

## ICT-Project-Based Learning on Cognitive and Psychomotor in Football Courses Learning Achievement

Ardo Okilanda<sup>1</sup> Yendrizal<sup>2</sup>  
<sup>1,2</sup>State Universitas N Padang  
ardo.oku@fik.unp.ac.id

### Abstract

The digital tools gave such alternative to make learning easier. Students got the opportunity to explore their knowledge while found by learning experience such tutoring and discussing. This study employed a quasi-experimental design with a non-equivalent post-test-only control group design. The results found  $t_{cal} = 2.90$  and for  $t_{table} 5\% = 2.00$  and  $1\% = 2.66$ . It means  $t_{(ratio)} > t_{table}$ . It concluded that there is a positive effect of using ICT-Project-Based Learning on cognitive and psychomotor in football courses learning achievement. Learning football using ICT-Project-Based Learning on cognitive and psychomotor in football courses through Zoom was interactive because students' easier to ask directly to lecturers so that increases their learning achievements'. PBL integrated with ICT was successful to improve students' skills and achievement. PBL had a positive impact on student learning and procedures in learning.

**Keywords:** PBL, ICT, Football, Cognitive, Psychomotor

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Correspondence author: Ardo Okilanda, State University of Padang, Indonesia. E-Mail: ardo.oku@fik.unp.ac.id

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## INTRODUCTION

ICT on learning process is the best ways after Covid-19 comes to the world (Pandey et al., 2022). The digital tools gave such alternative to make learning easier (Guo & Wan, 2022; Ironsi, 2022; Raja & Lakshmi Priya, 2022). The technology development gave more space exploration in education (Broo et al., 2022; Leaver et al., 2022; Marks & Thomas, 2022). The education technology has five disciplines those are Videlicet design, development, application operation, management and assessment. Those disciplines aim to improve the education quality. The education quality can be seen from learning achievement (Kemethofer et al., 2022). The learning achievement is the result of literacy learning formal and informal (Liu & Chung, 2022; Ludewig et al., 2022; Putri et al., 2022). Students got the opportunity to explore their knowledge while found by learning experience such tutoring and discussing (Foulkes & Naylor, 2022; Johns

& Burks, 2022; MAHLANGU, 2022). The students on this study were observe as preliminary observation of the starting based conduct the study. The preliminary observation was from football courses consist of three classes named by A, B, C class. The observation was interviewed to the students and got the result that football courses was difficult to learn on online class. The relative factors such students background come from several types and they are new comer in university, so it was difficult got capable learning achievement. Others, the lecturer's strategy did not optimal in delivering literacy. The knowledge understanding not only bound with literacy comprehension but also the links of those understanding to meaningful knowledge (Jacobson et al., 2022; Kim & Burkhauser, 2022; Lin & Bates, 2022).

Based on those problems, it needs strategy to improve students' achievement in football courses when should leaning from home. One of interactive strategy is Project Based Learning (PBL) through ICT. This PBL strategy suitable for students who learn from home because students invited to unite, independent, explore their body and knowledge and assessment according to their condition (Soubra et al., 2022; Utari & Afendi, 2022). The PBL strategy has suitable stages for colleges students because of the PBL steps begin with found the problems, discussing the suitable design to complete the problem solving, colleting and analyzing the data, collecting reports and communicate to others students to find the project activities result (Dermentzi et al., 2022; Doğan & Tüzün, 2022; Saleh et al., 2022; Wirantaka & Sukarno, 2022). The theoretical principles of PBL in science revolve around learners making sense of -real-world phenomennal and solving relevant questions by planning and carrying out their own investigations (Penuel et al., 2022; Schneider et al., 2022; Srinivasa et al., 2022). Collaborating with classmates, students engage in experiences in which they create artifacts that support the development of scientific ideas and use of scientific practices. PBL uses the three dimensions of scientific knowledge that allow students to draw from their knowledge across disciplines and life

experiences, rather than being the passive recipients of knowledge. Mielikäinen (2022) was found that PBL integrated with ICT was successful to improve students' skill and achievement. PBL was positive impact on the students learning and procedures in America (Fassbender et al., 2022; Rosenkranz, 2022; Sanchez et al., 2019). According to above explanation, it formulated that PBL through ICT Zoom Meeting class will improve students' achievements in football courses. Other, students' knowledge process linking will improve.

