Vol. 13, No. 1, April 2024 • ISSN 2302-9609 (Print), 2746-4024 (Online)

L'Geneus: The Journal Language Generations of Intellectual Society

journal homepage: www.iocscience.org/ejournal/index.php/geneus

Implementation Of Guided Inquiry Based Student Worksheets in Basic Statistics Courses

A. Rasul[1], Subhanudin[2], Habibi Sutirta[3]

Email: rasulmtkaunm@gmail.com
STKIP Hermon Timika
Jl. Budi Utomo Jl. Raya Sp1, Ujung, Kec. Mimika Baru, Kabupaten Mimika, Papua 99971

ARTICLEINFO

Article history:

Received: 26/03/2024
Revised: 02/04/2024
Accepted: 10/4/2024
Available online: 30/04/2024

Keywords:

LKM;
Basic Statistics;
Guided Inquiry.

ABSTRACT

This development research aims to determine: (1) the results of each stage of guided inquiry- based MFI development in basic statistics courses, (2) the feasibility of guided inquiry-based MFIs in basic statistics courses, (3) the effectiveness of guided inquiry-based LKMs in statistics courses basis based on student achievement. Research and development of MFIs uses the Borg and Gall R&D procedure which is simplified into 9 stages. Based on the results of data analysis, it can be concluded: (1) The results of each stage of product development through the Borg and Gall research and development (R&D) procedure are the formation of guided inquiry-based MFIs in basic statistics courses that have been tested on lecturers and students gradually. . (2) LKPD based on guided inquiry in basic statistics courses that have been validated by material experts, linguists and media experts and learning experts show a fairly good, (3) LKPD based on guided inquiry in basic statistics courses can improve student achievement.

1. Introduction

Statistics is a scienceknowledge which related with data(Cumming, 2014). Wrong one method for obtain or collect data is with do study directly or experiment in the field and result in note then in analysis(Cumming, 2014). In do a research or trial, is required a design study good studyexperiment or study survey(Yin, 2009). Design study needed as steps procedural incarry out something study(Peffers et al., 2007).

Statistics is defined asgathering fact which formnumbers which arranged in shape list or table which describe something problem(Dytham, 2011). In statistics also explained about ways gather data,processing data and also the analysis as well as withdrawal conclusion from results analysis the(Campbell & Kashy, 2002). Statistics also could said as set method which used for discuss about: 1) how method gather data and give information optimally, 2) how method summarizing, process andserve data, 3) how method do an analysis ofbunch data, so that from results analysis arise strategies certain. 4) how method take conclusion and suggest the best decision to makethe basis of which strategy and, 5) how determine the magnitude of the risk of error which possible happen if takedecisions on the basis of the strategy

Statistics for college tall is eye studying general which exist in every level study program strata one so that statistics become eye studying must which must learned(Adelman, 2009). However on in fact no all student own ability mathematical which good(Schoenfeld, 1988). With thus raises heterogeneity ability statistics base on every group study student(Slavin, 1987). For lecturers who teach eye studying statistics base of course encounter a variety of student conditions in study, there is student which easy to understand statistical material, there is student which need attention and Technique teach certain so that capable understand Theory statistics.

Lots factor which flat back problem the, however as a lecturer who must create learning which good and oriented on process and also student learning achievement then the lecturer must capable apply method learning which appropriate in teach statistics base. Wrong one instruments in learning student is quiz or sheet student work (LKM)(Vivany, 2019). Worksheet students must be able implement from whole Theory which has student learn During lectures(Celikler, 2010).

Statistics books that became reference main for student are printed books with various formulas and symbols are public for students who are just learning student(Rumsey, 2002). Thing this naturally make it difficult for students to learn statistics base(Abd-El-Khalick et al., 1998). Leave from thinking that writer Arrange a student worksheet (LKM) which could help student in complete every theory statistics in a directed and guided manner(Gravemeijer, 1998). So drafting sheet work student (LKM) based inquiry guided Becomes wrong one effort strategic in increase achievement study statistics base student informatics(Takaendengan & Manginsela, 2015).

Sheet Work student (LKM) is something ingredients teach print which form sheets paper which containing (Mitten et al., 2005). Theory, summary, and instruction implementation(Glaser & Bassok, 1989). Duty learning which must done by student, good characteristic theoretical and/or practical which refers on competence must achieved student, and its use depends with ingredients teach other(Simons et al., 2000). Based on opinion this, so use MFI own a number of superiority as: (a) enable student in process study teach, (b) help student in develop draft, (c) practice student for find and develop process study teach, (d) help lecturer in arrange lesson, (e) as guidelines lecturer and student in carry out process learning, (f) help student obtain notes about Theory which studied through study activity, (g) help student for add information about draft which studied through activity study in a manner systematic.

