



ICT TPACK-Oriented of Floor Gymnastics Learning Media for Elementary School Students

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ABSTRAK

Guru penjasorkes pada masa pandemi covid-19 umumnya menggunakan media buku teks dan video tutorial untuk memvisualisasikan gerakan senam dasar. Hal ini menyulitkan siswa dalam belajar. Penelitian ini bertujuan untuk mengembangkan media pembelajaran keterampilan dasar senam berorientasi Information, Communication and Technology/ ICT Technological Pedagogical and Content Knowledge/ TPACK untuk peserta didik SD kelas tinggi. Jenis penelitian ini yaitu pengembangan. Penelitian pengembangan ini menggunakan rancangan model ADDIE yang memfokuskan pembahasan pada tahapan analisa dan perancangan. Metode pengumpulan data adalah observasi, wawancara, dan kuesioner. Instrumen pengumpulan data yaitu kuesioner. Analisa data dalam penelitian ini dilakukan dengan analisis deskriptif kuantitatif dan kualitatif. Hasil penelitian menunjukkan pertama, 342 orang (82%) peserta didik SD membutuhkan media pembelajaran keterampilan dasar senam berorientasi ICT TPACK, Kedua, tugas gerak yang dirancang telah divalidasi pakar dan praktisi PJOK dengan skor rerata 94,22 termasuk pada kategori sangat baik. Berdasarkan analisis data dan pembahasan, simpulan penelitian ini adalah peserta didik SD sangat membutuhkan media pembelajaran keterampilan dasar senam berorientasi ICT TPACK. Tugas gerak yang dirancang pada materi kombinasi gerak dasar menggunakan meja lompat, gerak keseimbangan pada lantai dan kayang sudah bervariasi dan sesuai dengan kurikulum, menjamin kecukupan belajar gerak, terdapat karakter yang diinternalisasi serta keamanan dan keselamatan peserta didik terjamin.

ABSTRACT

Physical education teachers during the Covid-19 pandemic generally used textbooks and video tutorials to visualize basic gymnastic movements. It makes it difficult for students to learn. This study aims to develop information, communication and technology/ICT Technological Pedagogical and Content Knowledge/TPACK-oriented gymnastics basic skills learning media for high-grade elementary school students. This type of research is development. This development research uses the ADDIE model design, which focuses on the analysis and design stages discussion. Data collection methods are observation, interviews, and questionnaires. The data collection instrument is a questionnaire. Data analysis in this study was carried out using descriptive quantitative and qualitative analysis. The results showed that first, 342 people (82%) of elementary school students needed ICT TPACK-oriented gymnastics basic skills learning media. Based on data analysis and discussion, this study concludes that elementary school students need learning media for basic ICT TPACK-oriented gymnastics skills. The motion assignments are designed on a combination of basic movement materials using a jumping table, balance movements on the floor and kayaks that are varied by the curriculum, guaranteeing the adequacy of learning motion. Some characters are internalized, and the safety and security of students are guaranteed.

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1. INTRODUCTION

Physical Education (PE) is known as an integral part of the national education curriculum that provides flexibility for PE teachers to manage and facilitate students to learn to move and move to learn (Kwon & Block, 2017; Pickard & Maude, 2021; Pratama et al., 2021). Learning to move implies becoming more physically competent, while moving to learn emphasises learners for having a range of understanding, attitudes and skills about working with others, honesty, sportsmanship, discipline, sharing space and equipment and more. PE is a subject that focuses on maintaining and improving physical fitness and movement skills in students during the learning process (Huang & Ning, 2021; Sahin et al., 2018; Sutopo & Sukoco, 2020). However, not only that, Physical Education also helps students to improve critical thinking, maintain students' emotional stability, and foster good values contained in sports such as respect and sportsmanship (Kok et al., 2021; Muhtar & Dallyono,

2020; Phelps et al., 2021). To manage and facilitate, at least, to pay attention to the following three things, such as: first, the integration between physical education, sports and health. Second, not only skills, however, there must be underlying knowledge, as well as attitudes that must be formed through the Physical Education. Third, to promote the interesting games and not just to strict sports rules (O'Brien et al., 2020; Turan & Koç, 2018).

