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Meta-Analysis : The Effectiveness of Project-Based Learning Model on Learning Outcomes

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ABSTRACT

This consider point to examine the adequacy of the project-based Learning show on learning results. This consider employments a meta-analysis strategy with auxiliary information sorts. The information were gotten within the frame of post-test comes about for the Control lessen and the exploratory class from inquire about articles employing a venture based Learning show for Learning results. This can be based on the come about of the calculation of the investigate information which gotten an impact estimate esteem of 0.584. This makes the venture based Learning show a successful Learning demonstrate to be utilized in Learning. A add up to of 27 investigate articles were dismembered and the information gotten was calculated utilizing the impact estimate (ES) equation. The calculation results show that project-based Learning show includes a moderate effect on learning results. Hence, the project-based Learning show is successful and can be utilized within the Learning handle.

Keywords: Project base learning, Learning outcomes

INTRODUCTION

Education is a conscious effort that is directed to prepare students through activities of pursuit, guidance, and training for their role in the future [1]. Education aims to help students develop skills and personal characteristics in a positive direction [2].

Learning is the process of the relationship between educators and students with the factors that are in the process [3]. Learning is a planned method prepared to obtain individual Learning activities [4]. Learning is an effort carried out by educators who are planned with the benefit of providing knowledge, with models of compiling and creating a Learning environment with many models that make students undergo the teaching and Learning process well [5]. The Learning process is basically a relationship practice where the application is between educators as a source of material to students as recipients of material. The quality of education in an educational institution is determined by the quality in the teaching and learning process.

Project-Based Learning demonstrate (venture Based Learning) may be a Learning demonstrate that employments issues as the primary step in collecting and coordination modern information based on encounter in genuine exercises. Project-based Learning is planned to utilized on complex issues that understudies got to explore and get it [6], [7].

The advantages of the Project-Based Learning Model are as follows: a). Able to increase student Learning motivation. b). Skills increase student Learning motivation. c). Can improve student skills in managing various sources. d). Students are more active in Learning. e). Indirectly improve student communication skills. f). Train students in organizing a project. g). Improve skills in time management. h). Learning becomes fun.

RESEARCH METHOD

The investigation strategy utilized in this think about is the meta-analysis strategy. In this meta-analysis, the information used is auxiliary information. The auxiliary information in this think about came from the pre-test and posttest scores of the exploratory course on specialized professional instruction articles that utilize directions media in specialized professional instruction.

He investigate articles utilized were from national and worldwide diaries from 2013 to 2021. The number of investigate articles utilized were 27 articles from inquire about in different concentration of specialized professional instruction spread over different Professional Tall Schools within the world. At that point the information that has been gotten is calculated utilizing calculated the impact estimate equation. The equation for this impact measure is as takes after.

$$ES = \frac{M_e - M_c}{SD}$$

Description:

ES = Effect Size Value

Me = The average value of the experimental class

Mc = Average value of Control class

SD = Pooled standard deviation

Furthermore, to obtain the pooled standard deviation value can be calculated using the formula *SD pooled*. The following formula *SD pooled*.

$$SD \ pooled = \sqrt{\frac{(N_e - 1)SD_E^2 + (N_C - 1)SD_C^2}{N_E + N_C - 2}}$$

Description:

SD pooled = Combined Value of Standard Deviation

Ne = Range of Students in the Experimental Class

Nc = Various Students in Control Class

SDe = Standard Deviation Value for Experiment Class

SDc = Standard Deviation Value For Control Class

After the esteem is gotten, at that point the normal esteem of the test is decreased by Control the normal esteem. at that point partitioned by the standard deviation. The calculation comes about will get a esteem, which in this point translated with an impact measure category table, which can be based on the comes about of this elucidation, the impact category of a treatment is gotten. In this case the treatment is the application a extend-based Learning of demonstrate to Learning results.

Table 1. Criteria effect sizeBig Effect SizeDescription0,00-0,20Has a weak effect (very low)0,21-0,50Has low effect0,51-1,00Has a moderate effect> 1,00Has high effect(Source: [8])

RESULT AND DISCUSSION

After carrying out a survey of 27 inquire about articles that apply learning employing an extend-based Learning show, the information gotten from the explore and control lesson are gotten. Exploratory and control information gotten were from exploratory investigate articles and inquire about and advancement (R&D) inquire about articles. The information gotten comes from inquire about with a run from 2013 to 2021. The information collection is displayed in table 2.

