Gymnastics Multimedia Learning Development for Physical Education

Riangga Dwi Martanti[1], Sri Winarni[1]

[1]*State University of Yogyakarta, Sleman, Yogyakarta, Indonesia*
Master of Sports Science, Faculty of Postgraduate

Keywords: *Multimedia, Gymnastic, Junior High School.*

Abstract: The purpose of this study is to develop gymnastics multimedia learning in physical education (PE) for junior high school (JHS). This study adapted the research and development of Dick & Carey model of education with 4 steps, namely (1) the needs analysis stage, (2) the product design stage, (3) the stage of evaluation and evaluation, and (4) the final product stage. The subjects in this study were 1 material expert, 1 media expert, 2 PE teachers, and 126 students. The effectiveness test was carried out at Jatilawang JHS 1with 1 class of 34 students. Data were collected using questionnaire techniques and performance. The results of the study were in the form of developing gymnastic learning on PE of JHS the form of an Android-based application entitled "MaGym" consisting of 6 main menus, namely (1) main menu, (2) introduction, (3) material, (4) instruction, (5) evaluation, and (6) author profile. Based on the assessment of material experts, media experts, PE teachers, students and product effectiveness tests, it could be concluded that the development of gymnastic learning in PE for JHS was feasible to apply to PE for JHS students and the results of the study indicated that multimedia was effective in improving student gymnastics learning outcomes.

1 INTRODUCTION

Education is a process of human self-development. This is in accordance with Law No. 20 of 2003 concerning the National Education System which explains that National Education is "a conscious and planned effort to create a learning atmosphere and learning process, so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by him, society, nation and state ". Schools as formal institutions have the duty and responsibility to carry out the education process. In the learning process, there are many factors that influence the success of the learning process, including factors such as students, teachers, facilities, environment and school conditions. From the several factors above, the two most influential factors are student factors and teacher factors.

The purpose of the learning process is to provide information and to transfer information from learning resources to recipients. The learning process can be done anytime and anywhere. A good learning process should have good learning resources. These learning resources will provide some of the information that is useful for learning. The source of learning is now diverse and can be in the form of books, article magazines, the internet or from the instructors themselves. Even with these good learning resources, students are required to be able to improve their own abilities.

To help students in motion, the approach to use media with excess repetition of motion with encouragement and examples directly or with the help of the media is now crucial to have. Sound, images, videos and simulations are examples of media forms that can be used. Direct examples in front of children and important videos are useful in learning motion. The approach to motion from easy to difficult in the form of examples of movement with the media can help students learn to move well.

The demands of the 21st century on digital literacy, the learning resources are no longer just textbooks. Nowadays, it covers existing information in technology. Technological developments for the community, especially android, make teachers and students no longer familiar with their roles in daily life. In terms of learning, teachers should have tried to improve learning achievement by integrating technology, for example on how to use Android to integrate with various media as learning multimedia. The use of multimedia learning is helping students not only to understand teaching material, but also to practice their skills.

One of the technological advancements,that is developed at this time, is a smartphone. Smartphone is a device that allows for communication (call or SMS). It has the functions as a PDA (Personal Digital Assistant) and a computer.

Physical education requires learning media, so that they will facilitate educators in delivering the materials. One of the materials taught is gymnastics. Also, learning media should be able to facilitate students in understanding the materials provided. However, in reality, there are many students who underestimate this and considered this as boring, unattractive, and also scary. Moreover, the condition is worsen by conventional and limited learning media, as well as teachers who lack mastering the floor gymnastics materials since floor gymnastics materials is considered unattractive by students. Students assume that floor gymnastics is a scary sport that makes the body sick and can cause injury.

The existence of important media can be the tool for teachers in the teaching and learning process. With media, students can learn more easily in understanding the materials. The goal of learning can be conveyed, so that the students are expected to be able to apply the knowledge in everyday life. The abundance of media and the increasing affordability of access to technology make it possible to use it. Choosing the right media to support the teaching and learning process is important, so that the main objectives of learning can be achieved.

In an effort to provide complete learning resources, the researchers intend to create multimedia-based android learning for floor gymnastics learning. The learning application was called MaGym.

The purpose of this study is to develop multimedia that are suitable to be used as learning media. These multimedia should be appropriate in the opinion of the materials experts, instructional media experts, teachers and students. Finally, it

should be able to effectively improve the skills of floor gymnastic for junior high school students.