Gymnastic activity skills learning in elementary school is one of the PE materials given to students that used to involving limbs both using tools and not using tools to form and develop a harmonious personality, provide health, improve movement skills and create movement skills, orientation skills in space and time, and to get achievements (Heri et al., 2017; Hosseini & Gursel, 2012). There is a strong relationship between student motivation and learning outcomes in floor gymnastics on rolling material (Hadjarati et al., 2020; Popescu et al., 2013; Sugihartono, 2019). According to the researchers observations and discussions with physical education teachers in Buleleng Regency, the basic gymnastics skills material given to students aims to improve students' flexibility, muscle strength, muscle endurance, form discipline and courage. To realise these goals, the creativity of Physical Education teachers is needed in facilitating students in Physical Education learning, one of which is on the material of basic gymnastics skills and the use of learning media in accordance with the characteristics of students (Pickard & Maude, 2021).

Physical Education teachers in Buleleng Regency during the covid-19 pandemic generally used textbooks and video tutorial media to visualise the basic of gymnastics movements. It indicates that the Physical Education teachers in Buleleng have used Information and Communication Technology (ICT) in the Physical Education learning process. It accordance with the research which states that the Physical Education (PE) learning process in the 21st century era certainly cannot be separated from the role of ICT (Yuniarni et al., 2020b, 2020a). However, if we explored more deeply, the video tutorials as the ICT media for Physical Education learning provide that limited visualisation only at the stages of movement starting from the initial attitude, the attitude of implementation to the final attitude of a movement. It does not gives all the learners opportunity to be creative in carrying out the movement tasks, the movements must be exactly the same as what is seen, observed through the video tutorial.

Ideally, Physical Education teachers provide varied movement tasks to students, so that students have meaningful experiences when learning basic gymnastics skills (Lin et al., 2021; Pop & Ciomag, 2014). This research is urgently carried out to provide knowledge, attitudes and basic movement skills of gymnastics on various motion tasks, not just video tutorials. Similarly with the Technological Pedagogical and Content Knowledge (TPACK) is a framework that integrates technological knowledge, pedagogical knowledge, and content knowledge in a learning context (Juanda et al., 2021; Kaliappen et al., 2021; Kartimi et al., 2021; Surayya & Asrobi, 2020). TPACK was originally developed by Shulman's (1987) who described Pedagogical and Content Knowledge (PCK), to illustrate how the teachers' understanding of learning technology in producing effective learning using technology (Ammade et al., 2020; Muhaimin et al., 2019; Nazari et al., 2019; Rohmitawati, 2018; J. M. Santos & Castro, 2021). TPACK is important for Physical Education teachers, it caused by the development of technology, Physical Education teachers are required to be more able to use technology in the teaching and learning process in the classroom. This is why technology-based learning media is very important to use in learning.

Learning media means that everything can convey or channel messages from a planned source, able to stimulate the thoughts, feelings, attention and interests of students in such a way that the learning process occurs (Kurniawan et al., 2019; Leszczyński et al., 2018; Majid et al., 2012; Syawaludin et al., 2019; Weng et al., 2019). Furthermore, there are 4 (four) types of learning media, such as: visual media, audio media, audio-visual media, and multimedia (Dewi et al., 2019; Handayani et al., 2017; Pradilasari et al., 2019; Samat & Aziz, 2020). According to another experts, categorise learning media into 6 (six) basic categories, such as: text, audio, visual, video, manipulative, people.