	Table 2. Meta-analysis data										
					Mark	_					
No	Writer	Year	Title	Field	Experiment Mean	Control	SD	N	Mean	SD	N
1.	Ni Kt Nik Aris Sandi Dewi, Ni Ny Garmina h, Kt Pudjawa n	2013	The Influence of Project-Based Learning Models on Science Learning Outcomes of Fourth Grade Students at SD N 8 Banyuning [9].	Natural Science	22,07		4,09	26	17,27	3,88	26
2.	Jailen G. N. Nusa	2019	The Effectiveness of Project-Based Learning Models in Volcanology Courses on Student Learning Outcomes [10].	Volcanology	89,74		11,1 1	20	72,11	11,9 4	20
3.	Erlia Utami Panjaita n	2019	The Effect of Project-Based Learning Model on Biology Learning Outcomes of SMAN 1 Aeksongsongan Students [11].	Biology	80,57		8,38	35	75,26	8,66	39
4.	Lisa Ariani, Melva Zainil	2020	The Influence of Project-Based Learning (PJBL) Models on Learning Outcomes of Mobile and Flat Shapes for Grade IV Elementary School [12].	Mathematics	54,09		31,9 5	32	41,59	27,1 4	32
5.	Husnul Khotima h, Suhirma n, Raehana h	2020	The Effect of Project-Based Learning Model on Creative Thinking and Scientific Literacy of SMAN 1 Gerung Students in 2018/2019[13].	science	73,59		13,8 6	34	60,67	12,7 9	33

Table 2. Meta-analysis data

6.	Rika Mawarni dan Ridwan Abdullah Sani	2020	The Effect of Stem-Based Project-Based Learning Model on Student Creative Thinking Ability on Static Fluids in Class XI SMA Negeri 4 Tebing Tinggi T.P 2019/2020[14].	Science, Technology, Engineering, and Mathematics		36,96	10,0 7	35	36,61	8,76	35
7.	Wilma Muzria, Tin Indrawat i	2020	The Effect of Project-Based Learning Model on Student Learning Outcomes in Integrated Thematic Learning in Elementary Schools [15].	Integrated Thematic	82,5		8,55	18	73,36	9,48	11
8.	Rinta DoskiYa nce, Ermania ti Ramli, dan Fatni Mufit	2013	The Effect of Application of Project-Based Learning (PBL) Model on Physics Learning Outcomes of Class XI Science Students at SMA Negeri 1 Batipuh, Tanah Datar Regency [16].	Physic	80,2		8,27	20	75,3	6,86	22
9.	Fadila Putri. N, Hanesm an	2020	The Effect of the Implementation of Project-Based Learning Model on Learning Outcomes [17].		85		13,2 6	16	76,5	9,45	16
10.	Rindi Novitri Antika, Sulton Nawawi	2017	The Effect of Project-Based Learning Model on Seminar Courses on Student Creative Thinking Skills [18].	Seminar	75,7		7,17	35	71,3	8,54	35

				0					,	
11.	Muliani, Faradhill ah, Safitri Maya	2021	Application of the Project- Based Learning Model to Student Learning Outcomes on Static Fluids at SMA Negeri Unggul Subulussalam [19].	Static Fluid	53	7,50 4	20	52,25	7,51 8	20
12.	Azwar Alamsya h Yunus, Sidin Ali, Muham mad Aqil Rusli	2016	The Effect of Project-Based Learning Model on Physics Learning Outcomes and Critical Thinking Ability of SMA Negeri 1 Tanete Riaja Students [20].	Fisika	11,97	2,01	32	10,58	2,71	33
13.	Heri Mulyono , Evi Erdi Agustin	2020	Pengaruh Model Project-Based Learning Terhadap Hasil Belajar Siswa Pada Mata Pelajaran Pemrograman Dasar Di SMK Muhammadiyah 1 Padang [21].	Sekolah Menengah Kejuruan	81,2	4,24	10	72,67	6,57	12
14.	Frida Anggrian i, Nanik Wijayati, Eko Budi Susatyo, dan	2019	Pengaruh Project-Based Learning Produk Kimia Terhadap Pemahaman Konsep dan Keterampilan	Physic	80,61	5,83	36	77,08	6,51	36

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Social

science

82,667

Proses Sains

Outcomes in

Social Science Learning Class VII SMP Negeri 2 Purwokerto [23].

Siswa SMA [22]. The Effect of Project-Based Learning on Student Learning

Kharoma h

Neneng

Kusmijat

i

15.