1.1 Multimedia Learning

Multimedia learning comes from two words, namely multimedia and learning. The word multimedia is also composed of a combination of two words namely multi and media. Multi in Latin comes from the word *nouns* which means various. Media comes from the word *medius* in Latin, which means middle, intermediary or introductory. The notion of multimedia is an interrelated combination of text, images, photos, sounds, animations and videos that are made digitally. Based on the above meanings, it can be concluded that multimedia is a combination of various media that serves to convey information to the public (Vaughan, 2010).

Multimedia learning is actually part of a learning environment facilitated by instructors or educators to achieve learning goals. The idea is to use of various media to display information (Ivers, 2010). These media can include writing, graphics, videos, images, and sounds. Based on this statement, multimedia is a learning tool whose content is a combination or integration and integration of more than one media for a personal interest or learning.

The multimedia term used as a combination of text, still graphics, animations, audio and video within a single technology, such as computer or television. It means that multimedia is used to describe a combination of writing, graphics, animation, audio, and video in one technology, such as computers and television (Bates, 2003).

The choice of earning media used in learning activities needs to consider factors in the curriculum. The contents of the information and knowledge should be good or up to date. In other words, the media should be able to be updated regularly, as the current technology is developing very rapidly. Multimedia learning has many types, namely computer-based learning, e-learning, 3D, mobile learning and animation and presentation media (Darmawan, 2016). Multimedia used in this research is mobile learning.

Mobile learning is a type of learning done through portable devices that are easy to access and easy to carry anywhere. Also, it makes it easy to communicate with others and can be used anywhere (Goksu and Atici, 2013). Mobile devices used in mobile learning can be in the forms of laptops, palmtop computers or PDAs (personal digital assistants), tablet PCs, and smartphones (Valk, Rashid, and Elder, 2010).

Mobile learning is learning that utilizes technology and mobile devices. Mobile here means a PDA, cell phone, laptop, tablet PC and so on. Users can access learning content anywhere and anytime with mobile learning without having to visit a certain place at a certain time. Thus, users can access educational content without being bound by time and space.

Mobile learning can be utilized and developed in the form of a new learning culture that is more modern, democratic and educational (Miftah, 2013). Learning culture is a small part of the culture of society. The culture of the community here can be interpreted as the integration of all objects, ideas of knowledge, institutions, and ways of doing things; patterns of behavior, values, habits, and attitudes of a generation in a society, that is accepted by a generation from its predecessor generation and is passed often in a form that has changed to the generation successor.

The characteristics of mobile learning are (1) enabling student mobility through mobile devices, (2) learning anytime and anywhere, (3) encouraging collaborative learning, (4) engaging students with constant connectivity, and (5) enabling authentic learning (Ibanez, 2016). Mobile learning tends to use mobile devices such as mobile phones, smartphones, PDAs, and so on.

1.2 Physical Education

Physical education is an essential educational process that utilizes physical activities to produce holistic changes in the individual physically, mentally and emotionally (Mahendra, 2003). Physical education treats the children as a whole unit rather than as someone who is separated from his physical and mental qualities.

Physical education is included in the scope of education, so that its objectives are also tailored to the purpose of education in general. Physical education is education about motion and all things related to one's personal development physically, mentally and socially. Physical education is an integral part of mind education that tries to achieve the goal of developing physical, mental, social, and emotional fitness for the community, with a vehicle for physical activity (Sukintaka 2001).

To attract student involvement in learning, the teacher must build a good relationship by establishing a sense of sympathy and mutual understanding. A good relationship will make the bridge to the passionate life of students, lead the way into the new world of students, know the strong interests of students, speak in the hearts of students, foster good relations can make it easier for teachers to engage students, facilitate classroom management, and extend focus time and increase student excitement. The implementation of physical education has an important meaning in the world of education. The purpose of physical education consists of four domains, namely physical, psychomotor, affective, and cognitive domain. In the four domains, physical education is part of education with the aim of education as the final goal. Based on the principles and foundation of physical education, the purpose of physical education is to develop physical, mental, social integration and form an independent person; to choose the form of physical education and physical activity that is in accordance with the conditions of a person and social environment; and to develop health in accordance with standards (Rosdiani, 2013).

