International Journal of Human Movement and Sports Sciences 10(5): 906-912, 2022 http://www.hrpub.org
DOI: 10.13189/saj.2022.100506

# The Effect of Physical Activity-Based Physical Education Learning Model in the Form of Games

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*Received July 14, 2022; Revised August 24, 2022; Accepted September 19, 2022*

***Cite This Paper in the Following Citation Styles***

***(a):*** *[1] Gusril, Willadi Rasyid, Anton Komaini, Ahmad Chaeroni, Ummi Kalsum , "The Effect of Physical Activity-Based Physical Education Learning Model in the Form of Games," International Journal of Human Movement and Sports Sciences, Vol. 10, No. 5, pp. 906 - 912, 2022. DOI: 10.13189/saj.2022.100506.*

***(b):*** *Gusril, Willadi Rasyid, Anton Komaini, Ahmad Chaeroni, Ummi Kalsum (2022). The Effect of Physical Activity-Based Physical Education Learning Model in the Form of Games. International Journal of Human Movement and Sports Sciences, 10(5), 906 - 912. DOI: 10.13189/saj.2022.100506.*



**Abstract** This study aims to determine the effect of the physical education learning model based on physical activity in the form of games for the Anak Dalam Sakai Tribe in the interior of Riau Province, Indonesia. This research begins with developing a product using the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model. The research sample is 30 people. The data collection instruments were observation, documentation, questionnaires and tests for physical education (PE), sports and health (PJOK). Data were analyzed by qualitative and quantitative analysis. The results of the study can be concluded as follows: (1) The playing activities of the Orang Rimba in Sakai Riau Province are in the sufficient category; (2) The design of the PJOK learning model for the Suku Anak Dalam Sakai, Riau Province consists of a traditional game of dust ball, putting nails in a bottle, throwing and catching small balls, dragon snakes, rubber jumps, long jumps without a prefix and throwing the ball with a zig zag run; (3) The Suku Anak Dalam Sakai PJOK learning model based on valid and practical play activities; (4) The Suku Anak PJOK learning model in Sakai Riau Province based on valid, practical and effective play activities.

**Keywords** Physical Education, Sports and Health, Physical Activities

## 1. Introduction

Learning Physical Health Sport Education (PJOK) for *Suku Anak Dalam Sakai* (SAD), Riau Province, includes: PJOK learning is still traditional, learning is still monotonous, and teacher creativity in packaging PJOK material and in its implementation is still not systematic, PJOK facilities and infrastructure are still limited. *Suku Anak Dalam Sakai are* animist peoples who live throughout the lowland forests of Sakai, Riau Province. Sakai is one of the tribes who inhabit the interior of Riau on the island of Sumatra. The ancestors of the Sakai tribe are believed to have come from Pagaruyung, a Malay kingdom that once existed in West Sumatra. In the past, the Sakai Tribe had a pattern of life that was still nomadic, moving from one area to another. The results of the study stated that playing activities (PA) and SAD motor skills were in the low category. The limitation: the use of ball is of course only limited to the experience of *Suku Anak Dalam Sakai*, Riau Province and the teachers lack of knowledge, skills and attitudes to teach PJOK. The solution offered in the research is to develop a learning model of PJOK based on the PA of the *SAD* in Sakai Riau Province in detail and create PJOK material based on the play activity of *Suku Anak Dalam Sakai*, Riau Province in developing motor skills and physical fitness of *SAD*. Thus, the PJOK learning model for the *Suku Anak Dalam Sakai*, Riau Province, is obtained based on valid, practical and effective play activities.

A learning model is a conceptual framework that describes a systematic approach to organizing a learning experience to achieve a particular learning goal and serves as a guide for learning designers in planning and implementing learning activities suggests that a learning model is a plan or pattern that can be used as a guide in carrying out learning, designing materials, and guiding teacher actions in learning settings in the classroom or other settings [1]. It is stated that Models-based approaches to physical education offer potential solutions to physical education problems posing educational philosophies [2]. It was carried out first of all, the notion that physical education as a practice area has the potential to contribute to a variety of beneficial outcomes in education for students, across multiple domains, a potential that can be confirmed empirically.