By making learning media that can help the learning process and can make learning more interesting, it able to makes students do not feel bored with the learning that was done before (Hoerunnisa et al., 2019; Jannah et al., 2019; Mariyah et al., 2021; Rahmatsyah & Dwiningsih, 2021). Other research found that for students, TPACK is an important thing, by utilising existing technology, the learning process can be more effective and efficient (Herizal et al., 2022; Koehler et al., 2013; Kuala, 2020; Rahmadi et al., 2020). The novelty of this research can be seen from 2 things, namely: first, providing varied movement tasks starting from easy, medium and difficult on the gymnastics fundamental skills displayed through learning videos. Second, providing positive sports values or internalised character that lead to the realization of student profiles pancasila. This research aims to develop an ICT TPACK which oriented the Physical Education learning media that visualises video tutorials and motion task videos on basic gymnastics skills material for elementary school students in the high level.

2. METHOD

This type of research is development. This development research uses the *ADDIE* model design, the purpose of this development research is to develop products in the form of materials, media, tools and or learning strategies used to overcome learning problems, validate products, and test the effectiveness of products (Sugiyono, 2017; Tegeh et al., 2014). The design of the *ADDIE* model has 5 main stages, such as. First, analyse, namely conducting a needs of assessment, identifying needs problems and conducting task analysis. Second, design, namely designing a clear and detailed product design/blue-print. Third, development, to realising the product design, validating Physical Education experts, learning media experts and Physical Education practitioners and product trials. Fourth, implementation, implementing products for product effectiveness. Fifth, evaluation, evaluating products.

This article focuses on the first two stages, namely: analyse, and design. The methods used in collecting data are observation, interviews, and questionnaires. Observations and interviews are used to find out the problems that occur in the field. Questionnaire method is used to collect scores given by experts and students. The research instruments were needs analysis questionnaire (google form), interview guidelines and observation sheets. The needs analysis questionnaire for both teacher and learner respondents included 4 (four) aspects, there are: 1) The implementation of learning gymnastic activities, 2) The availability of facilities and infrastructure for learning gymnastic activities, 3) Learning materials for gymnastic activities given to students, and 4) Learning media. The instrument grids are presented in Table 1 and Table 2.

Table 1. The Instruments used in the Research

No	Indikator
Analysis of Needs Aspects of Implementation of Floor Gymnastics Learning Activities in Elementary Schools	
1	The basic movement on the table jumping
2	Balancing movement in the floor or block point
3	Front rolling movement activity
4	<i>Kayang</i>
Floor Gymnastics Activity Materials that are Most Favoured by High-Level of Elementary School	
1	Balancing Motion
2	Front Rolling Motion
3	<i>Kayang</i>
4	Basic Motion on the Table Jumping
5	The Combination of Front Rolling Motion, <i>Kayang</i> , and Balancing Motion

Table 2. Instrument Grid for Experts

No	Scoring Component
1.	Suitability of Teaching Materials with the Curriculum
2.	Sufficiency of Motion Learning
3.	Internalised Character
4.	Learner Security and Safety

There are four aspects that will be translated into statements filled in by 5 Physical Education teacher respondents and there are 415 students from 4 elementary schools in Buleleng Regency, such as: SD Negeri 1 Banjar Jawa, SD Negeri 2 Banyuning, SD Negeri 3 Banjar Jawa and SD Negeri 3 Kampung Baru. Researchers also conducted in-depth interviews and observations with Physical Education teachers in Buleleng to complement and ensure that the data obtained was in accordance with the daily reality in elementary schools. Data analysis used by quantitative and qualitative descriptive approaches. Qualitative descriptive analysis was used to process data in the form of input provided by experts and students. Quantitative descriptive analysis is used to process data in the form of scores given by experts and students.

