



Motor Cognitive Coordination Training Program Based Android Apps

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Abstract

Innovation in the field of education is still very rarely carried out by education practitioners, especially physical education and sports. Therefore, the researcher aims to create an innovation product in physical education learning by designing an android-based application that contains the MCCT (Motor Cognitive Coordination Training) program. Motor cognitive coordination training is an exercise method based on the kinetic life training method. Kinetic life training is a combined concept of movement coordination exercises and cognitive challenges, in which simple skills such as hand-eye coordination or continuous are combined with intellectual tasks to create complex exercises. The research method used in this study is the Research and Development (R&D) method. The results showed that the effectiveness of using the MCCT application was 68% smaller than the MCCT program which was given by the direct instruction method, which was 78%. However, on some observation items, the effectiveness of the MCCT program based on the android application is greater than the MCCT program with the direct instruction method.

How to Cite

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INTRODUCTION

In the conditions of the Covid 19 pandemic, academics are competing to always innovate according to their respective fields. In learning physical education in elementary schools, teachers are required to continue the teaching and learning process to students even though face-to-face learning is not carried out in full. This requires teachers to continue to innovate so that the learning objectives of physical education can be realized as a whole.

There are three domains that must be achieved in the physical education learning process in schools, namely affective, cognitive, and psychomotor. As mentioned by (Abduljabar, 2001) physical education not only causes a person to be physically educated, but all aspects related to total human welfare. Thus, through physical education learning, students are not only trained to improve skills, but students are trained in knowledge and social development. However, the reality that we often see in physical education learning is more focused on the movement skills possessed by students while cognitive abilities are sometimes not touched by physical education teachers in schools. As explained in (Insyasiska, Zubaidah, Susilo 2013) "effective physical education is able to stimulate students' thinking and analytical skills when involved in physical activities. Game patterns that emphasize the importance of students' reasoning abilities in making decisions.

The decline in cognitive abilities in students is the cause of the lack of student physical activity caused by the lack of physical education learning in schools based on students' cognitive abilities and critical thinking. Physical education activities in schools are reduced, due to other considerations and are considered as learning that is considered to interfere with learning concentration (Ratey and Loehner, 2011). Meanwhile, through the provision of physical activity at an early age may be able to provide benefits to their cognitive function for life in the future. Cognitive ability is a mental activity of thinking power, and memory, as well as processing information that requires a person to be able to get memories, solve a problem, and think about the future or all psychological processes related to how individuals can learn, pay attention, observe, imagine, predict, , assess and think about the environment (Chang, 2012).

In improving students' cognitive abilities, teachers can use a program called MCCT (Motor Cognitive Coordination Training). This program has been widely used in an effort to improve students' motor skills through movement

coordination exercises. Motor cognitive coordination training is an exercise method based on the kinetic life training method (Lutz, 2017). Kinetic life training is a combined concept of motor coordination (movement) and cognitive challenge, in which simple skills such as hand-eye coordination or balance are combined with intellectual tasks to create complex exercises (Lutz, 2017). Meanwhile, according to (Pietsch, Böttcher, & Jansen, 2017) states that Life kinetic has a significant effect on cognition and thinking patterns of children in elementary school. Several studies have also proven that the ability of this cognitive function affects the development of motor coordination in children and adolescents.

However, there has been no research on a product designed to run the MCCT program online through an android application. So that in the Covid-19 pandemic situation, the MCCT program is expected to be given even though the condition of students is carrying out the learning process at home. The teachers' ability to give motion assignments is felt to be lacking due to the limitations of software (software/applications) that can be used practically through each students' device. Thus, the researchers created an application that contains the MCCT (Motor Cognitive Coordination Training) program so that students can perform the movement tasks contained in the program at their respective homes without experiencing difficulties.

METHOD

In this study the method used is Research and Development (R&D). Educational research and development is a process used to develop and validate educational products (Borg and Gall, 1989) meaning that educational development research (R&D) is a process used to develop and validate educational products. This study aims to create an android application-based product in physical education learning that contains the MCCT program for use in the online learning process.

