

# Transformation of Pencak Silat Learning Towards Android-Based Mastery Learning in the Coaching Study Program

<sup>1</sup>Albadi Sinulingga, <sup>2</sup>Sanusi Hasibuan, <sup>3</sup>Indra Kasih, <sup>4</sup>Onyas Widiyaningsih, <sup>5</sup>Deni Rahman Marpaung

<sup>1</sup>*Universitas Negeri Medan, Indonesia, e-mail: father@unimed.ac.id*

<sup>2</sup>*Universitas Negeri Medan, Indonesia, e-mail: sanusihhasibuan@unimed.ac.id*

<sup>3</sup>*Universitas Negeri Medan, Indonesia, e-mail: indrakasih@unimed.ac.id*

<sup>4</sup>*Universitas Negeri Medan, Indonesia, e-mail: onyas@unimed.ac.id*

<sup>5</sup>*Universitas Negeri Medan, Indonesia, e-mail: denirahman@unimed.ac.id*

## Abstract

This research produces learning products by creating learning media to help complete learning of Android-based pencak silat courses in the sports coaching study program at the State University of Medan. This research uses research and development (R&D) methods. This study uses the ADDIE model development research method which is a systematic learning design model using 5 steps, Analysis, Design, Development, Implementation, Evaluation. This research was carried out at the Faculty of Sports Science, Coaching Education Study Program, Medan State University and conducted in May 2022. The sample in this study was students who took the pencak silat course which consisted of 2 classes. Data collection in this study was carried out by filling out questionnaires by media experts, material experts and students with the following research results: A small sample, from the distribution of statement questionnaires given with indicators of Basic Material, Basic Material Display, Learning Skills material, Kick Material Display.

**Keywords:** Learning Transformation, Android-based learning, Pencak silat.

## INTRODUCTION

The development of information technology in recent years has grown rapidly this development cause changed the paradigm of society in seeking and obtaining information, which is no longer limited to newspaper, audio-visual and electronic information, but also other available sources of information. one of them through the Internet network. In the physical education curriculum in junior high, high school, and college, especially in the sports science faculty, there are Pencak Silat subjects. Pencak Silat is a self-defense sport originating from Indonesia. In Indonesia, various martial arts colleges have their techniques and terms. The basic method that the various schools have are the same but differ in terms. Pencak Silat

comes from two words namely Pencak and Silat. Pencak means the basic movements of martial arts that are bound by the rules. Silat means a perfect self-defense movement originating from spirituality. The term Silat is widely known in Southeast Asia, but in Indonesia, the term used is Pencak Silat. There are a lot of materials in Pencak Silat, but in the achievement of lecture competencies, of course, you have to get the maximum final bill. Teaching requires activities that require the involvement of individual students. If there are no students, the teacher cannot do the teaching. The teacher must realize that there will be no misinterpretation of teaching activities, therefore, learning and teaching are terms that

are standardized and integrated into the concept of teaching.

The results of initial observations through the distribution of questionnaires of students who were taking Pencak Silat lectures were 32 students stating that 23 students or 66.7% had difficulty mastering the material given by the lecturer. 30 students or 93.3% stated that the number of face-to-face learning was still lacking, and 32 students or 100% expressed an innovative desire for lectures with digitizing tools for learning Pencak silat. Learning media will be designed with learning devices using learning technology by utilizing Android-based digitalization devices. Therefore, this study will unravel the problems that occurred by transforming Pencak silat learning towards android-based mastery learning in the sports coaching education study program in the final achievement of lectures, namely competence.

#### Learning Concept Transformation

An education process is a form of education that is carried out consciously and planned, so that students can actively develop their potential, according to the context of the times they face, especially in this era of globalization, the world of education must reconstruct thinking, toward thinking that is more transformative and has a global perspective. The success of education is a measure of the success of a country because with good quality education it will form a good quality of resources. Thus, the world of education must get more attention from relevant stakeholders, namely the government as policymakers, the community, and education practitioners, such as lecturers, teachers, and students (RenataWidya Nanda, 2017). The development of information and communication technology is moving so fast, reaching all sectors of life. Information and communication technology quickly and revolutionary has changed the mindset and human civilization. As for our question now, how do we use technology in a positive, wise, and responsible way, especially in the field of learning; both formal and informal. Therefore, learning can be anytime, anywhere, with anything by transforming from conventional to digital. (Isriani Hardini, 2013).

Several development models in research, one of which is the ADDIE model developed by Dick and Carry in 1996 to design a learning system. In the product development step, the ADDIE research development model is considered to be more rational and more complete. This model can be used for various forms of product development in learning activities such as models, learning strategies, learning methods, media, and teaching materials. (Salamah et al., 2020)

#### Pencak Silat

Pencak Silat is a self-defense system inherited by our ancestors as the culture of the Indonesian nation so it needs to be preserved, fostered, and developed. Indonesia is a country that is the center of the traditional martial arts of Pencak Silat. Pencak Silat is one of the cultural sports, and the heritage of the Indonesian nation's ancestors that is used to defend themselves against the challenges of the environment that has developed in pre-historic times (Iskandar, 1992: 8; Rizki A Daulay & Albadi Sinulingga, 2016). Pencak silat is one of the martial arts sports in Indonesia. Pencak silat can be played individually, in pairs, or teams. Mastering martial arts is a very necessary master the basic techniques of Pencak silat. Hearing about Pencak Silat, ordinary people must be interested in one of these sports, because Pencak Silat comes from the culture of the Indonesian nation, therefore its development was born from the taste and talent of the people in Indonesia. (Waskita et al., 2018). The rules of Pencak silat are the basic rules on ways to implement or practice Pencak silat. This rule contains moral teachings as well as values and aspects of Pencak silat as a unit. Thus, the basic rules of Pencak silat contain ethical, logical, aesthetic, and athletic norms. This rule can be interpreted as a basic rule that regulates the implementation of Pencak silat ethically, technically, aesthetically, and athletically as a unit. (Erwin Setyo Kriswanto, 2015)