3. RESULT AND DISCUSSION

Result

Gymnastic activity in the high level of Elementary School aims improve students' flexibility, muscle strength, muscle endurance, build discipline and courage. The first step of this development research is the analyse stage, which is carried out through 3 main activities, there are: 1) curriculum analysis, 2) distributing needs analysis questionnaires in the form of google forms, and 3) conducting observations and interviews with Physical Education teachers. The results of the first activity, which is curriculum analysis, shows that there are 4

(four) types of floor gymnastics material for high level students, such as: 1) a combination of basic movements using a jumping table, 2) balance movements on the floor or titian blocks, 3) forward roll movements, and 4) “kayang” movements. The second activity of the analysis stage is to distribute a needs of analysis questionnaire in the form by a google form. There are 4 (four) things that are analysed, there are: 1) the implementation of learning gymnastic activities, 2) the application of online modes of learning gymnastic activities, 3) the most preferred gymnastic activity learning material, and 4) learning media. Here are the following of four results of the analysis needs. At the beginning, the results of the needs analysis of the aspects of the implementation of learning floor gymnastics activities in primary schools in Buleleng Regency are shown in Table 3.

Table 3. The Results of Analysis Needs of the Implementation Aspects of Floor Gymnastics Activity Learning in Elementary Schools in Buleleng Regency

No	Material	The Implementation of Floor Gymnastics Learning	
		Ever	Never
1.	The basic movement on the table jumping	174 people	241 people
2.	Balancing movement in the floor or block point	266 people	149 people
3.	Front rolling movement activity	329 people	86 people
4.	<i>Kayang</i>	302 people	113 people
	Average	268 people	147 people
	Percentage	65%	35%

According to the Table 3, there are about 174 in the high level students stated that they had learned basic movement material on the jumping table, most (266 people) students learned balance movement material on the floor/walking beam, most (329 people) students learned front roll material and most (302 people) students learned *kayang* material. Refers to this data, there are about 268 people (65%) of students stated that they had carried out floor exercise learning at school on basic movement material on the jumping table, balance movements, front rolls activity, and *kayang*. The second aspect of the needs analysis is the online mode of learning gymnastic activities. According on the results of the study, it appears that the online mode application implemented by Physical Education teachers on the floor gymnastics material as listed in Figure 1.

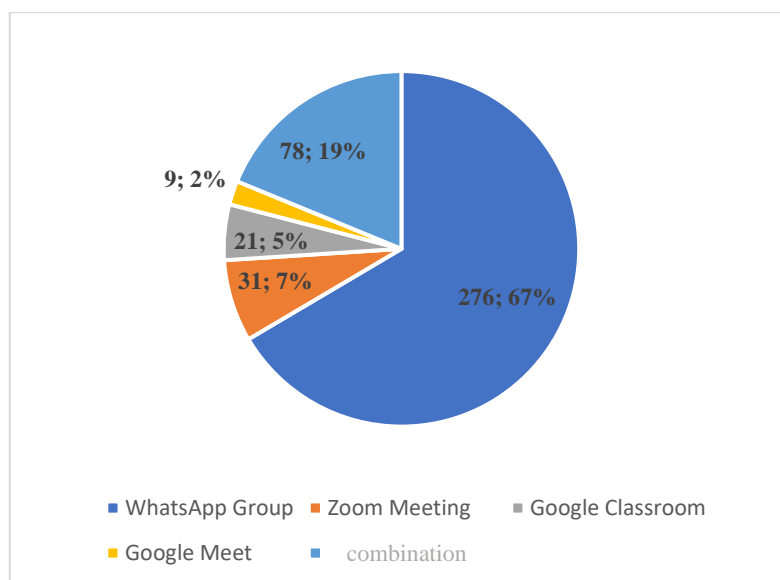


Figure 1. Online Application in the Gymnastic Learning Activity in Elementary School in Buleleng Regency

Referring to the Figure 1, the online mode that have implemented in the floor gymnastic exercise learning materials by Physical Education (PE) teachers mostly utilised by the WhatsApp Group / WAG application as many as 276 people (67%), Zoom Meeting as many as 31 people (7%), Google Classroom as many as 21 people (5%), Google Meet as many as 9 people (2%) and a combination of 78 people (19%). In the other words, the WAG (WhatsApp Group) application is most often used by Physical Education teachers in

Buleleng Regency to provide the floor gymnastic exercise material. The third aspect of the needs analysis was the most preferred learning material for gymnastic activities, as shown in Table 4.