PJOK is an educational process through physical activity and at the same time an educational process to improve physical abilities [3]. Physical and health education is essentially an educational process that utilizes physical activity and health to produce holistic changes in individual qualities, both physically, mentally, and emotionally [4]. Physical education aims to develop aspects of health, physical fitness, skills, critical thinking, emotional quality, social skills, reasoning and moral action through physical sports activities [5-6]. The human ability to do activities is related to the physical ability to respond to the activity itself [7]. Education through physical activity means physical activity is a means to achieve educational goals [8]. Clinical Assessment of Depression (CAD) has a positive effect on physical and mental health [9-10]. Physical education is a conscious effort to create an environment that is able to influence the good of students to develop towards positive behavior through physical activity [24-27].

Playing activities are fun for kids. To support children's development both physically and psychologically, children need to play to express their freedom without being wrong and constrained by regulations [12-13]. Playing activity is an activity carried out by children actively/passively, in the form of individuals/groups, using tools/without tools, and carried out outdoors/indoors involving imagination, appearance, all feelings, hands or the whole body and can provide pleasure and physical fitness [11]. Play activities are: As a play activity where children have the opportunity to do various choices of games with or without tools, and they can choose how to use these tools [14-17]. For children, playing activity is a serious but fun activity; through playing activities, various jobs are realized [36]. The need for play for children is as big as for food, warmth and love; in essence playing activity is one way to stimulate children. Playing is an activity chosen by children, because it is fun not because it will get prizes or praise [18-22]. Playing in the learning process can provide various motion experiences for children, where the experience of motion plays a very important role in the process of growth and development of children. PA as a means of socialization where it is hoped that through playing can provide an agreement for children to explore, discover, express feelings, be creative, and learn in a fun way [23]. In general, children's interest in playing activities tends to always increase, but the increase varies from one child to another. This is due to the tendency of traits possessed, among others: (a) The ability to focus on an activity that is being carried out is increasing [28]. (b) Enthusiasm for seeking new experiences is quite high [29]. (c) Better social development [30]. (d) The differences in the behavior of boys and girls are getting clearer [31]. (e) Increasingly to master a certain form of activity with a high competitive spirit [32].

## 2. Research Methodology

Research and Development used the ADDIE model. ADDIE (Analysis, Design, Development, Implementation, Evaluation) refers to the main processes of the learning system development process [33]. The development model chosen in this research is to use the development models. The stages that will be passed in this model are analysis, design, development, implementation, evaluation. After completing the designed model, then experiments are carried out according to needs [34].

The sample was 30 people of *Suku Anak Dalam* Sakai, Riau Province. The sample was taken by using purposive sampling technique for reasons according to the research objectives. In collecting the data used observations, interviews, questionnaires and tests of motor skills, then did not ignore the possibility of using non-human resources of information, such as available records and questionnaires.

There are the explanations of every stage in ADDE Models. At the analysis stage, an analysis of the problems in PJOK learning is carried out. At the development stage, develop the design that has been made. Furthermore, they were asked for opinions, considerations, corrections, from the experts until the suitability and accuracy of the model was found. At the implementation stage, apply the material model to PJOK learning. Next, the evaluation stage is evaluating the implementation of the model. The evaluation was carried out to see the quality of the developed model which was carried out in the form of a Focus Group Discussion (FGD). This FGD forum was attended by lecturers, students, and education experts from experts in the fields of sports, health and recreation. Hence, they got the PJOK learning model based on the play activities of the *SAD Sakai* in Riau Province. This model is described as figure 1.

Based on Figure 1, it can be explained that the product development model that was compiled started from an analysis of the desired situation and needs, and then continued with product design, product development and implementation into the world of education. All these designs are prepared based on guidelines that have

guaranteed quality and standards so that the validity of the data achieved can be ensured.