According to convey that inquiry is an approach learning where participant educate search using various source information and idea for increase understanding they to problems, topics, and issues(Kuhlthau et al., 2015). More continued Sudrajat in said that: Inquiry learning is a learning activity involve in a manner maximum whole ability Participant educate for look for and investigate something (things, people or events)(Ulfah, 2020). Systematic, critical, logical analytical so can formulate yourself his discovery with full believe self(Platt, 1964).

Learning uses the method inquiry first time developed by Richard Suchman which want so that Participant educate ask why something incident happen, then Participant educate do activity, collecting and analyzing data, until finally Participant educate find answers to questions this is inquiry learning is Suite activity that learning emphasize on process think critical and analytical for seek and find answers from something problem questionable.

According to said too that the inquiry learning process give a chance to students to have experience study which real and active so that participant educate trained in solve problem at a time make interesting decisions conclusion from statement in on that, feature on learning inquiry namely the emphasis on activity. Participant educate in a manner maximum for look for and find information, activity which conducted by whole(Bogdan & Biklen, 1997). Participant educate directed look for and find the answer yourself from something which in ask so raise believe self to self participant educate, and learning this inquiry develops Learner 's ability to think sec systematic, logical and critical(Kurfiss, 1988). According to learning inquiry guided inquiry is deep learning models implementation the teacher gives or provide instructions/guidance which wide to Participant educate on guided inquiry learning model (guided inquiry) this teacher has give instruction instruction about Theory which will taught to Participant educate

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necessary. Instruction the could form questions so that students are able find or look for information himself regarding this question or action- action which given teacher which must conducted for solve problem. Processing this could conducted sec alone nor group.

2. Method

Type study which used on study this is study and development research and development. product developed that is Sheet work Student (LKM) based inquiry tutored in statistics courses base(Putra & Sudargo, 2014).

Development product film animation need a number of step in the process(Kerlow, 2009). Procedure development which developed by Borg & gall (Havis, 2016) "The major step in the R & D cycle used to develop minicourses are US follows: Research and information collecting, planning, develop preliminary form of products, preliminary fields testing, play product revision, play fields testing, operational product revision, operational fields, Finals product revision, Dissemination and implementation"

Based on quote above, could concluded that according to Borg & gall steps development R&D as follows:

1. Research and information collecting (search and collection data).
2. Planning (planning).
3. Develop preliminary form of product (Develop product form beginning).
4. Preliminary fields testing (test try field beginning).
5. Play product revision (revision results test try field beginning).
6. Play fields testing (test try field main).
7. Operational product revision (revision product operational).
8. Operational field testing (test try field operational).
9. Final productrevision (improvement product end).
10. Dissemination and implementation (dissemination and implementation).

3. Results and Discussion

MFI based inquiry guided which has developed on beginning drafting draft first, then validated by material experts, media experts, expert language and expert learning based on appropriateness content from various aspect. Here are the results,

Table 1. Validation Draft First

No.	Aspect	Score Validation	Description
1	Fill Theory	80	Well
2	Language	72	Enough
3	Presentation	75	Well
4	Graphic	75	Well

Validation MFI based inquiry guided which has been structured as preliminary draft or first draft that has been submitted tested by 4 experts from 4 aspects of assessment showing that MFI which has arranged still own a number of lack and need exists improvements in terms of content and technique presentation.

After MFI based inquiry tutored in statistics courses base in repair as draft second based on input from validators so draft in test try it to student as Sheet Work Student (MFI), following result, student fill in coesiner which has provided about appropriateness Guided inquiry-based MFIs eye studying statistics base.

From results evaluation which has conducted student and also lecturer shows that there is improvement and progress positive from MFI based inquiry guided, this is indicated by increase in the average score given student or also lecturer from draft second until draft to four.

For measure effectiveness MFI eye-based guided inquiry studying statistics base so

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writer do test comparison that is compare achievement study statistics base student which study with MFI based inquiry guided with achievement study students who study with modules statistics base. Testing conducted with test different average two group which no in pairs. Following data descriptive results testing.

Table 2. Results Evaluation Lecturer and Student to MFI Draft Second

No.	Aspek Penilaian	Mahasiswa		Dosen	
		%	Ket.	%	Ket.
1	Isi Materi	78,20	B	81	B
2	Bahasa	70,23	C	78	B
3	Penyajian	68,45	C	75	C
4	Grafis	74,88	B	78	B
Rata-Rata		72,94		78	

Table 3. Results Evaluation Lecturer and Student to MFI Draft Third

No.	Aspek Penilaian	Mahasiswa		Dosen	
		%	Ket.	%	Ket.
1	Isi Materi	80,43	B	85	B
2	Bahasa	78,45	B	80	B
3	Penyajian	76,77	B	80	B
4	Grafis	75,23	B	82	B
Rata-Rata		77,72		81,75	

Table 4. Results Evaluation Lecturer and Student to MFI Draft Fourth

No.	Aspek Penilaian	Mahasiswa		Dosen	
		%	Ket.	%	Ket.
1	Isi Materi	82,11	B	86	B
2	Bahasa	80,21	B	82	B
3	Penyajian	80,56	B	85	B
4	Grafis	81,55	B	85	B
Rata-Rata		72,94		78	

Test try field aim for distribute LKM to one lecturer which teach eye studying statistics base on program studies infomatics and also students who he taught that is student semester 3 so that lecturers and students know and try MFI based inquiry guided.