2019

73,167

4,48

8

24

4,11

4

24

16.	Ahmad Fauzi, Ika Rizqi Meilya, Herlina Siregar	2018	The Effect of Project-Based Learning (PJBL) Learning Model on Student Learning Outcomes of Package C Program [24].	Package C	80.43	9,34	35	64,86	10,2 5	35
17.	Komang Ratna Mayuni, Ni Wayan Rati, Luh Putu Putu Putrini Mahade wi	2019	The Effect of Project-Based Learning (PJBL) Learning Model on Science Learning Outcomes [25].	Natural Science	22,15	3,68	20	17,23	4,18	22
18.	Noor Idayu Abu Bakar	2019	Effectiveness of Project-Based Learning In Improving Listening Competency Among ESL Learners at a Malaysian TVET College [26].		47,8	15,2	25	38,7	10,9	19
19.	Muham mad Sirih, Nurdin Ibrahim, Priyono	2020	Comparison of Project-Based Learning and Discovery Learning Models on Biology Learning Outcomes By Controlling Student Prior Knowledge[27].	Biology	73,63	6,15	20	73,37	6,81	20
20.	Tri Suci Utami, Darma Santi, Achmad Rante Suparma n	2018	The Effect of Project-Based Learning (PBL) Learning Model on Cognitive Learning Outcomes of Class XI Students at SMK Negeri 02 Manokwari[28].	Vocational high School	35,5	13,5 6	20	24,79	7,58	24

21.	Wina Triani, Zulkarna in, Rahma Kurnia	2015	The Effect of Project-Based Learning Model on Geography Learning Outcomes [29].	Geography	80,43	9,34	35	64,86	10,2 5	35
22.	Siti Mega Farihatu n, Rusdarti	2019	The Effectiveness of Project-Based Learning (PjBL) on Increasing Creativity and Learning Outcomes [30].	Creativity	79,84	7,56	33	76,81	8,69	33
23.	Rizal Mukra, M. Yusuf Nasution	2016	Differences in Student Learning Outcomes Using Project-Based Learning Models With Problem Based Learning on Environmental Pollution and Conservation Materials [31].	Pollution and Environment al Preservation	51,00	15,9 9	39	76,30	7,86	39
24.	N H D Retno, W Sunarno, A Marzuki	2019	Influence of Phisycs Problem- Solving Ability Through the Project-Based Learning Towards Vocational High School Student Learning Outcomes [32].	Towards Vocational High School	85,14	4,29	35	76,43	5,5	35
25.	Gita Maelani, Rini Agustin Eka Yanti, Uu Adkur Sutendy	2021	The Influence of the Implementation of Project-Based Learning (PBL) Learning Models Through the Use of Independent Learning Activity Units (UKBM) Media on Student Learning Outcomes [33].	Independent Learning Activity Unit Media	89,62	5,92	34	78.97	9,28	33

27.	Chyntia Dewi, I Gusti Agung Oka Negara, I Ngh. Suadnya na	2017 I	The Effect of Outdoor Study- Based Project- Based Learning Model on Science Learning Outcomes of Class V Students [35].	Natural Science	79,82 X 61,855	7,82 6	32	69,28	7,53 9	32
26.	A Mardin, M Zainil Ni Pt.	2019	The Effect of Project-Based Learning (PjBL) Model on Problem Solving Ability in Data Presentation Materials in Class V Elementary School [34].	Data Presentation	35,3	20,5 8	13	56,5	16,0 4	15

In arrange to create it less demanding to analyze Exploratory and Control information, the Tests and Controls collection is displayed in graphical frame. The charts of the test and Control bunches are as takes after.



Figure 3. Meta-Analysis Data Tabulation

After the test and Control esteem information were collected, the normal test esteem was 61,855, the Control normal esteem was 56.475 and the pooled standard deviation was 248,669, so that after calculating the impact measure equation experiment and control, the ultimate 0.584. esteem was The esteem of 0.584 on the off chance that deciphered with the impact estimate criteria table, at that poin the venture based Learning Learning show includes а direct impact on Learning results.

Extend-based Learning on Learning results, among others, is since this Learning show is able encourage student to autonomous Learning. The capacity of this extend-based Learning demonstrate is indisngu is hable from great reflection, portability, and freedom. This Extend-based Learning Demonstrate energizes the developm ent of imagination, autonomy, duty, selfconfidence, and basic and expository considering in understudies. This metaanalysis does not rule out the possibility of vocational education which helps improve student learning outcomes.

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CONCLUSION

Venture Based Learning Learning Demonstrate contains a direct impact on Learning results. This can be based on the comes about of the calculation of the investigate information hich gotten an impact estimate esteem of 0.584. This makes the venture based Learning show an successful Learning demonstrate to be utilized in Learning.

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