## METHOD

This study employed a quasi-experimental design with a non-equivalent post-test-only control group design. The goal of a quasi-experimental design is to establish a causal link between an independent and dependent variable (Maggin, 2022; Oripova, 2022; Wen & Liu, 2022). A quasi-experiment, on the other hand, does not rely on random assignment (He, 2022; Yin et al., 2022). Subjects are instead assigned to groups based on non-random criteria (Mitchell et al., 2022; Schroeder & Kucera, 2022). In circumstances when genuine trials cannot be performed for ethical or practical reasons, quasi-experimental design might be effective (Dehn et al., 2022; Hwang et al., 2022; Q. Zhang et al., 2022). Experiments were conducted to determine the influence of PBL delivered via ICT Zoom Meeting on cognitive and psychomotor learning accomplishment in a football course. The research lasted four months, beginning with preparation and exchange of impressions with the lecturer, followed by experiments and reporting on research findings with the lecturer. The population of this study was sport students of football course consist of three classes. Each class consisted of 25 students. The samples of this study were 36 students. The data collection was learning achievement test score and psychomotor scores obtained from observation. Instruments organization was adopted from Mielikäinen (2022) described on the table 1 above.

Table 1. Instruments organization based

Variable	Subcategory	Codes
Social climate	Social communication	Decision making, interaction, communication tools
	Reviews	Milestones, technical reviews, scheduling
Learning	Learning Strategies	Learning by doing
	Metacognitive strategies	Self-regulated learning, face-to-face, remote learning
	Specialization	Division of tasks, elective studies, solution options, individual learning paths, lifelong learning
Systemic	Curriculum	Progress of studies, pedagogical models
	Competency profile	Football competencies
Professional development	Professional skills of instructors	Teamwork skills, attitudes, professional skills
Setting	Real-life context	Industry practices
Required sources and support	Instruction and supervision	Technical support, tutorials, need for guidance
	Learning environment	Devices and classrooms
	Initial orientation	Learning through examples, provided material
Nature of learners	Interpersonal	Online learning, collaborative learning, sharing knowledge, collegial support

Instrument and observation sheet was validated by two experts. Then, the reliability carried out after validity. The psychomotor learning was collected with skill observation sheet and showing the football skill through Zoom Meeting. The assessment on student's project observation sheet is based on two students' ability named by dribbling and passing. Hypothesis testing was determining with normality testing dan homogeneity.

## RESULT AND DISCUSSION

The PBL through ICT Zoom Meeting class applied on the sample class who consist of football course class. The lecturer made a class through Zoom meeting and give the theory before apply the PBL steps in the class. The lecturer determined the cognitive and psychomotor learning achievement after

implemented those two learning models. Homogeneity test is done before testing the hypothesis to determine whether the data is homogeneous or not. This is done so that there are no mistakes in drawing conclusions as a result of using an incorrect formula. For the results of this test, the largest score = 90 and the smallest score = 50, so the result is 40. Meanwhile, the number of class intervals (K) =  $1 + 3.3 \log n = 6$ . In addition, the length of the class interval (P) =  $R/K = 40/6 = 7$ . A list of the frequency distribution of experimental class exams will be presented in table 2.

Table 2 . Experimental class frequency distribution lits

Score	$f_1$	$x_1$	$x_1^2$	$f_1 \cdot x_1$	$f_1 \cdot x_1^2$
50 – 56	5	53	2809	265	14045
57 – 63	5	60	3600	300	18000
64 – 70	7	67	4489	469	31423
71 – 77	5	74	5476	370	27380
78 – 84	6	81	6561	486	39366
85 - 91	7	88	7744	616	54208
Total	35			2506	184422

From the table above, the results are obtained

$$\Sigma f_1 x_1^2 = 184422$$

$$\Sigma f_1 x_1 = 2506$$

$$N = 35$$

So that the average and standard deviation can be found as follows:

$$\begin{aligned}\bar{x}_1 &= \frac{\Sigma f_1 x_1}{\Sigma f_1} \\ \bar{x}_1 &= \frac{2506}{35} \\ \bar{x}_1 &= 71.6\end{aligned}$$

Standard deviation:

$$\begin{aligned}s_{1^2} &= \frac{n (\Sigma f_1 x_1^2) - (\Sigma f_1 x_1)^2}{n(n-1)} \\ s_{1^2} &= \frac{35(184422) - (2506)^2}{35(34)} \\ s_{1^2} &= \frac{6454770 - 6280036}{1190} \\ s_{1^2} &= \frac{174734}{1190} \\ s_{1^2} &= 146.83\end{aligned}$$



$$s_1 = 12.11$$

Table 3. Distribution of expected frequency and observed frequency in experimental class