The purpose of some views above about the nature of physical education is that physical education learning should be maximized as best as possible for students, so that students' physical, mental and emotional development can always be maintained. Physical health will also be able to facilitate students to carry out daily activities effectively and efficiently produce something that is optimal. In addition, physical education must also be delivered as pleasant as possible, so that students can enjoy the educational process and can achieve optimal results and can achieve learning goals.

Gymnastics is one of the gymnastic materials in physical education. Floor exercises are carried out on the floor without using tools. Rolling, balance, and spinning are the basic movements in gymnastics. Gymnastics is part of gymnastics, and the term "floor" shows that the movement of the exercise is done on the floor using a mat or rug (Sholeh, 1992). Gymnastics is one of the sports in which there are elements of bouncy bouncing, balance, jumping and jumping (Sutrisno and Khafadi, 2010).

A series of floor exercises is a series of two or more movements in floor gymnastics (Husdarta and Eli, 2010). A series of gymnastic movements is a combination of gymnastic movements carried out sequentially without time to stop during a movement (Isnaini and Suranto 2010). The circuit motion is two or more movements, carried out sequentially with short gestures (Wisahati, 2010). From some of the information above, the writer can conclude that a series of gymnastic movements is a combination of two or more gymnastic movements which are carried out sequentially without pauses.

Gymnastics is a body exercise that was chosen and created intentionally, planned, and arranged systematically, with the aim of forming and developing a harmonious personality. Gymnastics as a body exercise is chosen and constructed deliberately. It is done, planned, and arranged systematically with the aim of increasing physical fitness, developing skills, and instilling mental and spiritual values.

Gymnastics is effective to optimize children's growth and development. The movements in gymnastics are very suitable for filling out physical education programs. Its movements stimulate the development of physical fitness components, such as strength and endurance of muscles from all parts of the body.

Gymnastics learning requires special classroom settings that are different from learning other PE materials. This is because gymnastics requires tools, such as mattresses. The purpose of this class arrangement is to increase the amount of active learning time and opportunities for students to do more exercise, especially by reducing the amount of time to wait their turns because the mattresses are limited in number. This can be understood when there are only 1 or 2 mattresses, while the number of students can be around 30 children. If the teacher does not think about how to make use of the existing mattress and how the student's turn is carried out, there will be a waste of time, because students will wait longer for their turns rather than do the exercises

Dominant movement patterns are the bases or foundations for all the more difficult gymnastic movement skills. They can be stepping stones in developing all gymnastic skills. Learning gymnastics for those who have never done gymnastics at all with a high degree of difficulty must be based on the dominant movement pattern skills first.

Floor gymnastics materials taught for junior high schools, especially in class VIII, include the forward roll, backward roll, headstand, handstand, cartwheel, neck spring, round off, tiger sprung, and a series of movements. Some of these skills are the continuation of class VII material.

Children in junior high school are included in adolescence who are usually still in the period of searching for self-identity. Usually, their emotions still tend to be volatile. PE teachers must understand and pay attention to the characteristics and needs of students. The teacher will be able to make students learn more effectively, and to make PE learning goals to be more effective.

2 METHODS

2.1 Research Design

This type of research is research and development, namely the type of research used to produce certain products, and test the effectiveness of these products. Research and development (R & D) is a process used to develop and validate educational products. We not only use things like textbooks, instructional films, and computer software, but also methods, such as methods of teaching, and programs such as drug education programs or staff development programs (Sholeh, 1992).

The development model used in this study is the model of Dick & Carey, namely (1) identifying learning objectives, (2) analyzing learning and context, (3) determining learning objectives, (4) developing assessment instruments, (5) developing learning strategies, (6) developing and selecting materials learning, (7) designing and conducting formative evaluations, revisions, and (8) designing and conducting summative evaluations (Sutrisno and Khafadi, 2010).

2.2 Research Procedure

This research and development procedure used the steps of Dick & Carey. Then, from the adaptation of the research and development procedures, the researchers carried out the steps of research and development into 4 stages. The researcher tried to adjust the pace of development of Dick & Carey's learning with the step of developing the video. The four stages included the Requirement Analysis Phase, Product Design Phase, Validation and evaluation phase, and Final Product Stage.