Unfortunately, R&D still plays a minor role in education. Less than one percent of education expenditures are for this purpose. This is probably one of the main reasons why progress in education has lagged behind progress in other fields. The Research and Development method (Borg and Gall, 1989) in this study is used to create an innovation in the field of education which is still very rarely done.

Partisipan

In this study, 36 participants were involved

with the status of Physical Education teachers in elementary schools and 100 elementary school students consisting of 70 male students and 30 female students as participants in the use of MCCT application. There are 36 physical education teachers in charge of monitoring the use of the MCCT application by students. Primary school students selected in this study were students with a range of ages 9 to 10 years.

Prosedur

Dalam penelitian ini, fokus dari tujuan The research is to create an android-based product that can be used for the needs of the physical education learning process in elementary schools that focuses on the development of students' cognitive abilities. The procedures and steps taken in this research are 1) looking for potential problems that occur in the realm of achieving physical education learning objectives in elementary schools that focus on students' cognitive development through movement learning. 2) researchers are looking for various information related to the lack of emphasis on the cognitive domain in the student movement learning process so that it can be identified what movement patterns will be designed in the MCCT program and then poured into an android-based application. 3) Create a simple MCCT application design so that it is easy to use for the student movement learning process that can be monitored online. 4) Perform expert validation on applications that have been made so that their use can be used for the graphic coordination learning process so that students' cognitive abilities can increase. 5) Product revision is carried out after the expert validation process. 6) After the product has gone through the revision stage, a trial is conducted to determine the level of product effectiveness by comparing the application of the MCCT program using an android-based application and the MCCT program given directly through the home visit method by the teacher. The effectiveness of the application was measured using an observation sheet designed to be filled out by parents and teachers of physical education. 7) Product improvement will be seen from the success of the previously revised application usage trial. 8) Applications that have been tested for the first and second use, then product improvements are made, after which the application is ready to be used.

RESULTS AND DISCUSSION

MCCT Application Development

In this study, the first step to making an application is planning, the plan arises from a

problem, namely the lack of touch in the cognitive domain in the learning process of physical education in elementary schools. The MCCT program has been widely applied to train movement coordination in early childhood, but there has never been an application in the implementation instructions of this program. The COVID-19 pandemic has made the physical education process online. Thus, an instrument is needed in implementing the MCCT program to be applied to elementary school students.

In making the MCCT application, hosting/domain and coding languages are needed, but in using the application, gadgets, laptops, connector cables, and lcd monitors are needed as support and implementation. The following is the flow of the research results



Figure 1. MCCT application development research flow

After all the components are available, the next step is to install the application on all gadgets and laptops that will be used and are already connected to the internet network. After making the application, the testing and revision stages are carried out first, then the product improvement stage, then the application can be used and runs well

Editing video

The editing process uses Adobe After Effect CC 2021 software. By adding rounded layers and bevels so that the content is more user friendly. After the editing process is complete, all content is rendered and then compressed using the Handbrake application.



Figure 2. Editing process using Adobe After Effect CC 2021

Use of MCCT (Motor Cognitive Coordination Training) Android Application

The MCCT (Motor Cognitive Coordination Training) Android application has a feature that can be used without using an internet connection, meaning that this application is a one time download.

There are 5 kinds of movement menus that can be selected by application users, namely 1) Alternating, 2) Hand Clap, 3) Hand to foot clap, 4) Directed Eye Movement, 5) Focusing Eyes on an Object Cognitive Skill. To bring up the menu, the application user simply touches the layer on the main menu so that the menu will appear sliding up, to close the menu simply click anywhere on the Android smartphone screen. Each Movement menu consists of video content with a looping feature (ie a feature with a video that plays continuously until the user presses the Back button), another feature is the addition of text explanations that can be zoomed in and zoomed out. The appearance of the application is made very user friendly without having to press a lot of buttons. So that users are more practical in using it. The following is a screenshot of the MCCT (Motor Cognitive Coordination Training) android application



Figure 3. MCCT (Motor Cognitive Coordination Training) application display

Source Code Aplikasi

The application software for developing the MCCT android application is Basic 4 Android which is a native Android development with the principle of what you see is what you got by using the Visual Basic programming language.