X	Z	Zi	Li	Ei	Oi
49.5	- 1.82	0.4656			
56.5	- 1.24	0.3923	0.0733	2.56	5
63.5	- 0.66	0.2454	0.1469	5.14	5
70.5	- 0.09	0.0359	0.2095	7.73	7
77.5	0.48	0.1844	0.2203	7.71	5
84.5	1.06	0.3554	0.171	5.98	6
91.5	1.64	0.4495	0.0941	3.29	7

$$\begin{aligned}
 \chi^2_{ratio} &= \sum_{i=1}^k \frac{(O_i - E_i)^2}{E_i} \\
 \chi^2_{ratio} &= \frac{(5-2.56)^2}{2.56} + \frac{(5-5.14)^2}{5.14} + \frac{(7-7.73)^2}{7.73} + \frac{(5-7.71)^2}{7.71} + \frac{(6-5.98)^2}{5.98} + \frac{(7-3.29)^2}{3.29} \\
 \chi^2_{ratio} &= 2.32 + 0.003 + 0.06 + 0.95 + 0.00006 + 4.18 \\
 \chi^2_{ratio} &= 7.51
 \end{aligned}$$

**Test criteria:**

Rejected if, Ho  $\chi^2_{ratio} \geq X^2(1 - \alpha)(k - 3)$ ,

Significant level 5% ( $\alpha = 0.05$ ):

$$\begin{aligned}
 \chi^2_{table} &= \chi^2(1 - 0.05)(7 - 3) \\
 &= \chi^2(0.95)(4) \\
 &= 9.49
 \end{aligned}$$

Significant level of 1% ( $\alpha = 0.01$ ), so:

$$\begin{aligned}
 \chi^2_{table} &= \chi^2(1 - 0.01)(7 - 3) \\
 &= \chi^2(0.99)(4) \\
 &= 13.3
 \end{aligned}$$

5% and 1% for  $\chi^2_{ratio} < \chi^2_{table}$ . So, hypothesis accepted.

Table 4. Control class frequency distribution list

Score	$f_2$	$x_2$	$x_2^2$	$f_2x_2$	$f_2x_2^2$
50 – 54	6	52	2704	312	16224
55 – 59	5	57	3249	285	16245
60 – 64	7	62	3844	434	26908
65 – 69	6	67	4489	402	26934
70 – 74	6	72	5184	432	31104
75 – 80	6	77	5929	462	35574
Total	36			2327	152989

Table 5. Expected and observed frequency distribution of the control class

X	Z	Zi	Li	Ei	Oi
49.5	- 1.70	0.4554			
54.5	- 1.15	0.3749	0.0805	2.89	6
59.5	- 0.59	0.2224	0.1525	5.49	5
64.5	- 0.04	0.0160	0.2064	7.43	7
69.5	0.50	0.1951	0.2111	7.59	6
74.5	1.05	0.3531	0.158	5.68	6
80.5	1.85	0.4678	0.1147	4.13	6

The results found  $t_{cal} = 2.90$  and for  $t_{table} 5\% = 2.00$  and  $1\% = 2.66$ . It means  $t_{(ratio)} > t_{table}$ . So, it could be concluded that there is a positive effect of using ICT-Project-Based Learning on cognitive and psychomotor in football courses learning achievement. Learning football using ICT-Project-Based Learning on cognitive and psychomotor in football courses through Zoom was interactive because students' easier to ask directly to lecturers so that increases their learning achievements'. It was in accordance with the findings of Mielikäinen (2022); Fassbender et al., (2022); Rosenkranz (2022); Sanchez et al. (2019) PBL integrated with ICT was successful to improve students' skills and achievement. PBL had a positive impact on student learning and procedures in learning.

## CONCLUSION

Based on the results of the tests that have been given to students and testing the hypotheses above, it made conclusions: by using ICT-Project-Based Learning, especially in on cognitive and psychomotor in football courses learning achievement has a positive effect on helping students improve their football skills and it is shown that the ratio  $> t_{table}$ , namely  $t_{ratio} = 2.73$  and  $t_{table} 5\% = 2.00$  and  $1\% = 2.66$ . Students who are taught using ICT-Project-Based Learning get better grades than students who are taught with e-learning. This has a positive impact on the students whom in ICT-Project-Based Learning through Zoom meetings. PBL uses the three dimensions of scientific knowledge to enable

students to draw from their knowledge across disciplines and life experiences, rather than being passive recipients of knowledge.

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