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PREFACE

Assalamualaikum warahmatullahi wabarakatuh and Greetings.

I would like to thank all authors for their contributions in the proceedings. I gratefully acknowledge Universitas Muhammadiyah Jakarta (UMJ) for their collaboration in organising Educational Initiatives Research Colloquium 2019. This collaboration has initiated the publication of this proceeding. This initiative is an effort to promote publication culture among academicians and students through their participation and engagement in this colloquium.

Finally, I would like to thank all parties involved in making the research colloquium and publication of proceedings a success.

DATO DR. MOHAMED NAJIB BIN ABDUL GHAFAR

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TABLE OF CONTENTS

No.	Content	Page
	Editorial Board	i
	Preface	ii
	Paper Title	
1.	The Importance of Visualization Skills among Engineering Students Marlissa Omar, Dayana Farzeeha Ali, Ahmad Nabil Md. Nasir, Mahani Mokhtar & Sri Imawati	1
2.	Teach Agriculture Malaysia: Bridging Difference with Shared Content Nur Husna Abd Wahid Melanie Miller Foster, Daniel Foster, Brad Kinsinger, Yusri Kamin, Nornazira Suhairom & Mahyuddin Arsat	6
3.	The Effects of Physical Activity to Social Skills of the Students Misriandi, Yufiarti, Elindra Yetti, Iswan & Farihen	10
4.	The Effect of Students' Self-concept and Learning Motivation toward Their Social Sciences Learning Achievements (A Survey at High School Students of Labschool FIP-UMJ) Ahmad Susanto, Herwina Bahar & Yusri Kamin	15
5.	The Depiction of Mathematics Teaching-Learning Process for Slow Learners Asih Puryanti, Rahmita Nurul Muthmainnah & Ismah	19
6.	Authentic Leadership, Emotional Intelligence and Job Performance: An emerging issue in school context Ramlah Lopez, Jamilah Ahmad, Farah Zulkelfy & Amariah Lopez	22
7.	Issues and Challenges Faced by TVET Teachers at Vocational Colleges in Malaysia Nur Leena Abdul Rahman, Mahani Mokhtar, Dayana Farzeeha Ali & Widia Winata	26
8.	Reading Log in Extensive Reading as Integrated Learning Strategy in Industrial Revolution 4.0 Mutiarani, Zaitun, Hasanul Misbah & Mahani Stapa	32
9.	The Relationship between Students' Knowledge of Ecosystems and Students' Critical Attitudes to the Environmental Damage Problems at Schools Azmi al Bahij, Apri Utami Parta Santi, Novalia Sari & Mahyuddin Arsat	35
10.	The Development of BIPA Teaching Materials for Basic Level of Foreign Students Based on Multicultural Approach Khaerunnisa & Mutiarani	38
11.	A Review of Problem Solving in Realistic Mathematic Education Zaharah Ja'afar, Sarimah Ismail & Mohd Najib Ab Kadir	43
12.	Four Key Dimensions to Characterise Sustainability Courses in Higher Education Mahyuddin Arsat, Nor Fadila Md Amin, Adibah Abd Latif, Nornazira Suhairom, Nur Husna Abd Wahid, Rashidah Arsat, Zainal Abidin Arsat & Azmi Al Bahij	49