Table 4. Floor Gymnastics Activity Materials that are Most Favoured by High-Level of Elementary School Students in Buleleng Regency.

No	Materials	Most Favoured Floor Gymnastics Materials	
		Amount	Percentage
1.	Balancing Motion	130 people	31%
2.	Front Rolling Motion	117 people	28%
3.	<i>Kayang</i>	54 people	13%
4.	Basic Motion on the Table Jumping	22 people	5%
5.	The Combination of Front Rolling Motion, <i>Kayang</i> , and Balancing Motion	92 people	22%
Amount		415 people	100%

Referring to the Table 4, it might be seen that the 3 (three) floor exercise materials that students like the most are: 1) the material of balance movement is most favoured by elementary school students as many as 130 people (31%), 2) front roll material as many as 117 people (28%), and 3) *kayang* material as many as 54 people (13%). The fourth aspect of the analysis needs is a need for Physical Education learning media. According to the results of this study, the data obtained that elementary school students who need learning media for ICT TPACK-oriented floor gymnastics activity materials are shown in Figure 2.

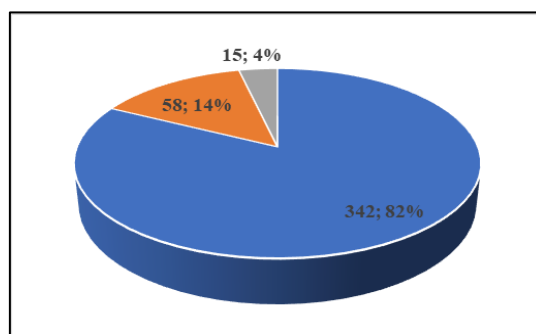


Figure 2. The Number of Primary School Students Who Need Learning Media for ICT TPACK- That Orientated Floor Exercise Activities

According to Figure 2, it might be seen that as many as 342 people (82%) of elementary school students are need learning media for ICT TPACK- that oriented on the floor exercise activity materials, 58 people (14%) expressed doubts, and 15 people (4%) students did not need it. The third activity carried out at the stage analysis that is observation and interview by the Physical Education teachers, and here are the followings are the results: 1) the four primary schools in the research location already have PJOK teachers with academic qualifications in the field of Physical Education Health and Recreation, 2) Elementary schools have facilities and infrastructure for learning floor gymnastics activities in the form of 2 - 3 mattresses with decent condition, and 3) floor gymnastics activity materials that are made into ICT TPACK-that is oriented by videos which are basic motions on the jumping table / bench, *kayang* and balance motions.

The second stage of this research is about the design. At this stage, researchers identified that the analysed and designed floor exercise motion tasks at easy, medium and difficult difficulty levels. The floor exercise materials for high-level students studied were bench jumping, *kayang* and balance movements, with movement tasks as listed in table 5.

Table 5. Floor Gymnastics Movement Tasks at Easy, Medium, and Difficult Levels for High School Learners

No	Floor Gymnastics Activity	Level of Difficulty of the Movement Task		
		Easy	Medium	Hard
1.	Jumping on the bench	Jump to the top of the bench without a prefix for 3 times	Jump to the top of the bench with a running start on three times	Jump to the top of the bench with a running start and rotate the body in the air

No	Floor Gymnastics Activity	Level of Difficulty of the Movement Task		
		Easy	Medium	Hard
2.	Internalised Character	opportunities Brave, Discipline	opportunities Brave, Responsibility	180o for 3 times. Brave, Discipline
	<i>Kayang</i>	<i>Kayang</i> through sleep position assisted by a friend for 8 counts	<i>Kayang</i> through sleep position without help from friends for 8 counts	<i>Kayang</i> by standing position assisted by a friend for 8 counts
3.	Internalised Character	Hard work, Team work	Hard work, Discipline	Brave, Team Work
	Balancing Movement	Stork stand with eyes that open for about 8 counts	Stork stand, arms outstretched, with closing eyes for about 8 counts	Stork stand, hands up, with closing eyes for about 8 counts
	Internalised Character	Hard work, Responsibility	Hard work, Discipline	Hard work, Responsibility