2.3 Product Trial Design

Products in the form of videos need to be tested to determine their quality and feasibility. Product testing is part of a series of validation and evaluation stages. In this research, the product would be consulted with supervisors, experts, junior high school teachers, and junior high school students especially eight graders, as potential users of learning videos. The steps in the validation and evaluation stages were pravalation, expert validation, and due diligence.

The subjects of the assessment included 1 media expert, 1 material expert, 2 PJOK SMP teachers, and 126 VIII grade junior high school students. For

feasibility test, 1 class or 34 students was for product effectiveness testing.

The instrument of data collection is useful to obtain the data needed according to the research objectives. Research instruments were in the form of suggestions, comments sheets, and questionnaires. A questionnaire is a number of written questions that are used to obtain information from the respondent in the sense of reports about the person or things that are known. The contents of the questionnaire included the form of assessing the feasibility of learning videos using a Likert scale with alternative answers, namely very good, good, sufficient, lacking and very lacking. Efforts to obtain quantitative data were given the alternative answers as well with a score of very good = 5, good = 4, enough = 3, less = 2, very less = 1.

2.4 Data Analysis Techniques

The analysis of the results of the research data was conducted using qualitative and quantitative approaches. Data in the form of suggestions and criticisms from experts and students were analyzed using a qualitative approach, while the feasibility data of learning videos and opinions on video suitability were processed with a quantitative descriptive approach. To analyze data about the feasibility of video learning, it was done by the following steps, namely:

a. conducting tabulation of assessment data,
b. calculating the average score of each indicator with the formula:

$$x = \frac{\Sigma X}{N}$$

Description:
X = average score
N = number of test subjects
ΣX = number of scores

c. summing the average score of each, and
d. interpreting the average number of qualitatively using the following 5 scale score conversion formula

Table 1: Average amount conversion guidelines score becomes value with five categories

No.	Range Score	Value	Category
1	Mi + 1.50Sbi <X	5	Very Good
2	MI + 0.50Sbi <X ≤ MI + 1.50Sbi	4	Good
3	MI - 0.50Sbi <X ≤ MI + 0.50Sbi	3	Fairly Good
4	MI + 1.50Sbi <X ≤ MI - 1.50Sbi	2	Less
5	X ≤ MI + 1.50bi	1	Very Less

Description:
X = ideal mean Ideal
maximum score = number of indicators x highest score
Ideal minimum score = number x lowest score
Mi = ideal mean = ½ (ideal mak score + ideal min score)
Sbi = ideal standard deviation = 1/6 (min max-score score)

For effectiveness tests, the following criteria were set.

Table 2: Criteria for testing the effectiveness

No	Scale Rating (%)	Qualifications
1	0-55	Very Poor Good
2	56-65	Less Good
3	66-80	Good
4	81-100	Very Good

3 RESULTS

This multimedia gymnastics learning application is called MaGym. This product was developed in the form of apk software that can be accessed or installed via a smartphone device, so that later users, teachers and students will easily use it in the learning process. Based on the research procedure adapted from Dick & Carey, the first step taken by the developer was a needs analysis. Needs analysis was done to collect data through field studies and literature studies.

Development is the stage of manufacturing products based on guidelines in the form of storyboards that have been made at the design stage. Developers used the Android studio application in making this application, with the Java programming language and could be operated with a minimum of 15 fire. At this stage, the product was made up to review media experts and material experts as well as revisions. The multimedia gymnastics learning product floor included several sections and pages, namely menu pages, introduction pages, material pages, instructions pages, evaluation pages, history pages, author profile pages and exit icons.

Product feasibility test was given to 126 students or 3 classes of 8th grade and 2 teachers of Physical and Health Education subjects in Junior High School. The trial was carried out in Jatilawang Junior High Schools 1 and 2. The process of carrying out the feasibility test of this product was to provide products in the form of floor gymnastic learning multimedia applications in Junior High School Sports and Health Physical Education which were run on *smartphones*. Then, students were given time to operate and make movements with videos.

The response to the multimedia application of floor gymnastics learning in Physical Education for Junior High School Sports and Health that was run on *smartphones* in PE teachers had 4 aspects, namely material quality, material content, appearance and programming. The results of the assessment data for each product component in the form of a score were converted into a scale value of five. The result of the score conversion became a scale of five. Data from product evaluation by 2 PE teachers showed that the multimedia application of floor gymnastics learning in Junior High School Physical and Sports Education which had been developed well. The aspect of material quality got a

value of 46.5 with the category "Very Good". The content aspect of the material got a value of 56.5 with the category "Very Good". The display aspect got a score of 72.5 with the category "Very Good". The programming scored 32.5 with the category "Very Good".