## 3. Findings

Based on the review of some of the literature that has been stated above, the findings in this paper are as table 1.

Data on the results of learning motivation from 30 people from the Suku Anak Dalam Sakai, Riau Province, obtained the interval class 94-100 as many as 3 people (10%), the interval class 101-107 as many as 4 people (13%), the interval class 108-114 as many as 9 people (30%), the interval class 115-121 as many as 11 people (37%), the interval class 122-128 as many as 2 people (7%) and the interval class 129-135 as many as 1 person (3%) (Table 1). For more details, Figure 2 shows a histogram of the game activity data.

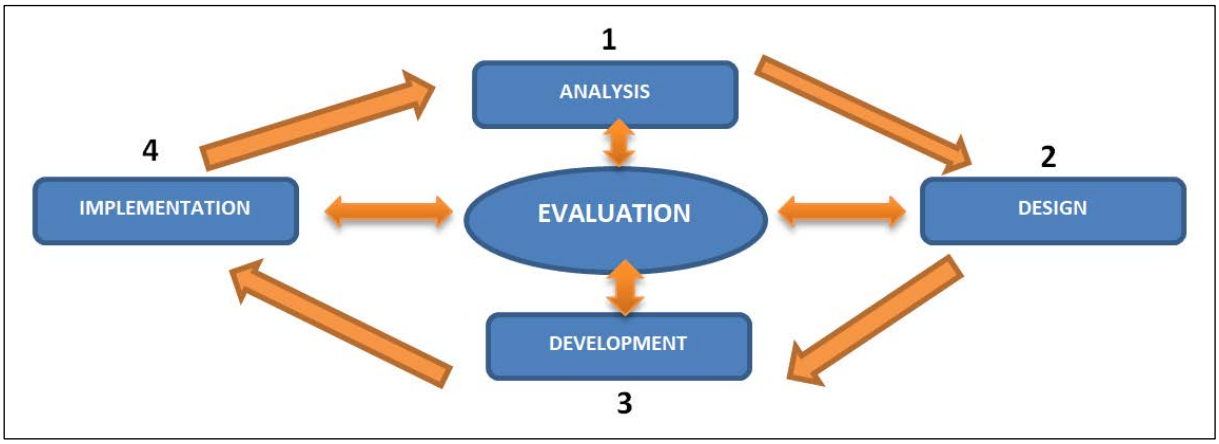


**Figure 1.** The PJOK Learning Model Based on the Play Activities of the SAD Sakai, Riau Province

**Table 1.** Distribution of the Frequency of Playing Activities of *Suku Anak Dalam Sakai*

| No | Interval Class | F.absolute | F.relative(%) |
|---|---|---|---|
| 1 | 129-135 | 1 | 3% |
| 2 | 122-128 | 2 | 7% |
| 3 | 115-121 | 11 | 37% |
| 4 | 108-114 | 9 | 30% |
| 5 | 101-107 | 4 | 13% |
| 6 | 94-100 | 3 | 10% |
| | Total | 30 | 100 |
| | Average | 113.2 | |