The Effectiveness of Using the MCT Application

After conducting several stages of application testing, the effectiveness of the MCCT program in the application was measured, which was compared with the direct instruction method (face to face). Effectiveness was measured using an observation sheet designed to determine the effectiveness of the movement coordination

learning process. This measuring instrument has gone through the validation stage with the following results **Table 1.**

Table 1. Instrument Validation Results

		Tes Aplikasi	Kriteria (CS)
Effectiveness Observation Sheet	Pearson Correlation	1.000	0.955
	Sig. (2-tailed)	0,024	0.000
	N (sampel)	20.00	10.00

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

The **Table 1.** above shows the magnitude of the validity coefficient for the manual test of 0.955 with a Sig value of 0.024 <0.05. Thus the results of the instrument validity test show that the observation sheet can be used to measure the effectiveness of using the MCCT program.

The results of measuring the effectiveness of the two methods can be seen in the following **Table 2.**

Table 2. Comparison of the Effectiveness of the MCCT Program

Effectiveness Indicator	MCCT Application Usage	%	Direct Instruction	%
Student Enthusiasm	Very good	19	Very good	56
	Good	24	Good	15
	moderate	32	moderate	10
	less	20	less	10
	Very less	5	Very less	9
Program Achievement	Very good	25	Very good	21
	Good	38	Good	30
	moderate	18	moderate	25
	less	10	less	15
	Very less	9	Very less	9
Motion Control	Very good	12	Very good	24
	Good	23	Good	39
	moderate	20	moderate	15
	less	34	less	10
	Very less	11	Very less	12
Instructions	Very good	22	Very good	24
	Good	48	Good	20
	moderate	15	moderate	25
	less	10	less	19
	Very less	5	Very less	12

Interaction	Very good	2	Very good	35
	Good	6	Good	34
	moderate	13	moderate	15
	less	46	less	10
	Very less	33	Very less	6
Mean		68 %		78%

From the **Table 2.** above, it can be seen that the effectiveness of the MCCT program with the direct instruction method is 78% and the effectiveness of the MCCT program based on the android application is 68%. However, on some observation items, the effectiveness of the MCCT program based on the android application is greater than the MCCT program with the direct instruction method (face to face).

Researchers apply one method of life kinetic exercise which is a combined concept of movement coordination and cognitive challenge, in simple skills such as hand-eye coordination or balance combined with intellectual tasks to create complex exercises (Lutz, 2017). One of the kinetic life training methods is Motor Cognitive Coordination Training which is a training method that has developed based on the kinetic life training method. In the Motor Cognitive Coordination Training program, the key is a combination of movement and cognitive tasks that are carried out simultaneously at one time.

The purpose of making the MCCT application is to maintain the learning process in the cognitive domain through motion tasks so that it does not get lost due to the current distance learning situation. Cognitive ability is a thinking process, which is an individual's ability to connect, assess and consider an event or an event (Jawati, 2013) Meanwhile (Ibda, 2015) said that "cognition is a general concept that includes various forms of recognition which include: observing, seeing, paying attention, giving, guessing, thinking, imagining, estimating and judging. Therefore, cognitive ability is a thinking ability possessed by a person or individual to connect, solve and consider a problem or event, observe or pay attention and how an individual can imagine and predict what will happen to his environment.

Cognitive development abilities include grouping objects that have the same color, shape, and size, matching circles, triangles, and rectangles as well as recognizing and counting numbers 1 to 20 (Fernandes, Ribeiro, & Melo, 2016). The cognitive domain is divided into five domains including Attention (attention), Perception (perception), Language (language), Visuospatial (room

recognition), Executive function (executive function: planning, organizing and implementing functions) (Siska, 2019). The MCCT (Motor Cognitive Coordination Training) application focuses on attention or concentration in the form of focusing attention over a long period of time.