#### Media

Media is everything that can be used to channel messages that can stimulate the occurrence of a

work process. Media is a tool (hardware) and materials (software) combination that can be used as messages, people, materials, tools, techniques, and the environment. The advantages of the media include: 1) clarifying the presentation of the message. 2) overcome the limitations of space, time, and memory 3) objects can be large and small. 4) motion can be fast/slow. 5) Past events. Complex object. 6) complex can be wide/narrow. 7) address the nature of the participants. 8) creating shared experiences and heterogeneous participant perceptions (Zainal Aqib, 2013). Humans can essentially learn through 6 levels (Veron A. MAgnesen) i.e., 10 percent of what we read, 20 percent of what we hear, 30 percent of what we see, 50 percent of what we see and hear, 70 percent of what is said 90 percent of what we said and done. In this simple and online era, the print-out media has gradually shifted. Print media may seem not very important because most activities can be done online using only a smartphone. The existence of smartphones has changed people's perspectives because a person can access various needs through applications that have been installed on the smartphone. Smartphones have enormous potential to help the training or learning process, even in the future smartphones will be able to answer the problem of access to learning resources. (Anas & Adi, 2018).

#### The Presence of Technology in Learning

The presence of technology and communication (ICT) has a significant influence on changes in various sectors of people's lives. Computers and the internet, for example, are the primary technologies supporting these changes in the field of education. Since the advent of the information age, there have also been many changes. Technological penetration, offering the effectiveness and efficiency of human activity encourages various innovations in society. We always try to keep up with the development of communication technology, by including it as one of the major needs of the family. (Prawiradilaga, 2013). The emergence and use of technology in this century is a significant development that affects teaching and learning, including the Pencak Silat lecture process.

Education is faced with a new dimension that is dominated by information technology which requires teachers or lecturers to improve their methodologies, skills, creativity, and innovation to help students achieve learning goals easily (Angga1 et al., 2020).

Learning using electronic media or known as e-learning (electronic learning) is a learning method using electronic media that connect to the internet (World Wide Web that connects all computer units around the world) and intranet (network that can connect all computer units within a company) to deliver the learning material. If you have a computer connected to the Internet, you can already participate in e-learning. In this way, the number of learners who can participate can be much greater than the conventional way of learning in the classroom (the number of students is not limited to the size of the classroom) (Elyas, 2018).

The use of technology in education for the needs of applicable learning media must require an effort whose aim is to facilitate the teaching and learning process, such as interactive and innovative learning media from a PC (Personal Computer/Laptop) in this learning media, the goal is as a learning aid, in the form of interactive software/applications. Android is an operating system made for mobile devices whose screens can be touched such as smartphones (Ricky, 2021).

#### Android

Changes in technology information will bring a new paradigm to teaching materials. Especially in technology and information products that have provided alternatives in learning materials that can be accessed by teachers and students in visual form, add insight and can also be downloaded by using a computer/laptop as the main device. The use of technology in learning media must require an effort which aims to facilitate the teaching and learning process, such as interactive and innovative learning media from a PC (Personal Computer)/Laptop. The goal in this learning is to be a learning tool, in the form of interactive software/applications. Android is an operating system made for

mobile devices whose screens can be touched such as smartphones (Ricky, 2021).

Android is a Linux-based mobile device operating system, which provides an opportunity for developers to develop as expected, the operating system underlying Android is licensed under the auspices of GNU, General Public License Version 2 (GPLv2), commonly known as Copyleft, This copyleft term is a license that any improvement by third parties must continue to fall under the terms, Android application developers are allowed to distribute their applications under whatever licensing scheme they want (Rahmanto & Utama, 2018). Regarding technology at a glance, there are interesting things about the technology that is currently developing very rapidly, namely Android. Android is a mobile device on an operating system for cellular phones based on Linux (Putra et al., 2021). Technological developments provide convenience in accessing learning media. Learning media can now be accessed using computers or other devices that can be used to display the media. Making learning media is also easier. Various software is available to create learning media. This software support can make learning media more interesting and can be easily produced. Learning media must be able to be used in mass, easily reproduced and used in various places. Learning media in the form of multimedia are easily made copies. To use multimedia, a device that supports the media is required. (Marwan, 2018).

#### Learning Outcome Competencies

Competence is an ability possessed by a person with cognitive, affective, and psychomotor dimensions which can be manifested in attitude, speech, and behavior. Efforts need to be made to improve the competence of Education Technology graduates by providing supportive courses for each competency and carrying out educational field practices following educational technology competencies. Therefore, it can be concluded that competence is related to a person's ability to do something. (Purwa Ningrum, 2017)

The learning model for students must be competency-based. It is intended to: speed up graduation, speed up the underprivileged, be able to go in and out of campus and get the desired certificate, know abilities, and produce according to company standards. The learning model for students must be competency-based. It is intended to speed up graduation, speed up the underprivileged, be able to go in and out of campus and get the desired certificate, know abilities, and produce according to company standards. Overall, the development design model for competency-based and production-oriented practical learning is a unified system that is systematic with the learning sequence according to the students' learning needs. The practical skills learning approaches mentioned above include active, creative, constructive, innovative, collaborative, cooperative, and productive learning. The important characteristics of each of these approaches are integrated to produce a model that allows students to develop creativity to produce products based on their understanding of the concept being learned.