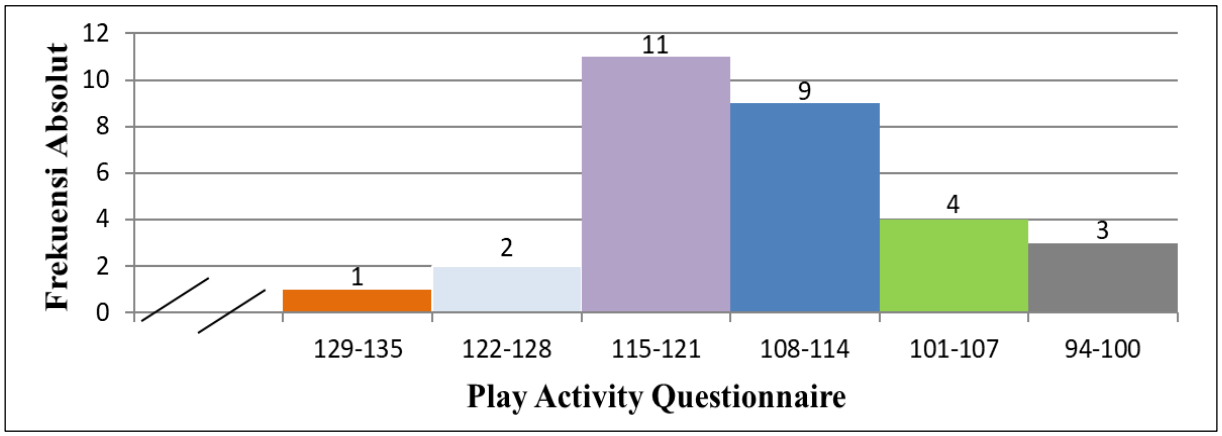


**Figure 2.** Playing Activities Histogram

In Figure 2 above it is clear that the highest interval value of 115-121 was obtained by 11 children, then continued at the interval of 108-114 as many as 9. So it can be seen that in the 129-135 interval the lowest data was obtained by only 1 person, followed by 122. -128 as much as 2.

Based on the results of the description in Table 2, it shows that the results of the expert's assessment of the sports and health physical education model (PJOK) based on playing activities is 4.68 which is in a very valid category.

Based on the results of the data that have been stated in Table 3, it can be seen that the results of the pretest that have a physical ability score with an interval of >19 very good categories are 11 people (37%), 18-18.99 good category are 9 people (30%), interval 17-17.99 Enough category as many as 5 people (17%), interval 16-16.99 Less category as many as 4 people (13%), and interval <15 Very Poor category as many as 1 person (3%).

Based on Figure 3, it can be explained as follows: at the interval level > 19, the Frequency value is 11 (the highest) in the Very Good category, then followed by an interval value of 18-18.99 with Frequency 9. While the lowest interval <15 is Frequency 1 in the Very Less category and followed by an interval value of 16-16.99 with Frequency 4 in the Not Enough category.

The following are the results of the recapitulation of the assessment before and after using the physical education, sports and health (PJOK) learning model for the effectiveness test.

## Results of Physical Ability Learning Physical Education, Sports and Health (PJOK) Effectiveness Test

Based on Table 4, it shows that the average physical ability score of sports and health physical education of 30 people before using the sports and health physical education learning model (PJOK) based on playing activities is 74.60% while after using the sports and physical education learning model. In health based on playing activities, there is an increase in the average score to 85.71% with a good rating.

**Table 2.** Results of Validation of Sports and Health PE Model (PJOK) Based on Playing Activities

| No | Expert | Score | Validation Score | Category |
|---|---|---|---|---|
| 1 | Validator 1 | 68 | 4.53 | Valid |
| 2 | Validator 2 | 29 | 4.83 | Very Valid |
| | Total | 97 | | Very Valid |
| | Average | | 4.68 | Very Valid |

**Table 3.** Frequency Distribution of Ability (PJOK) After Using the Physical Education Learning Model of Sports and Health (PJOK) Based on Playing Activities

| No | Interval | Frequency | Percentage | Catagory |
|---|---|---|---|---|
| 1 | > 19 | 11 | 37 | Very Good |
| 2 | 18-18.99 | 9 | 30 | Good |
| 3 | 17-17.99 | 5 | 17 | Enough |
| 4 | 16-16.99 | 4 | 13 | Not Enough |
| 5 | <15 | 1 | 3 | Very Less |
| | | 30 | 100 | |