13.	Designing Curriculum in the 21st Century Abdul Rahim Hamdan	55
14.	Factors Affecting Communication Apprehension among Universiti Teknologi Malaysia TESL Undergraduates He Yang, Mahani Stapa, Muhammad Adam Izzudin Mohd. Nasir & Mutiarani	59
15.	Empowering science teachers with Nature of Science Understanding Nor Farahwahidah Ab Rahman & Lidyatul Izzah	63
16.	Could Mother's Knowledge of Sex Education Inhibit the Level of Sexual Harassment in 6-7 years Old Children? Diah Andika Sari	67
17.	Block Learning Model on Volley Ball for Senior High School Students Doby Putro Paarlindungan, Ika Yulianingsih & Taufik Yudi Mulyanto	72
18.	Elementary School Students' Knowledge of Civics Education : A Study at Bangkok-Indonesian School (SIB), Thailand Zulfitria, R. Andi Ahmad Gunadi & Happy Indira Dewi	76
19.	Enhancing Students' Mathematical Understanding of Three Dimension through PABARU Tools Aid Nurbaiti Widyasari & Melisa Soptianingrum	82
20.	Student Brawls in Vocational High School: A Case Study in West Jakarta Sri Imawati, Mas Roro Diah Wahyu Lestari & Dayana Farzeeha Ali	85
21.	The Effect of Regional Performance Allowances to the Improvement of Teachers' Performance at DKI Jakarta Widia Winata, Ahmad Suryadi, Ansharullah & Mahani Mokhtar	90
22.	Efforts to Improve Learning Outcomes for Mathematics At SDN Aren Jaya VI Bekasi Through Media Pocket Counting Latifa Qurrotaini, Siska Kusumawardani & Devi Dwijayanti	98
23.	Language Crime in Indonesia: Forensic Linguistics Approach Ahmad Fadly & Aida Sumardi	101
24.	The Analysis of Mathematical Communication Ability of Junior High School Students of Bangkok Indonesian School (SIB): A Review Based on Students' Self Efficacy Ririn Widiyasari & Arlin Astriyani	104
25.	Application of Transformative Learning on Nurturing Psychological Domain of HEBAT Aswati Hamzah, Nooraida Yaakob & Mohd Norawi Ali	107
26.	The Influence of Authentic Assessment Models to the Reasoning Ability of Statistics in the Statistics of Education of PGSD Students of FIP UMJ Muhammad Hayun & Fitri Rosmi	112
27.	Improving Mathematical Problem Solving Ability by Using Three- Dimensional Props Learning Media Assisted by Question Card Mugiono, Hastri Rosiyanti & Viarti Eminita	116

The Influence of Authentic Assessment Models to the Reasoning Ability of Statistic in the Statistics of Education in PGSD FIP UMJ Students

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Abstract: This research is based on the low student learning outcomes in the education statistics course, most of which have difficulty in completing assignments and statistical subject exams, especially related to the mathematical statistical abilities of FIP UMJ PGSD students. The purpose of this study was to determine the effectiveness of the use of the valuation model in the PGSD student learning process, especially related to mathematical abilities in the subject of education statistics, so as to provide improvements and diagnosis in statistical learning which in fact is learning to count so that requires students' mathematical abilities. The research methodology used was an experimental method with a quasi-experimental approach in the form of a posttest only control group design, namely there was an experimental class as a treatment class, which provided an authentic assessment model and a control class as a comparison class that was not given any treatment or left natural without ignoring the potential. The results of the study were that there was an influence on the model of the mathematical ability of students in the education statistics subject which was very significant with the value $t = 3.57$ with sig. $0.001 < 0.05$, and also the contribution of influence or value of Determination of 0.20 meaning influence Authentic assessment models for mathematical abilities in statistical subjects are very significant.

Keywords: authentic assessment model, statistical reasoning ability, students of FIP UMJ

Introduction

The Statistics course is a basic and compulsory subject for all students at all universities. This course equips students to understand the types of data, how to collect data, process data and analyze and interpret data obtained. Statistical courses also require students to have basic abilities, namely numeracy (mathematical) because statistics are inseparable from the calculation process such as addition, subtraction, multiplication or division. Statistics teaches how a scientist has knowledge based on data and facts in the field so that in drawing an objective, transparent, fair and comprehensive conclusion. The efficacy of statistics can be seen from its contribution to the discovery of new theories expressed in the form of statistical models or arguments involving statistical concepts (Kadir, 2016: 1).

Background of the research

In statistical learning students are also required to understand the types of data and forms of data so they can differentiate, sort out how data is collected, how to analyze and what kind of analysis tools are used. Statistics is the study of how to collect, process / group, present, and analyze data and draw conclusions by calculating uncertainty based on the concept of probability. Besides that, statistics also emphasize reasoning skills and good problem solving skills so that they can determine the results and processes that are experienced well too. The reasoning ability in statistical learning is the basic must-have for every student, especially those who have just studied statistics, they can calculate, analyze, and interpret the processes that are passed and determine the type of data, analysis techniques and tools / formulas that must be used to solve a problem in statistics. Delmas defines statistical reasoning as statistical thinking in generating statistical information. This includes the ability to interpret a set of data, graphics and a number of statistical information (Martadiputra). Reasoning is a process to analyze a problem based on data and facts that are then correlated with theories that have been built. The reasoning ability is not based on intuition or imagination, but is present in the concept of reality that is attached to rational and logical thoughts. Reasoning is in line with thinking critically, creatively and analyzing an existing problem or event. Common sense abilities are usually possessed by people who are resilient, diligent and objective. Reasoning is a thought process that departs from observing the five senses (empirical observations) which produces a number of concepts and understandings (Maryati, 2017: 133).

