion material from every basic technique that is learned, compared with merely reading motion material in the form of writing. The first step to using the POJOK PEMBELAJARAN application involves the list stage in which the students enter their full name, their student identity number - referred to as the national student number (NISN), and the school name. They must then write a password. In the next step, students complete the LOG IN step by writing the national student number (NISN) and the password that has been registered. In the final step after LOG IN, students choose the motion material that will become the learning material that day. Figure 2 is a POJOK SISWA that is operated by students after conducting the learning process, by writing a description of learning outcomes in the achievement column and writing the description of difficulties during the learning process in the difficulty column. This is then sent to the physical education teacher to be examined and assessed, and the next steps that must be taken by students are entered. And figure 3 is also a POJOK SISWA, but figure 3 emphasizes the elaboration of learning material complete with the presentation in writing and two learning videos connected with YouTube.

**Figure. 1**  
The Interface of the Digital Teaching Material Application



**Figure. 2**  
Student Corner Feature



**Figure. 3**  
Student Corner Feature



## Digital Teaching Materials in the Personalized System of Instruction

The PSI model was originally developed by Keller and Sherman (Keller, 1974) as a teaching method for teaching in higher education. Interest in the PSI model has spread and has been used in other disciplines. Siedentop (1973) recommended the use of PSI in physical education and the PSI model became popular after Metzler (2005) developed teaching materials for lecture activities.

The PSI learning model shapes students to become independent learners (Grant & Spencer, 2011). The PSI model provides opportunities and flexibility for students to develop their interests and motivations. In learning using the PSI model, students are required to learn independently by assigning them to observe, understand, and practice the material given by the teacher. The materials are presented in a way that is in accordance with prepared concepts. The PSI teaching system is student-oriented and places more emphasis on individualising teaching than other methods. The instructions in the PSI model follow the needs and abilities of each student (Kalaivani, Sc, Ed, Phil, & Ph, 2014). The advantages of the PSI learning model as reported (Baxter, McEntyre, & Woodruff, 2018) significantly helped students to learn the materials provided by the teacher. Students were more independent and had greater responsibility during learning. In addition, the teachers gave evaluations more appropriately because they paid attention to the progress of each student during the learning process.

All managerial operations, such as teaching materials, learning assignments, and assessments, in the PSI model unit are explained to students in special workbooks (modules). In this study are teaching materials, learning assignments, and assessments developed into digital teaching materials which later became guides for students from the beginning until the end of the learning process. The contents of the digital teaching materials applied in the next PSI model would be developed and would contain: 1) Attendance policy; 2) Class rules and discipline plans; 3) Dressing-out policy; 4) How to obtain and return pieces of equipment; 5) Grading plans and applicable policies; 6) Procedures for starting each class; 7) Completed table of contents and inclusion of performance criteria with all PSI learning assignments; 8) All required readings (rules, strategies, history, etc.); 9) Student progress graph of completed tasks.

Some teachers may already have experience using digital technology, yet most teachers still experience confusion when digital teaching materials are aligned with the learning model that would be used. This study elaborates the steps for using digital teaching material applications that are synchronized with the use of the PSI model in physical education.

a. Preliminary learning steps:

- First phase: Starting class

All students prepare to start learning and bring a mobile phone with POJOK PJOK application installed.

- Second phase: Bringing equipment to class

The teacher brings the required equipment from storage to the field for student use.

- Third phase: Dispersing and returning equipment

Students are instructed to log in to their accounts using the "Login" feature in the POJOK PJOK application and the students take the required equipment.

- Fourth phase: Roll call (If needed)

Students read the digital teaching materials and the teacher verifies the activity after the students listen and read the digital learning materials.

b. Main learning steps:

- Fifth phase: Task presentation

Students read, understand, and observe the digital teaching materials based on teacher instruction. Students can access the material in the Pojok Pembelajaran (Learning Corner) feature.

- Sixth phase: Task Structure

Students organize tasks that will be practiced/studied based on teacher instruction, for example, learning material for soccer games. Students can access the digital teaching materials in the "Module 1" feature.

- Seventh phase: Assessment

Students verify and report their learning on their respective accounts in the Pojok Siswa feature through the digital teaching materials.