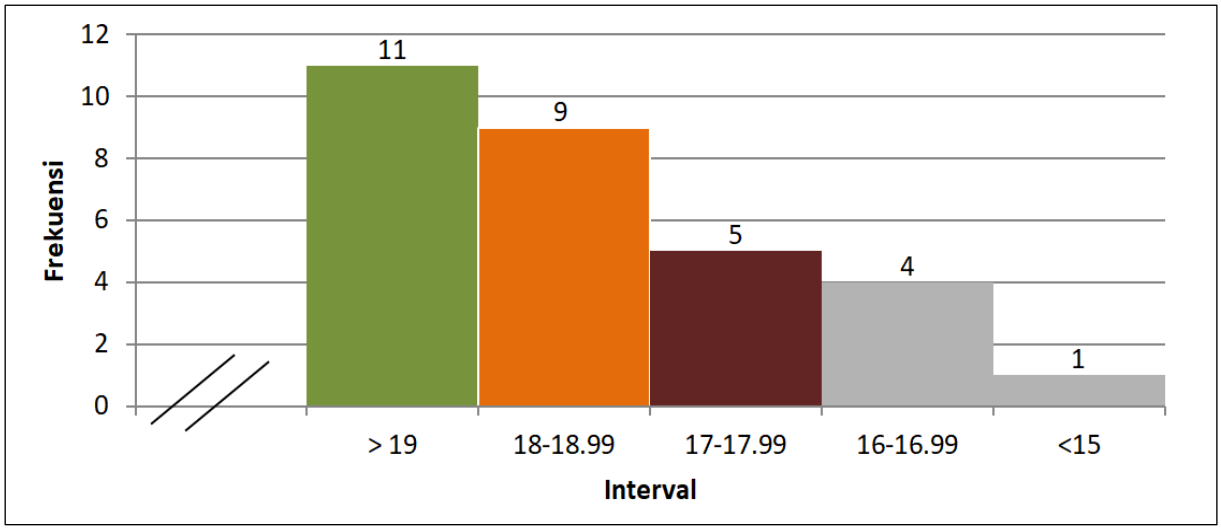


**Figure 3.** Histogram Post-test Physical Ability Learning Physical Education Sports and Health (PJOK)

**Table 4.** Physical Ability Physical Education, Sports and Health (PJOK) Effectiveness Test

| No | Observer | Total students | Total value (PJOK) | Average Score | Category |
|---|---|---|---|---|---|
| 1 | Before | 30 | 2214 | 73.80 | Effective enough |
| 2 | After | 30 | 2571 | 85.70 | Very effective |

## 4. Discussion

Based on the results of the study it can be concluded that: The playing activities of the *Suku Anak Dalam Sakai*, Riau Province are in the sufficient category. Every child develops at their own pace and may engage in these types of play earlier or later. And while these stages are progressive, they often occur simultaneously. A child may not leave one type of play behind when they move on to the next one. Cooperative play uses all of the social skills your child has been working on and puts them into action [35]. During constructive play, kids use cognitive skills to figure out how to make something work, whether it is a block tower that won't stand up or a sandcastle that keeps collapsing. This type of play also teaches the power of trying again.

The design of the PJOK learning model for the Suku Anak Dalam Sakai, Riau Province consists of traditional games of dust ball, inserting nails into bottles, throwing and catching small balls, dragon snakes, rubber jumps, long jumps without a prefix and throwing the ball by running zig zag. Through the process of physical activity in the form of games, children can learn aggressive behavior by observing them. If these aggressive behaviors are reinforced, children may imitate them and carry out the aggressive behavior themselves [36].

The learning model of PJOK *Suku Anak Dalam Sakai* based on play activities is valid and practical. Learning model PJOK *Suku Anak Dalam Sakai* Riau Province based on activity play is valid, practical and effective in improving PJOK learning outcomes. On the other hand, researched on the development of the gross motoric model of kindergarten based on play activities on the character of kindergarten students, which is also valid, practical and effective in improving gross motor skills and character development of kindergarten students [37]-[39].