#### Method

The type of research used in this research is research and development (R&D). This study used the Instructional Development Institute (ADDIE) model (Grabowski, 2003, p. 3) which consists of several stages, Analysis, Design, Development, Implementation, and Evaluation. The data analysis technique in this research uses quantitative descriptive analysis and qualitative descriptive analysis. Quantitative data analysis is used to analyze data validation value scale, initial field test, main field test, and operational field test. Qualitative data analysis is used to analyze observational data and input or suggestions given during validation, initial field testing, main field testing, and dissemination. Based on the results gained from the pre-test and post-test, the effectiveness of the test was then carried out using the Paired Sample T-Test using the SPSS program. 16 For Windows. (Triprayogo et al., 2020)

**Result**

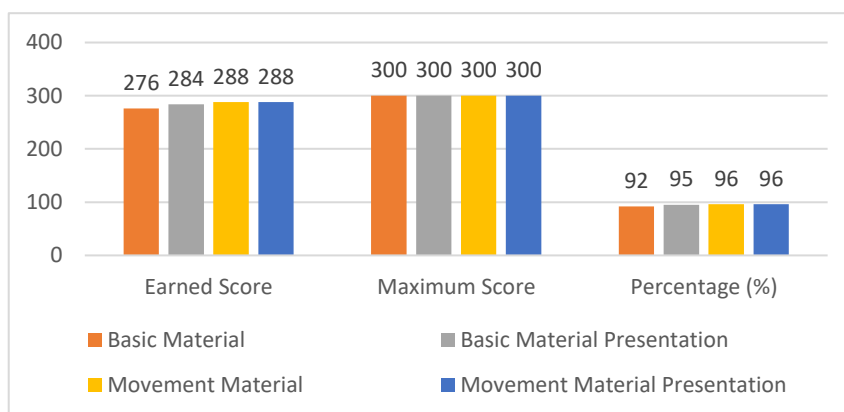
## SMALL GROUP SAMPLE DATA

Indicator Variables Of Pencak Silat Basic Materials

Results of a Small-Scale Trial Questionnaire Conducted by CLASS A regarding the Basic Materials of Pencak Silat

Aspects Assessed Score Obtained Maximum Score-Category Percentage

No	Aspects Assessed	Earned Score	Maximum Score	Percentage (%)	Category
1	Basic Material	276	300	92%	Very Decent
2	Basic Material Presentation	284	300	95%	Very Decent
3	Movement Material	288	300	96%	Very Decent
4	Movement Material Presentation	288	300	96%	Very Decent
Total		1136	1200	95%	Very Decent



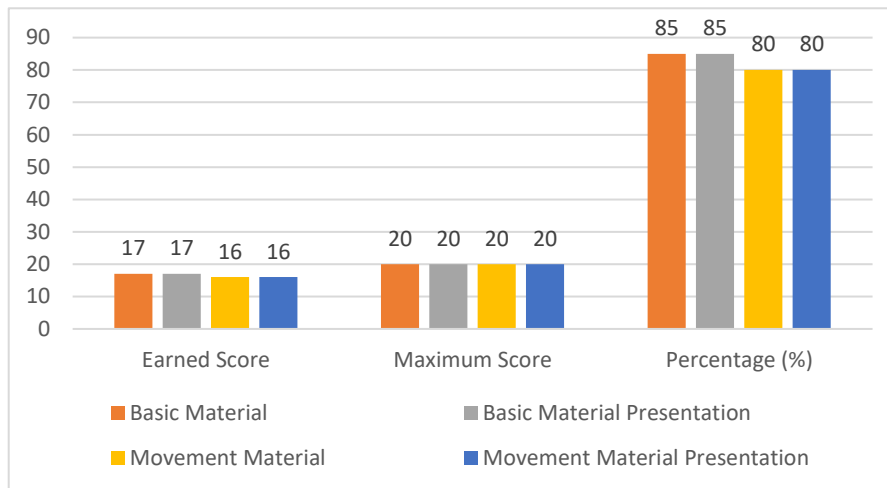
From the distribution of the questionnaire statements given to a small sample with indicators of basic material 92% categorized as very decent, 95% basic material presentation categorized as very decent, 96% movement material categorized as very decent, 96% movement material presentation categorized as very decent. With four indicators, the total

average of all indicators is 95% with a very decent category to be used.

## PENCAK SILAT EXPERT

Results Data "Development of Android-Based Pencak Silat Learning Devices" by Pencak Silat Expert Iwan Saputra S.Pd., M.Pd

No	Aspects Assessed	Earned Score	Maximum Score	Percentage (%)	Category
1	Basic Material	17	20	85%	Very Decent
2	Basic Material Presentation	17	20	85%	Very Decent
3	Movement Material	16	20	80%	Decent
4	Movement Material Presentation	16	20	80%	Decent
Total		66	80	83%	Very Decent



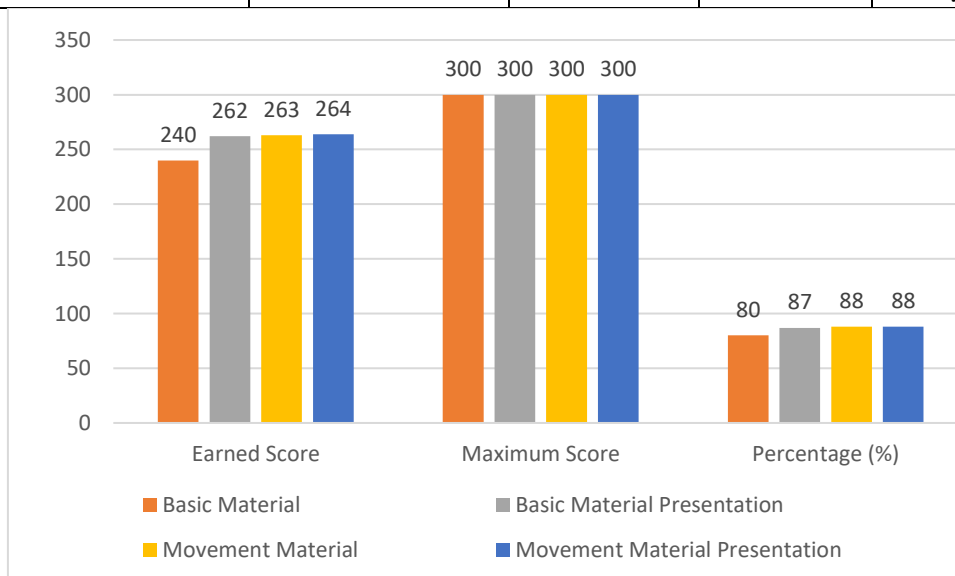
From the distribution of the statement questionnaires given to a small sample of Pencak Silat learning experts with indicators for basic materials 85% categorized as very decent, 85% basic material presentation being categorized as very decent, 80% movement material being categorized as decent 80% movement material presentation being categorized as very decent. With four

indicators, the total average of all indicators is 83% with a very decent to be used.