The three movement tasks have been validated by 2 (two) movement experts, and 1 (one) Practitioner / Physical Education (PE) teacher. Both of these experts have met the required criteria, such are: having a minimum academic qualification of Masters in Sports Education, having had a minimum teaching experience for about 10 years and having an educator certificate. The results of motion task validation conducted by the three validators showed in Table 6.

Table 6. The Results of Motion Expert and Physical Education Practitioner Validation of TPACK-Oriented Gymnastics Activity Learning Media for High Grade Elementary Students

No	Scoring Component	First Expert	Second Expert	Physical Education Practitioner
1.	Suitability of Teaching Materials with the Curriculum	15	15	14
2.	Sufficiency of Motion Learning	28	27	28
3.	Internalised Character	14	14	14
4.	Learner Security and Safety	14	14	15
	Score	71	70	71
	Scoring Value	94.67	93.33	94.67
	Score Average		94.22	

According to the Table 6, it might be seen that the average score of the three validators reached 94.22. This score if converted is included in the very good category. It means that the movement tasks developed through this research are very good in terms of compatibility with the curriculum, ensuring the adequacy of learning movement, internalised character traits and ensuring the safety and security of students. According to the results of the expert validation, it can be said that the motion task of TPACK-that oriented of the gymnastics activity learning media for high-level of elementary school students is in accordance with the principles, theory and practice of Physical Education.

Discussion

Physical Education (PE) subjects have a strategic role in realising the goals of the national education (Heri et al., 2017; Salmawati et al., 2017). The role of Physical Education (PE) is very important to form of a healthy body, have a noble mind, and have a good mindset, it makes students can contribute to realising the goals of national education which forms superior human resources in the future (Mustafa, 2022)(Heri et al., 2017; Nugraha et al., 2021; M. H. Dos Santos et al., 2021; Sulistyono, 2019). One of the Physical Education learning materials in elementary school is floor gymnastics activities, whereas floor gymnastics activities are carried out on the floor with a mat without using other tools.

Generally, in Physical Education learning process, teachers are use teaching materials, textbooks and video media. The use of videos in Physical Education (PE) learning process for gymnastics material for high-level of elementary school students can facilitate teachers and students in achieving the learning goals (Huang & Ning, 2021; R. Rustiana, 2013; Rustiana, 2012; Wicaksono et al., 2020). It refers to the statement which states that learning media is an important part that contributes to the success of learning, so that learning can take place

easily according to class conditions (Carolin et al., 2020; Wijaya & Kanca, 2019). In line with the opinion's explained that learning media is one of the facilities prepared by teachers to achieve learning objectives (Mufida & Kurniawan, 2018; Rahmat et al., 2019; Sexcio & Dafit, 2022). There are four functions of learning media, namely: clarify the presentation of the message, overcome the limitations of space, time, and sensory power, overcome the passivity of students, and provide the same stimulation, experience, and perception for each student (Ariesta, 2019; Jannah et al., 2019).