The research was to develop a learning model of PJOK based on the play activity of the *Suku Anak Dalam* in Sakai Riau Province in detail and made PJOK material based on the play activity of the *Suku Anak Dalam Sakai*, Riau Province in developing motor skills and physical fitness of SAD. The advantages of the solutions offered can explore the potential of the *Suku Anak Dalam Sakai* Riau Province.

## 5. Conclusions

Research and development on the learning model of physical education in sports and health (PJOK) based on play activities have been carried out so as to produce several conclusions.

1. Playing Activities of *Suku Anak Dalam Sakai* Provinsi Riau are in enough category.
2. Design of a physical education learning model for sports and health (PJOK) based on playing activities for the *Suku Anak Dalam Sakai*, Riau Province, the name of the game, the purpose of the game, the place of implementation, preparation of tools and how to play.

3. The learning development model of PJOK *Suku Anak Dalam Sakai* based on activities playing Baseball, Putting Nails in Bottles, Throwing Catch Small Balls, Dragon Snakes, Rubber Jumping, Long Jumping Without Prefix, Throwing Balls With Zig Zag Movement,
4. The *Suku Anak Dalam Sakai* learning model based on the play activities of the *tribal child* Sakai, Riau Province, is valid and practical.
5. The learning model for physical education, sports and health (PJOK) based *Suku Anak Dalam* play activities in Riau Province is effective.

# REFERENCES


[1] Al-Azawi, R., Al-Fatma, F., and Al-Blushi, M. (2016). Educational gamification vs. game based learning: Comparative study. Int. J. Innovat. Manag. Technol. 7, 132–136. doi: 10.18178/ijimt.2016.7.4.659.

[2] Anggita, G. M., & Rachman, H. A. Pengaruh Aktivitas Bermain Dan Perseptual Motorik Terhadap Keterampilan Motorik Siswa Sekolah Dasar Kelas Bawah. *Jurnal Keolahragaan*, vol. *2*, no. 2, pp.170-181, 2014. DOI: https://doi.org/10.21831/jk.v2i2.2612.

[3] Baena-Morales, S., Ferriz-Valero, A., García-Taibo, O. (2022). Influence of cooperative strategies and mindfulness on the perception and control of emotions in primary physical education. A proposal to improve sustainability in the social dimension. Journal of Physical Education and Sport, Vol. 22 (issue 7), Art 200, pp. 1590 – 1598. DOI:10.7752/jpes.2022.07200.

[4] Barlian, E. *Aktivitas Motorik Suku Anak Dalam Desa Muaro Kellis, Kecamatan Tengah Ilir, Kabupaten Tebo Provinsi Jambi.* Jurnal Prosiding Seminar Nasional Pascasarjana (UNP), pp.34-42. 2017.

[5] Timothy, L., Gregory J. S., Wayne, U. (2016). *"Physical education", "health and physical education", "physical literacy" and "health literacy": Global nomenclature confusion. Cogent Education, 3(1), 1217820–.* doi:10.1080/2331186X.2016.1217820.

[6] Małgorzata, B., Agata, K., Jana, K., Michał, B. (2019). *How Years of Sport Training Influence the Level of Moral Competences of Physical Education and Sport Students. BioMed Research International, 2019(), 1–10.* doi:10.1155/2019/4313451.

[7] Fairclough, S. (2004). *'Physical education makes you fit and healthy'. Physical education's contribution to young people's physical activity levels. Health Education Research, 20(1), 14–23.* doi:10.1093/her/cyg101.

[8] Janey, C.P., Mary, E.C., Martin, T.W., Margaret, A. (2014). *Depression, Coronary Artery Disease, and Physical Activity: How Much Exercise Is Enough?. Clinical Therapeutics, 36(11), 1518–1530.* doi:10.1016/j.clinthera. 2014.10.003.

[9] Lemos, A G., Alvigo., Eric, L.,& Barela, J. A. (2012). *Physical Educationin Kindegarten Promotes Fundamental Motor Skill Development.* Advance in Physical Education. vol.2, no. 1, 2012, pp. 17-21. DOI:10.4236/APE.2012.21003.