**INDICATOR VARIABLES FOR LEARNING BASIC PENCAK SILAT MATERIALS**

The Results of a Small-Scale Trial Questionnaire Conducted by CLASS A about Learning Basic Pencak Silat Materials

No	Aspects Assessed	Earned Score	Maximum Score	Percentage (%)	Category
1	Basic Material	240	300	80%	Decent
2	Basic Material Presentation	262	300	87%	Very Decent
3	Movement Material	263	300	88%	Very Decent
4	Movement Material Presentation	264	300	88%	Very Decent
Total		1029	1200	86%	Very Decent



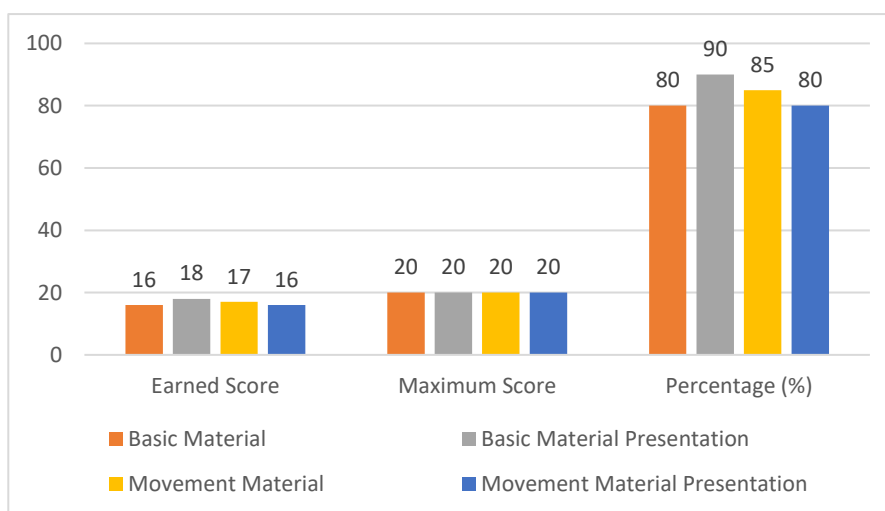
From the distribution of the statement questionnaires given to a small sample of Pencak Silat learning experts with 80% basic material indicators categorized as decent, 87% basic material presentation categorized as very decent, 88% movement material categorized as decent, 88% movement material presentation being categorized as very decent. With four

indicators, the total average of all indicators is 86% with a very decent category.

LEARNING EXPERT

Results Data "Development of Android-Based Sport Physiology Learning Devices" by Learning Expert Drs. Suryadi Damanik. M.Kes

No	Aspects Assessed	Earned Score	Maximum Score	Percentage (%)	Category
1	Basic Material	16	20	80%	Decent
2	Basic Material Presentation	18	20	90%	Very Decent
3	Movement Material	17	20	85%	Very Decent
4	Movement Material Presentation	16	20	80%	Decent
Total		67	80	84%	Very Decent



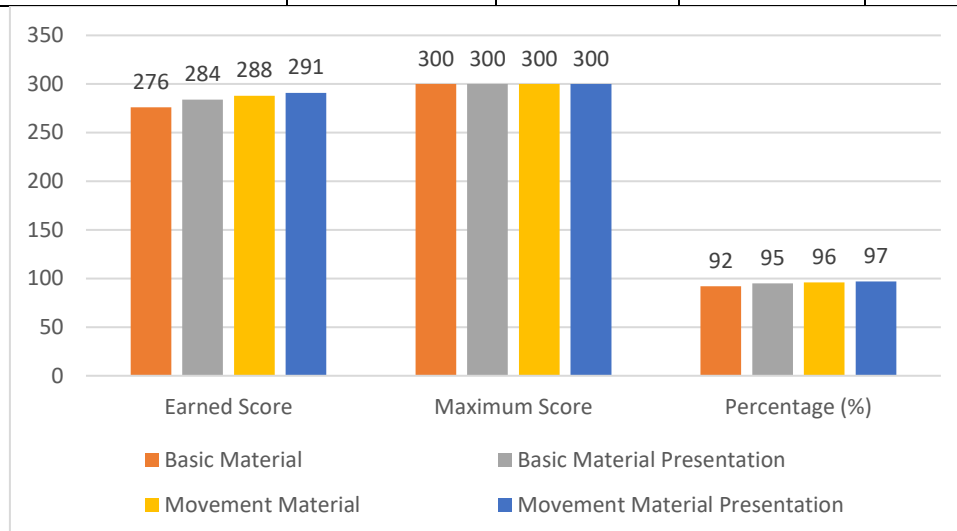
From the distribution of the statement questionnaires given to a small sample of Pencak Silat learning experts with indicators of basic material 80% categorized as decent, 90% basic material presentation categorized as very decent, 85% movement material categorized as very decent, 80% movement material presentation being categorized as decent. With four indicators, the total average of all indicators is 84% with a very decent category.