Based on observations about the use of the MCCT application compared to the direct instruction method, students' enthusiasm for the direct instruction method was greater than the use of the MCCT application because the learning process took place face-to-face, not with online applications. Likewise for motion control items, in the direct instruction method the teacher can immediately correct students' movements that are not good, but the use of online MCCT applications makes it difficult for teachers to correct students plus the limited knowledge of parents in controlling their children is also a major factor in the lack of motion control provided. on students. However, on the item giving instructions, the MCCT application program got better results because all instructions, videos and what steps students had to do were programmed in the application and students could easily access the assignment sheet, while in the direct method of giving instructions from each teacher will certainly be different according to the understanding of each teacher. However, in the interaction item, it is clear that the direct instruction method is superior because students perform movement tasks in groups, while in the use of the MCCT application students perform movement tasks independently under supervision by parents. Thus it can be seen that the use of the direct instruction method is considered more appropriate in the student movement learning process.

CONCLUSION

The results showed a fairly good level of effectiveness for the use of the MCCT application in the online student movement coordination learning process. Although in the field implementation the direct instruction method is still superior in several aspects of learning. However, the android application-based MCCT program is very helpful for students in performing movement tasks that are carried out online. So that the learning process of movement coordination with the aim of improving students' cognitive abilities can still be done.

REFERENCES

- Abduljabar (2011). *Pedagogi Olahraga*. Bandung: FPOK UPI

- Borg, W. R. and M. D. Gall (1989). *Educational Research: An Introduction*. Fifth Edition. New York and London: Longman
- Chang, Y. K., Labban, J. D., Gapin, J. I., & Etnier, J. L. (2012). The effects of acute exercise on cognitive performance : A meta-analysis. *Brain Research*, 1453(250), 87–101. <https://doi.org/10.1016/j.brainres.2012.02.068>
- Fernandes, V. R., Ribeiro, M. L. S., & Melo, T. (2016). Motor Coordination Correlates with Academic Achievement and Cognitive Function in Children, 7(March), 1–8. <https://doi.org/10.3389/fpsyg.2016.00318>
- Ibda, F. (2015). Perkembangan Kognitif : Teori Jean Piaget, 3, 27–38.
- Insyasiska, D., Zubaidah, S., & Susilo, H. (2017). Pengaruh Project Based Learning Terhadap Motivasi Belajar, Kreativitas, Kemampuan Berpikir Kritis, Dan Kemampuan Kognitif Siswa Pada Pembelajaran Biologi. *Jurnal Pendidikan Biologi*, 7(1), 9-21. doi:<http://dx.doi.org/10.17977/um052v7i1p9-21>
- Jawati, R. (2013). Peningkatan Kemampuan Kognitif Anak Melalui Permainan Ludo Geometri Di Paud Habibul Ummi Ii, Vol. I, No, 5–6. <https://doi.org/10.24036/spektrumpls.v1i1.1537>
- Lutz, H. (2017a). *Life Kinetik*. Auckland, Beirut, Dubai, Hãgendorf, Hongkong, Indianapolis, Kairo, Kapstadt, Manila, Maidenhead, Neu-Delhi, Singapur, Sydney, Teheran, Wien Member: Meyer & Meyer.
- Niederer, I., Kriemler, S., Gut, J., Hartmann, T., Schindler, C., Barral, J., & Puder, J. J. (2011). Relationship of aerobic fitness and motor skills with memory and attention in preschoolers (Ballabeina): a cross-sectional and longitudinal study. *BMC pediatrics*, 11, 34. <https://doi.org/10.1186/1471-2431-11-34>
- Pietsch, S., Böttcher, C., & Jansen, P. (2017). Training Improves Mental Rotation Performance in Primary School-Aged Children, 1–5.
- Ratey, J. J., & Loehr, J. E. (2011). The positive impact of physical activity on cognition during adulthood: a review of underlying mechanisms, evidence and recommendations. *Reviews in the neurosciences*, 22(2), 171–185. <https://doi.org/10.1515/RNS.2011.017>
- Siska, Y., & Harjanto, A. (2020). Executive Function; Peningkatan Minat Belajar Siswa Berbasis Multiple Intelegence. *Pedagogia: Jurnal Ilmiah Pendidikan Dasar Indonesia*, 1(1), 115-128. <https://doi.org/10.52217/pedagogia.v1i1.397>