The product evaluation data by the students in the table showed that the application of gymnastics multimedia learning in Junior High School Sports and Health Physical Education had been well developed. The aspect of material quality scored 47 with the category "Very Good". The content aspect received a score of 55,7 with the category "Very Good". The display aspect got a score of 69 with the category "Very Good". Finally, the programming aspect got the value 31 with the category "Very Good".

Product revisions were done twice, namely revision I and II. Revision I was carried out at the validation stage. Revision II was carried out after the product feasibility test. These revisions were based on data on advice and input from experts in material experts and media experts. The results of the validation by the material experts got suggestions for improvements and criticisms that became guidelines in making product revisions. After being validated by material experts, there were shortcomings in floor gymnastic learning multimedia in Physical Education for Junior High School, namely the original images or videos. Validation by media experts revealed several suggestions on gymnastics multimedia learning in Junior High School Sports and Health Education. First, on the title page, the study program needed to be added. Next, the button exit needed to be given a confirmation button. Then, the profile should be more complete, and the labels for next and back were revised. The video needed to be given navigation buttons, and the narration was clarified when play background music is off. Overall, the assessment of the product showed positive results.

Based on the results of the expert's assessment, the PE teacher and the students indicated that the Gymnastic Multimedia Learning in the Junior High School had the feasibility of material quality, material content aspects, excellent display and programming aspects.

Tests of effectiveness were carried out by using media in the learning process. The results of the learning process could be seen from the percentage of completeness of student learning outcomes on floor gymnastic materials, which was referred as the Minimum Completion Criteria Value. It included affective, cognitive and psychomotor aspects. This

effectiveness test was done by applying MaGym multimedia in class VIII A. The class used a learning method, namely the scientific approach. The results from the two classes reflected the level of achievement of competency indicators obtained by students. Overall, the results of student learning values including affective, cognitive and psychomotor aspects were described in the table as follows.

Table 3: Learning outcomes of class VIII PJOK gymnastics at Jatilawang Junior High School 1

Value	F (KKM)	Percentage	Categories
Number of Student	34		
Affective Value	34	100	Very Good
Cognitive Value	30	88,24	Very Good
Psychomotor Value	31	91,17	Very Good

The result of student learning values which include affective, cognitive and psychomotor aspects were described in the following diagram.
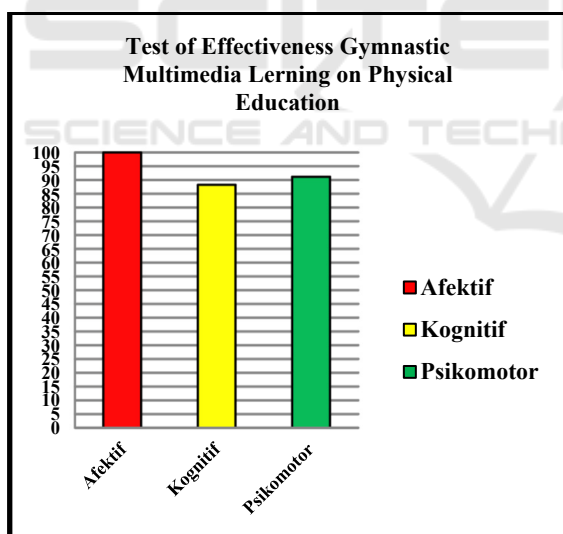

Figure 1: Student learning outcome values diagram by using MaGym Multimedia in Physical Education Learning of Gymnastic

The effectiveness test using percentage analysis showed that the application of Android-based MaGym multimedia, used by teachers and students in the floor gymnastic learning process in class VIII, was very effective. This could be seen from the percentage of students who had fulfilled the minimum completeness criteria. On the affective aspect, 34 students or 100% completed and entered in the excellent category. The cognitive values amounted to 88.24% or 30 students completed and included in the very good category. In the aspect of psychomotor, there were 91.17% or 31 students complete and fall into the very good category. The assessment of product effectiveness test on the development of floor gymnastics multimedia learning in Junior High School Sports and Health Education was in a very good category, so that this product was suitable for use in the learning process of physical education, sports and health.