[10] Komaini, A. Fundamental motor skills of kindergarten students (a survey study of the influence of financial condition, playing activity, and nutritional status). In IOP Conference Series: Materials Science and Engineering (Vol. 180, No. 1, p. 012156). IOP Publishing. 2017. https://iopscience.iop.org/article/10.1088/1757-899X/180/1/012156/pdf.

[11] Chaeroni, A., Kusmaedi, N., Ma'mun, S., Budiana, D., Haris. F. The Influence of the Learning Environment on Students' Physical and Mental Health Based on Gender, International Journal of Human Movement and Sports Sciences, Vol. 9, No. 4, pp. 622 - 628, 2021. DOI: 10.13189/saj.2021.090403.

[12] Chaeroni, A., Komaini, A., Pranoto, NW., Antoni, D. "The Effect of Physical Activity Programs and School Environments on Movement Activities and Mental Health," International Journal of Human Movement and Sports Sciences, Vol. 10, No. 2, pp. 131 - 137, 2022. DOI: 10.13189/saj.2022.100201.

[13] Ariswan, Rusdinal, Yusuf, M., Gusril. Effect of school head integrity and communication climate on productivity through teacher work discipline in state vocational Padang City. IOP Conference Series: Earth and Environmental Science this link is disabled, 314(1), 012038, 2019.

[14] International Journal of Psychological Rehabilitattion, Vol.24. no. 05, pp. 741-747, 2020. DOI: 10.37200/IJPR/V24I5/PR201742.

[15] Brockman, R., Fox, K.R. & Jago, R. (2011). What is the meaning and nature of active play for today's children in the UK?. *Int J Behav Nutr Phys Act* 8, 15.https://doi.org/10.1186/1479-5868-8-15.

[16] Gustafson, K,L., & Branch, R. *Survey of Instructional Development Models*, 4th ed. Syracuse, New York: ERIC Clearinghouse on Information and Technology, Syracuse University. 2002.

[17] Gustiawati, R., Fahrudin, F., & Stafei, M. M. Implementasi model-model pembelajaran penjas dalam meningkatkan kemampuan guru memilih dan mengembangkan strategi pembelajaran penjasorkes. 2014.

[18] Husdarta. *Manajemen Pendidikan Jasmani*. Bandung: Alfabeta. 2011.

[19] Jewett. *The Curriculum Process In Physical Education,* Second Edition, Brown & Bencmark Publisher. 2014.

[20] Kementrian Negara Pemuda Dan Olahraga Republik Indonesia. *Undang-Undang Republik Indonesia*. Jakarta. 2005.

[21] Kirk, D. Educational value and models-based practice in physical education. *Educational Philosophy and Theory*, vol.*45, no.* 9, 2013, pp. 973-986. https://doi.org/10.1080/00131857.2013.785352.

[22] Janey, C.P., Mary, E.C., Martin, T.W., Margaret, A. (2014). *Depression, Coronary Artery Disease, and Physical Activity: How Much Exercise Is Enough?. Clinical Therapeutics, 36(11), 1518–1530.* doi:10.1016/j.clinthera.

2014.10.003.

[23] Lemos., Anderson G., Alvigo., Eric, L.,& Barela, J. A. *Physical Educationin Kindegarten Promotes Fundamental Motor Skill Development.* Advance in Physical Education. vol.2, no. 1, 2012, pp. 17-21. DOI:10.4236/APE.2012.21003.

[24] Marheni, E., Afrizal, S., & Purnomo, E. Application of Character Building with Physical Education (CBPE). *Suluah Bendang: Jurnal Ilmiah Pengabdian Kepada Masyarakat*, vol. *20, no.*1, 2019, pp.46-53.

[25] Lemos, A G., Alvigo., Eric, L.,& Barela, J. A. (2012). *Physical Educationin Kindegarten Promotes Fundamental Motor Skill Development.* Advance in Physical Education. vol.2, no. 1, 2012, pp. 17-21. DOI:10.4236/APE.2012.21003.