Referring to the results of this study, as many as 342 people (82%) of elementary school students need the learning media for floor gymnastic exercise activity materials oriented to *ICT TPACK*. It implies that students need learning media that is in accordance with the characteristics of elementary school students to provide visualisation of floor gymnastics activity movements. The benefits of *ICT* in learning process including: 1) helping to visualise abstract ideas (Bingimlas, 2009; Eugenia et al., 2013), 2) displaying learning materials to be more interesting (Kundu & Bej, 2021; Magen-Nagar & Firstater, 2019), and 3) improving the quality of learning (Fitri & Putro, 2021; Ratminingsih et al., 2018). The learning media that developed through this research is oriented to the Information and Communication Technology Technological Pedagogy and Content Knowledge (*ICT TPACK*), which is one of frameworks that integrates the components of Technological Knowledge, Pedagogy Knowledge, and Content Knowledge in a learning context (Juanda et al., 2021; Kartimi et al., 2021). The *TPACK* framework can be used by teachers to improve their competence in teaching students to face the challenges of the globalisation era (Kaliappen et al., 2021; Sipriyadi et al., 2018). The results of the research also related to the *ICT TPACK* which also carried out concluded that *TPACK*-based Physical Education learning at SMP Negeri 1 Gondang, East Java, run well (Pratama et al., 2021).

Referring to the results of this study on the use of online modes in Physical Education (PE) learning, it can be seen that most people use the WhatsApp Group / WAG application, there are for about 276 people (67%), this is also in accordance with the research which concluded that 39% of Physical Education (PE) teachers in Demak Regency who are over 40 years old use the WhatsApp application during the Physical Education learning during the pandemic (Hudah et al., 2020). It inseparables from the large of number of students and teachers have download and use WhatsApp applications in daily interacting about learning, starting from sending learning materials, assignments from teachers to students and conveying various information related to schools. WhatsApp application that is easy to use (user friendly) is the main benchmark for students and teachers to use it in learning (Daheri et al., 2020; Sahidillah & Miftahurrisqi, 2019; Suardika, 2020). during the covid-19 pandemic the level of movement activity of male in elementary school students was at a moderate level of activity, while female students were at a low level of activity. It is certainly a serious concern for Physical Education (PE) teachers to continue to provide sufficient active moving time (academic learning time-physical education/ALT-PE). Furthermore, according to research, the effectiveness of Physical Education learning can be known through active learner activities that accordance with competencies and appropriate time allocations (Widarini et al., 2018). The studies showed that Physical Education (PE) learning time in elementary schools by online is very effective (Pranata & Fatayan, 2022).

This research has successfully designed a learning media in the form of a basic video learning of gymnastics skills which oriented to *ICT TPACK* for high-level of elementary school students. The advantages of this video learning design might be seen in 2 (two) aspects, such as first, it combines the video tutorials and motion task videos. Second, there are internalised characters in each motion task. The first advantage is that the video tutorial provides a visualisation of the movement stages of floor gymnastics activities starting from the initial attitude, execution and final attitude assisted by the Physical Education (PE) teacher and other students, while the motion task video presents a variety of motion tasks ranging from easy, medium and difficult difficulty levels that can be carried out by students. The repertoire of movements in question is that students recognise, learn and master various types of movements by paying attention to various things including body awareness and space awareness. While, the terms of motion are more directed to the way or technique of doing the motion. These two things will become the learners' own identity from other learners. The second advantage is there is internalised character in each movement task. Internalisation of character leads to the realisation of the Pancasila learner profile, such as: 1) faith, the devotion to God Almighty, and noble character, 2) global diversity, 3) mutual cooperation, 4) independence, 5) critical thinking, 6) creativity. These two advantages further strengthen and reinforce the role of Physical Education (PE) as a subject that uses to movement activities as a medium to achieve overall learning objectives covering cognitive, affective and psychomotor aspects.

4. CONCLUSION

According to the results of the expert validation, it can be said that the motion task of *TPACK*-that oriented of the gymnastics activity learning media for high-level of elementary school students is in accordance with the principles, theory and practice of Physical Education. The existence of *ICT TPACK*-which oriented on basic gymnastics skills of learning media is needed by high-level of elementary students to provide the

visualisation and motion tasks on basic movement materials on the jumping table/ bench, *kayang* and balance movements. The ICT TPACK Oriented Floor Gymnastic Learning Media for Elementary School Students that has been developed is valid, so it is suitable for learning. Students need ICT TPACK-oriented gymnastics basic skills learning media because this media can make it easier for students to learn.

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