VARIABLES OF VIDEO MEDIA INDICATORS BASIC MATERIALS OF PENCAK SILAT

Results of a Small-Scale Trial Questionnaire conducted by CLASS A about media video materials

No	Aspects Assessed	Earned Score	Maximum Score	Percentage (%)	Category
1	Basic Material	276	300	92%	Very Decent
2	Basic Material Presentation	284	300	95%	Very Decent
3	Movement Material	288	300	96%	Very Decent
4	Movement Material	291	300	97%	Very Decent

	Presentation			
	Total	1139	1200	95%
				Very Decent



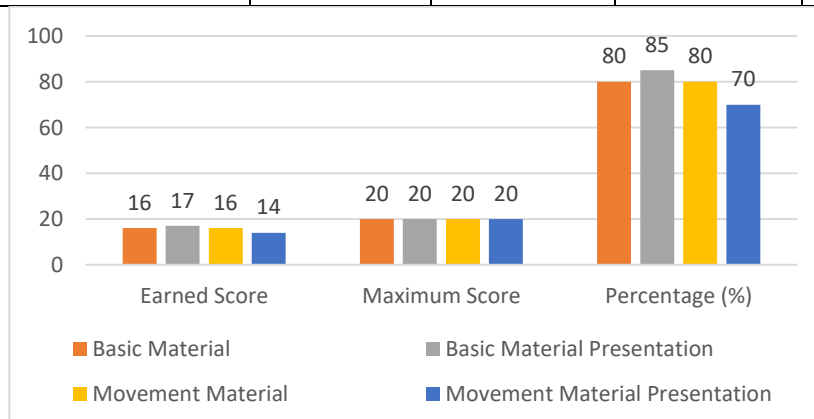
From the distribution of the statement questionnaires given to a small sample of Pencak Silat learning experts with indicators of basic material 92% categorized as very decent, 96% basic material presentation being categorized as very decent, 80% movement material being categorized as decent, 97% movement material presentation being

categorized as very decent. With four indicators, the total average of all indicators is 95% with a very decent category.

VIDEO MEDIA EXPERT

Result Data "Development of Sport Physiology Learning Devices Based on Android" by Video Media Expert Wais Alqurni, S.Kom

No	Aspects Assessed	Earned Score	Maximum Score	Percentage (%)	Category
1	Basic Material	16	20	80%	Decent
2	Basic Material Presentation	17	20	85%	Very Decent
3	Movement Material	16	20	80%	Decent
4	Movement Material Presentation	14	20	70%	Decent
Total		63	80	79%	Decent





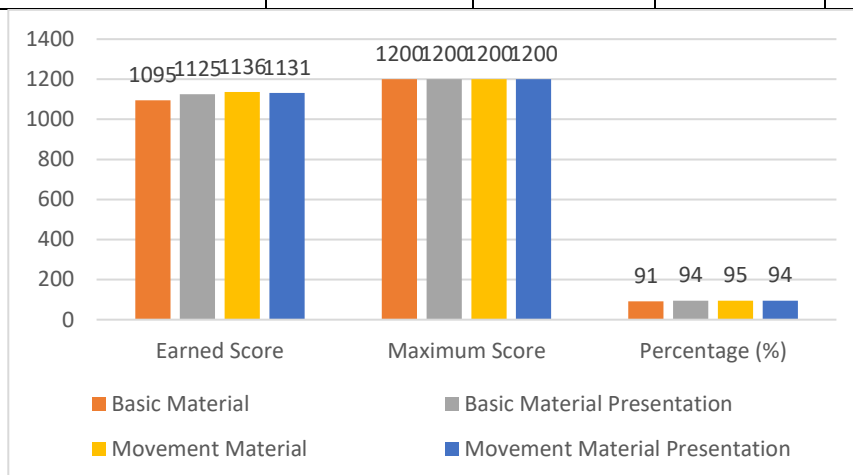
From the distribution of the statement questionnaires given to a small sample of Pencak Silat learning experts with indicators of basic material 80% categorized as decent, 85% basic material presentation categorized as very decent, 80% movement material being categorized as decent, 70% movement material presentation being decent. With four indicators, the total average of all indicators is 79% with categories decent to be used.

#### LARGE GROUP SAMPLE DATA

Indicator Variables Basic Matter of Pencak Silat

Results of The Large-Scale Trial Questionnaire Conducted by CLASS A & B about Pencak Silat Basic Materials

No	Aspects Assessed	Earned Score	Maximum Score	Percentage (%)	Category
1	Basic Material	1095	1200	91%	Very Decent
2	Basic Material Presentation	1125	1200	94%	Very Decent
3	Movement Material	1136	1200	95%	Very Decent
4	Movement Material Presentation	1131	1200	94%	Very Decent
Total		4487	4800	93%	Very Decent



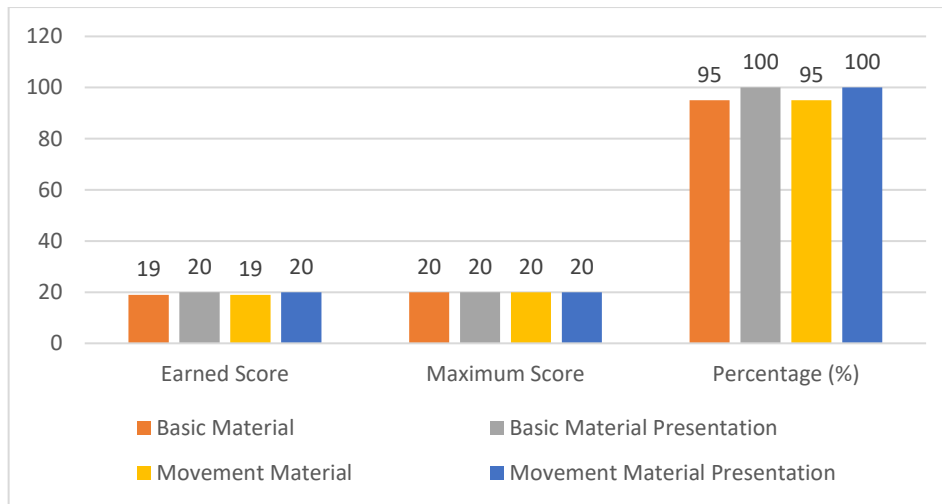
From the distribution of the questionnaire statements given to a large sample of 60 students, 91% of basic material indicators were categorized as very decent, 94% of basic material presentation were categorized as very decent, 95% of movement material were categorized as very decent, 94% of movement material presentation were categorized as very

decent. With four indicators, the total average of all indicators is 93% with a very decent to be used.