[26] Mulyardi. *Pengembangan Model Pembelajaran Anak Matematika Menggunakan Komik di Kelas 1 SD*. Disertasi. Program Pascasarjana. Univeristas Negeri Surabaya. 2006.

[27] Sierra-Díaz MJ, González-Víllora S, Pastor-Vicedo JC and López-Sánchez GF. Can We Motivate Students to Practice Physical Activities and Sports Through Models-Based Practice? A Systematic Review and Meta-Analysis of Psychosocial Factors Related to Physical Education. Front. Psychol. 2019. 10:2115. doi: 10.3389/fpsyg.2019.02115.

[28] Harvey, S.P., Lambourne, K., Greene, J.L. et al. The Effects of Physical Activity on Learning Behaviors in Elementary School Children: a Randomized Controlled Trial. Contemp School Psychol 22, 303–312 (2018). https://doi.org/10.1007/s40688-017-0143-0.

[29] Alhola, P., & Polo-Kantola, P. (2007). Sleep deprivation: Impact on cognitive performance. Neuropsychiatric disease and treatment, 3(5), 553–567.

[30] Vallerand, R.J. The role of passion in sustainable psychological well-being. Psych Well-Being 2, 1 (2012). https://doi.org/10.1186/2211-1522-2-1.

[31] Konrad-Ristau, K., Burghardt, L. Differences in Children's Social Development: How Migration Background Impacts the Effect of Early Institutional Childcare Upon Children's Prosocial Behavior and Peer Problems. Front. Psychol. 12:614844, 2021. doi: 10.3389/fpsyg.2021.614844.

[32] Weisberg, YJ., DeYoung, CG., Hirsh, JB. Gender Differences in Personality across the Ten Aspects of the Big Five. Front. Psychology 2:178, 2011. doi: 10.3389/fpsyg.2011.00178.

[33] DiMenichi, B. C., & Tricomi, E. The power of competition: Effects of social motivation on attention, sustained physical effort, and learning. *Frontiers in psychology*, *6*, 1282. 2015. Doi: https://doi.org/10.3389/fpsyg.2015.01282.

[34] Widyastuti, E., Susiana. Using the ADDIE model to develop learning material for actuarial mathematics**.** J. Phys.: Conf. Ser. 1188 012052, 2019.

[35] Najuah, N., Sidiq, R & Lukitoyo, PS. The Development Electronic Module of History using ADDIE Model. *International Journal of Educational Research &Amp; Social Sciences*, *2*(6), 1658–1663. 2021., https://doi.org/10.51601/ijersc.v2i6.168.

[36] Mendo-Lázaro, S., León-del-Barco, B., Felipe-Castaño, E., Polo-del-Río, M-I and Iglesias-Gallego, D. Cooperative Team Learning and the Development of Social Skills in Higher Education: The Variables Involved. Front. Psychol. 2018., 9:1536. doi: 10.3389/fpsyg.2018.01536.

[37] Shaw, D. S., Hyde, L. W., & Brennan, L. M. Early predictors of boys' antisocial trajectories. Development and psychopathology, 24(3), 871–888. 2012., https://doi.org/10.1017/S0954579412000429.

[38] Rifki, M. S., Farma, F., Komaini, A. ., Sepdanius, E. ., Alimuddin, & Ayubi, N. Development of Sit Up Measuring Tools Based on Arduino and Ultrasonic Sensors With Android Applications. *International Journal of Interactive Mobile Technologies (iJIM)*, *16*(08), 182–189. 2022., doi: https://doi.org/10.3991/ijim.v16i08.30673.

[39] Palmer, KK., Nunu, MA., Scott-Andrews, KQ., Robinson, LE. Perceived Physical Competence Predicts Gains in Children's Locomotor but Not Ball Skills across an Intervention. Int J Environ Res Public Health.18(11):5990. 2021 Jun 3., doi: 10.3390/ijerph18115990.