- Eighth phase: Monitoring learning progress

Students decide whether to continue or remain in the learning material/unit being studied. The teacher monitors the progress of each student's learning periodically in the Pojok Guru feature and fills in the learning achievement column through the digital teaching materials.

c. Final steps:

- Closing/Cooling down
- Praying

The use of digital teaching materials that are integrated with the PSI model requires students to fulfil benchmarks verified by teachers and to show an understanding of task presentation, the ability to follow directions, and to stay on the task and progress accordingly. Previous research (Baylari & Montazer, 2009) has shown that student learning is enhanced by the use of technology because it is useful as a source of visual learning, encourages individual development, and is valuable for assessment purposes. Furthermore, incorporating relevant technology into physical education can contribute to increased involvement in learning, enriched teaching, additional opportunities for individual feedback, and integrated assessment.

Digital teaching materials integrated with the PSI model help to present assignments in physical education that are not limited to videos, DVDs, or Youtube videos as well as various computer program applications. A valuable result of using digital teaching materials in the PSI model is that students benefit from meaningful teaching augmentation provided through digital content while enjoying the freedom they offer. When the teacher is preparing the material, students who need repetition of instruction can review the video according to the needs contained in digital teaching materials, so as to prevent other students who have already mastered the task from experiencing a delay in learning the movement skills.

For the digital teaching materials technology presented in this study, the incorporation of technology into physical education learning practices requires insight and good decision-making to determine the return of technology investments. Tannehill et al. (2015) noted that educators will generally respond differently to new developments in the field of technology. Teachers need to determine the cost and time needed to learn to use technology effectively during teaching. They also need to measure how the features of digital teaching materials improve their instruction and their impact on student learning experiences. Higher education institutions that produce physical education teacher candidates may also require professional development to effectively apply this technology and demonstrate its use. Sports pedagogy researchers (especially those whose research focuses on the use of the PSI model) must

analyse the impact of digital teaching materials, as presented here, on student learning, as well as on the teaching process. Researchers interested in studying the use of technology can focus on developing a greater understanding of the use of digital teaching materials for teachers in physical education (Mumtaz, 2000).

## **Conclusion**

This article introduces and develops the application of digital teaching materials that can be combined with the personalised system of instruction (PSI) learning model in a physical education class. The combination of the two offers new insights into the right time and place to use digital technology. The essence of physical education is to develop cognitive, affective, and psychomotor abilities through physical activity in the form of games in sports. In that context, teachers usually teach using directives and verbal instructions (e.g. whispers, feedback, questions). The use of digital teaching materials that can be easily accessed is expected to help students develop their learning independence. The steps toward incorporating digital teaching material technology and the PSI model in physical education are still in their infancy. However, the rich potential of technology, such as the application of digital teaching material POJOK PJOK, in supporting the development of innovative learning processes among teachers and students deserves further exploration and in-depth study. Lemaire & Greene, (2003) reported that new digital technology will continue to emerge, and technology will likely continue to make further breakthroughs into physical education. Thus, schools may be able to support it by providing their students with mobile phones or smartphones, installed with the digital teaching materials POJOK PJOK, for physical education learning. In addition, the students themselves will no doubt come to school with greater knowledge about how to use electronic tablets and the like. Especially in terms of physical education, students are given the opportunity to spend more time learning sports activities, and they are expected to be more independent (Siedentop, Hastie, & van der Mars, 2011). The teacher may choose to dedicate time in the classroom to present the use of technology in the form of digital teaching materials that have applied the PSI learning model aimed at supporting the development of learning. Sinelnikov, (2013) has shown the potential value of using iPads in the context of physical education in supporting learning by fulfilling various missing roles (for example, coaches, managers, and statisticians). The use of digital teaching materials, along with the PSI learning model, is a natural extension that can potentially support the development of competent students. Recommendations can be given to teachers in the form of the application of digital teaching materials is aligned with the application of a personalised system of instruction (PSI) in the learning process of physical education in schools. However, recommendations cannot necessarily be given when the use of digital teaching materials with the application of personalised systems of instruction (PSI) replace the role of a teacher in the learning process.



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