#### PENCAK SILAT EXPERT

Results Data "Development of Android-Based Pencak Silat Learning Devices" by Pencak Silat Expert Iwan Saputra S.Pd., M.Pd

No	Aspects Assessed	Earned Score	Maximum Score	Percentage (%)	Category
1	Basic Material	19	20	95%	Very Decent
2	Basic Material Presentation	20	20	100%	Very Decent
3	Movement Material	19	20	95%	Very Decent
4	Movement Material Presentation	20	20	100%	Very Decent
Total		78	80	98%	Very Decent



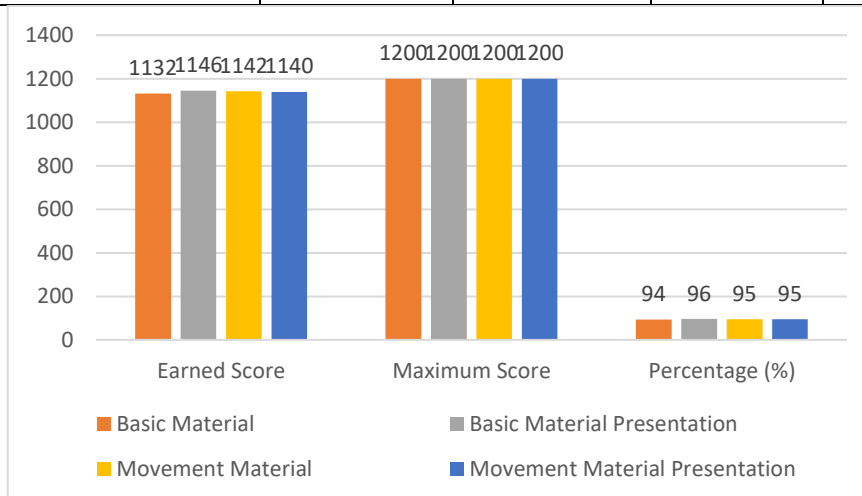
From the distribution of the statement questionnaires given to a large sample of Pencak Silat experts with indicators of basic material 95% categorized as very decent, 100% basic material presentation categorized as very decent, 95% movement material categorized as very decent, 100% movement material presentation categorized as very decent. With four indicators, the total average of all

indicators is 98% with a very decent category to be used.

**INDICATOR VARIABLES FOR PENCAK SILAT LEARNING BASIC MATERIALS**

Results of the Large-Scale Trial Questionnaire Conducted by CLASS A about Learning of Pencak Silat Basic Materials

No	Aspects Assessed	Earned Score	Maximum Score	Percentage (%)	Category
1	Basic Material	1132	1200	94%	Very Decent
2	Basic Material Presentation	1146	1200	96%	Very Decent
3	Movement Material	1142	1200	95%	Very Decent
4	Movement Material Presentation	1140	1200	95%	Very Decent
Total		4560	4800	95%	Very Decent



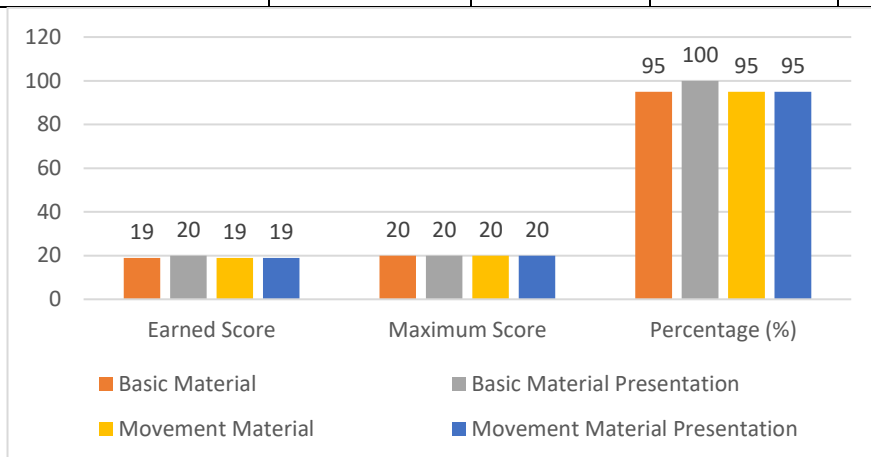
From the distribution of the statement questionnaires given to a large sample of Pencak Silat learning experts with indicators of basic material 94% categorized as very decent, 96% basic material presentation being categorized as very decent, 95% of movement material being categorized as very decent 95% movement material presentation being

categorized as very decent. With four indicators, the total average of all indicators is 95% with a very decent category.