Chervaney defines statistical reasoning as what students can do with statistical content and uses their skills in using statistical concepts to solve statistical problems. They see statistical reasoning as a process consisting of the following three steps: (1) comprehension, (2) planning and decision making, and (3) evaluation and interpretation (Garfield, 2002, Yusuf, 2017). Statistical reasoning ability also means the ability to understand well how to choose, present, reduce, and present data that will be used for existing problems (Maryati, 2017: 1). Statistical thinking is the ability to understand and understand the statistical process as a whole, and apply understanding to real problems by giving criticism, evaluation, and making generalizations relating to 1) describing data; 2) organizing data; 3) represent data; and 4) analyze and interpret data.

To improve students' statistical reasoning abilities various kinds of learning approaches are carried out in the form of learning, assessment, classrooms, as well as teaching competencies. One approach that is assumed to be able to improve students' reasoning abilities is the valuation approach. Assessment is a process for giving decisions to someone whether or not according to criteria. According to Nitko the assessment is a process to obtain information

used to make decisions about students, curriculum, programs, and education policies (Arifin, 2012: 8). Thus the appropriate assessment model to improve the ability of statistical reasoning is to use authentic judgment. Authentic assessment is an assessment that refers to use, teaching, and assessment that reflects real-world assignments (Shelley Keyser, 2008; Robyn Collins, 2013; Anthony, 2005; Anna Maria, 2014, Novita Sari and Wardani Rahayu, 2017).

Research Methodology

This study aims to determine the effectiveness of the assessment model on the learning of statistical subjects in the FIP PGSD UMJ students and how much the model contributes to the students' reasoning abilities in learning educational statistics. The research method used is the experimental method with the true experimental approach, meaning the researcher conducted random sampling on the respondents and carried out the design of determining many respondents and many classes used. The research design used was the pre-test-post-test control group design. The research design is as follows:

Table 1. Research design

Kelas	Pre-test	Treatment	Post-test
R	O1	X	O2
R	O3	-	O4

The sampling technique used is random sampling, which is randomizing the population that is the object of research. The population in this study were the third semester students of the PGSD FIP UMJ study program and the samples in this study were 50 people, with an experimental class of 30 people and a control class of 25 people.

Findings and Discussion

This research was conducted for 3 months, from October to December 2018 in the third semester (odd), which was attended by 50 students. The results of the study were divided into two groups: the experimental class as the treatment class and the control class as the comparison class, each of which was 25 students. Descriptions of the results of the research presented include pre-test and post-test, according to the pre-experimental design that was described in the form of descriptive statistics such as minimum-maximum values, mean, variance and std. Deviation.

Pre-Test

Based on the data obtained in the pre-test in the experimental class obtained the value of statistical reasoning ability for a minimum score of 60 and maximum 92, the average value of 68.56, std. Deviation 8.10. While for the control class a minimum score of 55, a maximum of 95, and a mean score of 68.16 and stad. Deviation of 10.98. This statistical reasoning ability of the two groups is relatively the same in both the experimental class and the control class, it can be seen in the table 2 below:

Table 2. Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Experiment	25	32,00	60,00	92,00	68,5600	8,10391	65,673
Control	25	40,00	55,00	95,00	68,1600	10,98742	120,723
Valid N (listwise)	25						

Post-test

Based on the data obtained through post-test obtained in the experimental class the average value (mean) = 82,36, std. Deviation of 5.36. Whereas in the control class, the mean value = 76.39, std. Deviation 6.40. Thus the comparison of the average value of the experimental class is relatively higher than the control class, so there is a very significant difference. This can be seen in the table 3 below:

Table 3. Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Experiment	25	28,03	65,38	93,40	82,3620	5,36574	28,791
Control	25	28,25	62,38	90,63	76,3920	6,40277	40,996
Valid N (listwise)	25						

Pre-test – Post-test

From the results of testing on the experimental class with paired sample technique the test value $t = 9,887$ with sig. $0,000 < 0,05$, on df 24, it is said to be significant, meaning that there is a difference in the value of statistical reasoning ability at pre-test to post-test in the experimental class with a mean (difference) of 13,8. Thus there is a very significant increase in the value of experimental class statistical reasoning abilities from pre-test to post-test, as shown in the table 4 below:

Table 4. Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre-test – Post-test	-13,802	6,979	1,396	-16,68	-10,920	-9,887	24	,000

Pre-test – Post-test (Control)

From the results of testing on the experimental class with paired sample test the test value $t = 4.811$ with sig. $0,000 < 0,05$, on $df = 24$, it is said to be significant, meaning that there is a difference in the value of statistical reasoning ability at pre-test to post-test in the control class with a mean (difference) of $8,23$. Thus there is a significant increase in the value of the control class statistical reasoning ability from the pre-test to post-test, as shown in the table 5 below:

Table 5. Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre-test – post-test	-8,232	8,55	1,711	-11,764	-4,700	-4,811	24	,000

Hypotheses of Data

Pre-test

In testing the initial reasoning ability (pre-test) in each group, namely the experimental and control groups, obtained t test value = 0.146 with sig values = $0.884 > 0.05$ and $df = 48$, then there is no difference in the value of reasoning abilities in both groups. the initial ability of the two groups before being given treatment or giving assessment techniques is the same, it is also seen in the average value that is not too far which is equal to 0.4 the difference in average. This can be seen in the table 6 below the independent sample test:

Table 6. Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Nilai	Equal variances assumed	2,851	,098	,146	48	,884	,400	2,73054	-5,090	5,89
	Equal variances not assumed			,146	44,149	,884	,400	2,73054	-5,102	5,90

Post-test

Whereas in testing the reasoning ability (post-test) after being given treatment in the experimental group by giving authentic assessment techniques and the control group not given treatment, obtained the test value $t = 3.57$ with the value sig. = $0.001 < 0.05$ and $df = 48$, then there are differences in the value of reasoning abilities in both groups. Thus, there is a very significant effect of authentic assessment techniques on statistical reasoning abilities of FIP UMJ PGSD students, with a contribution value of 0.20 or an average value of difference of 5.97 , it can be seen in the table 7 below:

Table 7. Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Nilai	Equal variances assumed	,864	,357	3,573	48	,001	5,97	1,671	2,610	9,329
	Equal variances not assumed			3,573	46,57	,001	5,97	1,671	2,604	9,331

Discussion

Reasoning ability is an ability that must be possessed by someone who is mature enough to analyze, differentiate and verify various problems faced in his life. In Bloom's taxonomy reasoning ability is at the stage of analysis (Analyze) which determines to distinguish, classify, and identify characteristics of a problem (Zainal Arifin, 2000: 16). In the results of this study it was found that the valuation technique that is authentic assessment contributed greatly to the statistical reasoning abilities of PGSD students, it obtained a value of $t = 3.57$ with $sig. 0.001 < 0.05$ this proves that there are differences in reasoning abilities of students who are given an authentic assessment model higher than students who do not provide authentic (conventional) assessment models. In statistical learning that requires strong reasoning skills, one way to encourage students to use their brain abilities is by authentic assessment models. Authentic assessment is a process of collecting, reporting and using information about student learning outcomes by applying the principles of assessment, ongoing implementation, authentic, accurate, and consistent evidence of public accountability. Authentic assessment is an assessment that uses a variety of assessment techniques that aim to encourage students to always be active and complete the tasks given.

Conclusion

Based on the results of the research and discussion above, it can be concluded that there is an influence of the Authentic evaluation model on statistical reasoning abilities in the subjects of educational statistics in the FIP UMJ students is significantly, with a value of $t = 3.57$ with $sig. 0.000 < 0.05$ $df = 24$ and determination value of 20%. This means that the authentic assessment model provides sufficient contribution to the value of students' statistical reasoning abilities.

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