4 CONCLUSIONS AND SUGGESTIONS

4.1 Conclusions

Based on the results of the analysis and discussion previously presented, it can be concluded that the multimedia of gymnastics learning in junior high school students was in the form of learning applications, called MAGYM. This application could be used as a medium for physical education learning gymnastic material and was effectively used to improve students' understanding in floor gymnastic learning.

4.2 Suggestions

Based on development research, the multimedia in this research can be used by physical education teachers of Junior High School as an interesting, easy and effective learning media, and by floor gymnastics trainers as an analysis and variation in the training process.

REFERENCES

Arikunto, S 2006, *Prosedur Penelitian Suatu Pendekatan Praktik Edisi Revisi VI,* Jakarta : Rineka Cipta

Bates, AW. & Poole, G 2003, *Effective teaching with technology in higher education, foundation of success,* San Fransisco, CA: Jossey-Bass.

Darmawan, D 2016, *Mobile learning sebuah aplikasi teknologi pembelajaran*, Jakarta: Raja Grafindo Persada

Dick, W., Carey, L., and Carey, J.O 2009, *The Systematic Design of Instruction,* New Jersey: Perason

Goksu, I & Atici, B 2013, Need for Mobile Learning Technologies and Opportunities, *Procedia Social and Behavioral Science*, vol. 103(2013): 685-694

Hadi, S 2004, *Metodologi research 2,* Yogyakarta: Andi Offset

Husdarta, J.S & Eli M 2010, *Pendidikan jasmani, olahraga & kesehatan smp/mts untuk kelas viii,* Jakarta: Pusat Perbukuan, Kementrian Pendidikan Nasional.

Ibanez, M.B 2016, Suport for Augmented Reality Simulation System: the Effects of Scanffolding on Learning Outcomes and Behaviour Patterns, *IEEE Transactions on Learning Technology*, vol. 9(1): 46-56

Isnaini, F & Suranto 2010, *Pendidikan jamani, olahraga, dan kesehatan viii,* Jakarta: Pusat Perbukuan, Kementrian Penddidikan Nasional

Ivers, KS. & Barron, AE 2010, *Multimedia in education designing, producing and assesing,* Santa Barbara, CA: Libraries Unlimited

Mahendra, A 2003, *Falsafah Pendidikan Jasmani,* Jakarta: Direktorat Pendidikan Luar Biasa

Mahendra, A 2001, *Pembelajaran Senam,* Jakarta: Direktorat Jendral Olahraga

Miftah, M 2013, Penerapan Teori Belajar dan Desain Instruksional dalam Program Mobile Learning, *Jurnal Kwangsan, vol.* 1(1):46-56

Rosdiani, D 2013, *Perencanaan Pembelajaran dalam Pendidikan Jamani dan Kesehatan,* Bandung: Alfabeta

Saifuddin, A 2002, *Sikap Manusia, Teori dan Pengukurannya,* Yogyakarta: Pustaka Pelajar

Sholeh, KM 1992, *Olahraga Pilihan Senam,* Jakarta: Depdikbud.

Sugiyono 2013, *Metode Penelitian Pendidikan (Pendidikan Kuantitatif, Kualitatif, dan R&D)*, Bandung: Alfabeta

Suharjana, F 2011, Pengemabangan Pembelajaran Senam Melalui Bermain di Sekolah Dasar, *Jurnal Pendidikan Jasmani Indonesia, vol.* 8(1): 18-23

Sukintaka 2001, *Teori Pendidikan Jasmani,* Solo: ESA grafika

Sutrisno, B and Khafadi, MB 2010, *Pendidikan Jasmani Olahraga dan Kesehatan 2,* Jakarta: Pusat Perbukuan Kemendikna

Valk, J., Rashid, A.T & Elder, L 2010, Using Mobile Phone to Improve Educational Outcomes: an Analysis of Evidence From Asia, *Inetrnational Review of Research in Open an Distance Learning*, vol. 11(1): 117-140

Vaughan, GM. & Michael, AH 2010, *Social Psychology (6th ed.),* Australia: Pearson Education

Wisahati, AS 2010, *Pendidikan Jamani Olahraga dan Kesehatan,* Semarang: Sejati