LEARNING EXPERT

Results Data "Development of Android-Based Sport Physiology Learning Devices" by Learning Expert Drs. Suryadi Damanik. M.Kes

No	Aspects Assessed	Earned Score	Maximum Score	Percentage (%)	Category
1	Basic Material	19	20	95%	Very Decent
2	Basic Material Presentation	20	20	100%	Very Decent
3	Movement Material	19	20	95%	Very Decent
4	Movement Material Presentation	19	20	95%	Very Decent
Total		77	80	96%	Very Decent



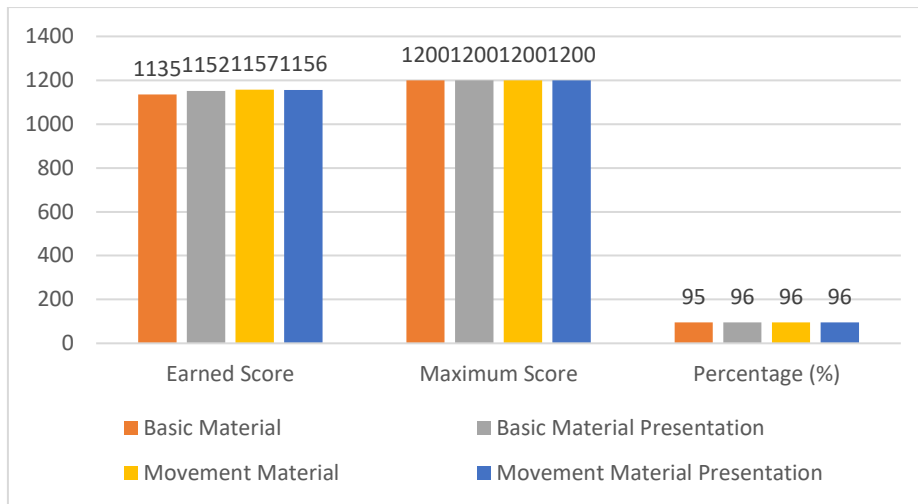
From the distribution of the statement questionnaires given to a large sample of Pencak Silat learning experts with indicators of basic material 95% categorized as very decent, 100% basic material presentation being categorized as very decent, 95% of movement material being categorized as very decent 95% movement material presentation being categorized as very decent. With four

indicators, the total average of all indicators is 96% with a very decent category.

INDICATOR VARIABLES OF VIDEO MEDIA BASIC MATERIALS OF PENCAK SILAT

Results of the Large-Scale Trial Questionnaire Conducted by Class A & B about Video Media Materials

No	Aspects Assessed	Earned Score	Maximum Score	Percentage (%)	Category
1	Basic Material	1135	1200	95%	Very Decent
2	Basic Material Presentation	1152	1200	96%	Very Decent
3	Movement Material	1157	1200	96%	Very Decent
4	Movement Material Presentation	1156	1200	96%	Very Decent
Total		4600	4800	96%	Very Decent

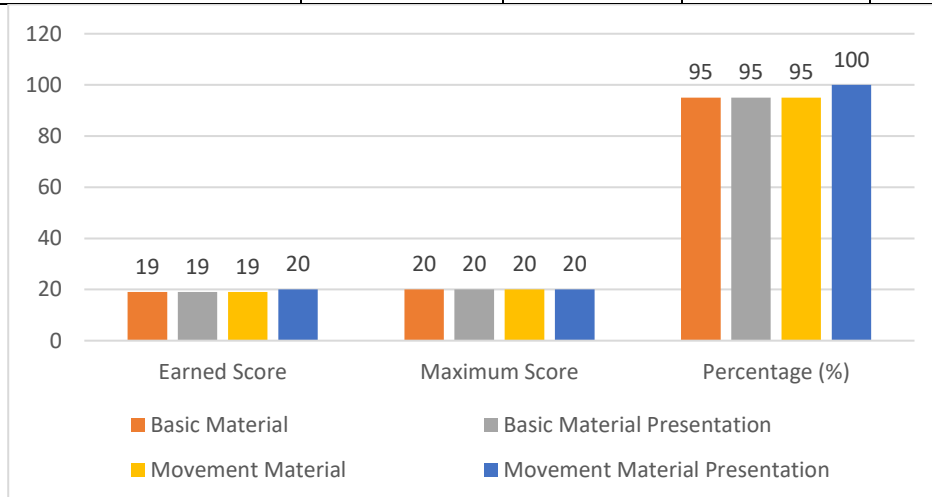


From the distribution of the statement questionnaires given to a large sample of Pencak Silat learning experts with indicators of basic material 95% categorized as very decent, 96% basic material presentation being categorized as very decent, 96% of movement material being categorized as very decent 96%

movement material presentation being categorized as very decent. With four indicators, the total average of all indicators is 96% with a very decent category.

Video Media Expert Wais Alqurni.S.Kom using three indicators as follows

No	Aspects Assessed	Earned Score	Maximum Score	Percentage (%)	Category
1	Basic Material	19	20	95%	Very Decent
2	Basic Material Presentation	19	20	95%	Very Decent
3	Movement Material	19	20	95%	Very Decent
4	Movement Material Presentation	20	20	100%	Very Decent
Total		77	80	96%	Very Decent



From the distribution of the statement questionnaires given to a large sample of Pencak Silat learning experts with indicators of

basic material 95% categorized as very decent, 95% basic material presentation being categorized as very decent, 95% of movement

material being categorized as very decent 100% movement material presentation being categorized as very decent. With four indicators, the total average of all indicators is 96% with a very decent category.

### Conclusion

Small sample, from the distribution of statement questionnaires given to a small sample with indicators of basic material, basic material presentation, movement material, movement material presentation. With four indicators, the total average of all indicators is 95% with a very decent category for use. From the distribution of statement questionnaires given to martial arts learning experts with indicators of basic material, basic material presentation, movement material, movement material presentation. The four indicators, the total average of all indicators is 83% with a very decent to be used. From the distribution of statement questionnaires given to a small sample of Pencak Silat material experts with indicators basic material, basic material presentation, movement material, movement material presentation. From the four indicators, the total average of all indicators is 86% with a very decent to be used. From the distribution of statement questionnaires given to pencak silat media experts with indicators of basic material presentation, movement material, movement material presentation. From the four indicators, the total average of all indicators is 84% with very decent to be used. From the distribution of the statement questionnaires given to a large sample of 60 students the indicators of basic material presentation, movement material, movement material presentation. From the four indicators, the total average of all indicators is 93% with very decent category to be used. From the distribution of statement questionnaires given to a large sample of Pencak Silat experts with indicators of basic material presentation, movement material, movement material presentation. From the four indicators, the total average of all indicators is 98% with very decent category to be used. From the distribution of the statement questionnaires given to the sample Pencak Silat

learning experts with indicators of basic material presentation, movement material, movement material presentation. From the four indicators, the total average of all indicators is 96% with a very decent category to be used. From the distribution of statement questionnaires given to a large sample of Pencak Silat learning video experts with indicators of basic material presentation, movement material, movement material presentation. From the four indicators, the total average of all indicators is 96% with a very decent category to be used.

### Recommendation

From the results of the small and large group test, it is stated that learning pencak silat using Android-based is very feasible to use. For pencak silat teachers, they can transform from conventional learning to Android-based learning. For other researchers, they can develop this research into better learning.

### Reference

- [1] Anas, M. K., & Adi, S. (2018). Pengembangan Kombinasi Tendangan A , T , C Berbasis Aplikasi Android Pada Siswa PSHT. 2(5), 92–98.
- [2] Anggal, P. D., Hariyanto1, E., & Tomi1, A. (2020). Pengembangan Bahan Ajar Multimedia Interaktif Pencak Silat Berbasis CourseLab 2.4. Jurnal Pendidikan Jasmani Indonesia, 16, 9–17.
- [3] Dr. Johansyah Lubis, M. P. (2016). Pencak Silat. Rajawai Sport.
- [4] Elyas, A. H. (2018). Penggunaan model pembelajaran e-learning dalam meningkatkan kualitas pembelajaran. Jurnal Warta, 56(04), 1–11. <http://jurnal.dharmawangsa.ac.id/index.php/juwarta/article/view/4>
- [5] Erwin Setyo Kriswanto. (2015). Pencak Silat. Pustaka Baru Press.
- [6] Helfrida Dwita Br Sinambela. (2021). RANCANG BANGUN MEDIA PEMBELAJARAN PENGENALAN PENCAK SILAT PANGEAN BERBASIS ANDROID. Jurnal Perencanaan Sains Dan Teknologi, 4.

- [7] Isriani Hardini, D. P. (2013). *Mozaik Teknologi Pendidikan* (1st ed.). Prenadamedia Group.
- [8] Marwan, I. (2018). Pengembangan Model Pembelajaran Seni Gerak Pencak Silat Berbasis Aplikasi Android. *Jurnal Pendidikan Jasmani Dan Olahraga*, 3(2), 153–160.  
<https://doi.org/10.17509/jpjo.v3i2.12453>
- [9] Prawiradilaga, D. S. (2013). *Mozaik Teknologi Pendidikan*. Kencana.
- [10] Purwa Ningrum. (2017). Pengembangan Model dan Rancangan Pembelajaran Sebagai Sumber Belajar Dalam Pendidikan Ekonomi. *Prosiding Pluralisme Dalam Ekonomi Dan Pendidikan*, 1. <http://ekp.fe.um.ac.id/wp-content/uploads/2017/06/9.-Purwaningrum-Puji-Lestari.pdf>
- [11] Putra, A. M., Andrian, M. A. W., & Hikmah, R. (2021). Perancangan Aplikasi Pembinaan Pencak Silat Berbasis Android Pada Yayasan Sinar Warna Nusantara. *Seminar Nasional Riset Dan Inovasi Teknologi (SEMNAS RISTEK)*, 983–987.
- [12] Rahmanto, Y., & Utama, R. Y. (2018). Penerapan Teknologi Web3D Berbasis Android Sebagai Media Pembelajaran Gerakan Dasar Silat. *Jurnal TAM (Technology Acceptance Model)*, 9(1), 7–14.
- [13] Renata Widya Nanda. (2017). *Transformasi Sistem Pendidikan Full Day School di Era Globalisasi*. Unesa, 2. <https://media.neliti.com/media/publications/248272-transformasi-sistem-pendidikan-full-day-82a14020.pdf>
- [14] Ricky, E. N. (2021). Pengembangan aplikasi pembelajaran pencak silat berbasis multimedia. *Altius*, 10(1), 40–52. <http://dx.doi.org/10.36706/altius.v10i1.13990>
- [15] Rizki A Daulay & Albadi Sinulingga. (2016). Pengaruh Latihan SAQ Terhadap Hasil Tendangan Samping Olahraga Pencak Silat. *Pengaruh Latihan Saq Terhadap Hasil Tendangan Samping Olahraga Pencak Sila*, 78–97.
- [16] Salamah, A., Adawiah Ahmad Rashid, R., & Mukhtar. (2020). The Development Of Citizenship Education Learning Models Through The Addie Model To Improve Student Characters At Mulawarman University. *Palarch's Journal of Archaeology of Egypt/Egyptology*, 17(9), 155–168.  
<https://www.archives.palarch.nl/index.php/jae/article/view/3422/3409>
- [17] Triprayogo, R., Sutapa, P., Festiawan, R., Anugrah, S. M., & Iwandana, D. T. (2020). Pengembangan Media Pembelajaran Jurus Tunggal Pencak Silat Berbasis Android. *Gelombang Pendidikan Jasmani Indonesia*, 4(2), 1. <https://doi.org/10.17977/um040v4i2p1-8>
- [18] Waskita, R. A., Fiati, R., & Murti, A. C. (2018). Animasi 3D Teknik-Teknik Pencak Silat Berbasis Android. *Simetris: Jurnal Teknik Mesin, Elektro Dan Ilmu Komputer*, 9(1), 121–128. <https://doi.org/10.24176/simet.v9i1.1829>
- [19] Zainal Aqib. (2013). *Model model Media dan Strategi Pembelajaran kontekstual*. CV Yrama Widya.