Based on results evaluation after try learning with MFI based inquiry guided which has arranged so lecturer and also

Table 5. Results Testing Descriptive Data

Ukuran Deskriptif	**Kelas Eksperimen**	**Kelas Kontrol**
Mean	78,23	73,73
Median	80	75
Mode	85	75
Std. Deviation	8,707	8,979
Variance	75,82	80,615
Skewness	-0,668	-0,44
Std. Error of Skewness	0,374	0,374

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Kurtosis	0,189	0,239
Std. Error ofKurtosis	0,733	0,733
Minimum	55	50
Maximum	95	90

Information:

Class Experiment: MFI based inquiry Guided

Class Control: Module

After in test descriptive for showing description data in a manner statistics, next conducted test condition analysis data that is test normality and test homogeneity from second group data.

a. Test Normality

Test normality data on study this use test Kolmogorof-Smirnov with, 95% confidence level. Following data results test,

Table 6. Results Testing Normality Data

No.	**Group**	**Score Sig.**	**Ket.**
1	Experiment	0.491	Normal
2	Control	0.281	Normal

From the results of normality testing data showing that second group data own score sig which is greater than 0.05 of this thing means second group data distributed normal.

b. Test Homogeneity

Test homogeneity is test for know two group data own variance which same or not. In this study test homogeneity use test fisher namely homogeneity test on two groups of data with levels trust 95%. Following results the test, From the test results showing score sig which more greater than 0.05 this shows that second group data own variance which same or homogeneous.

After requirements testing analysis data so study next with test hypothesis that is with test different average second group data which no in pairs. Following results the test,

Table 7. Results Testing Homogeneity

Variabel	**nilai sig.**	**Ket**
Prestasi Belajar Statistika	0,985	Homogen

Table 8. Results Testing hypothesis Descriptive Group Statistics

	Group	N	Means	std. Deviation	std. ErrorMeans
AchievementLearn Statisticsa Base	Experiment	40	78.23	8,707	1,377
	Control	40	73.73	8,979	1,420

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Table 9. Results Testing hypothesis t-test

		Q	df	Sig. (2 tailed)
Achievement Learn Statistics Base	Equal variances assumed	2,275	78	0.026
	Equal variances not assumed	2,275	77,927	0.026

From the results of hypothesis testing with test t showing that score sig which obtained is 0.026 score this smaller than 0.05. This shows that the learning achievement of basic statistics student which study with MFI based on guided inquiry and achievement learn students who study with module own difference average which significant. With look flat- flat achievement study statistics base student from second group (class) which get treatment different showing that achievement study student which study with MFI based inquiry guided own average which more tall from on which study with module.

Results study this also relevant with results study which has conducted by Nurfidianty et al from Faculty teacher training and Knowledge Education March Eleven University in year 2016 which produce that 1. Results every stage of product development through procedure R&D Borg & gall is arranged LKPD based inquiry guided on Theory thermochemistry which has revised based on suggestion and input from validator as well as has piloted to teacher and participant educate on initial field trial stage, trial run main field, and field trials operational. 2. LKPD based inquiry guided on Theory thermochemistry which has developed worthy used for learning based on the assessment of material experts, experts media, linguist, expert learning with average acquisition score Vaiken ≥ 0.87, and evaluation from teacher and participant educate with category evaluation "Very Well". 3. Learning use LKPD based inquiry guided on Theory thermochemistry effective increase results study knowledge, attitude and Skills participant educate. Average score results study participant educate which study use LKPD based inquiry guided on Theory thermochemistry higher than average the average value of student learning outcomes no study use LKPD based inquiry guided [8].

From results study which has conducted by Nurfidianty et al to Theory thermochemistry on student SENIOR HIGH SCHOOL. Difference which seen with study this is eye subject and level of education subject his research. From difference- difference that it turns out showing a similarity that the worksheet good for participant educate nor student You're welcome could walk with good if be prepared in a manner ripe. Inquiry learning turns out suitable to be applied either in school or in college tall.

4. Conclusion

Based on results study and discussion which has exposed previously showing that: 1) development (R&D) Borg and gall is arranged MFI based inquiry guided on eye studying statistics base has in trials on lecturers and also student in a manner gradually. 2) MFI based inquiry guided on eye studying statistics base which has in validation by expert materials, linguists and media experts and expert learning showing average enough good, 3) LKPD based inquiry guided on eye studying statistics base could increase achievement study student.

5. References

Abd-El-Khalick, F., Bell, R. L., & Lederman, N. G. (1998). The nature of science and instructional practice: Making the unnatural natural. *Science Education*, *82*(4), 417–436.

Adelman, C. (2009). The Bologna Process for US Eyes: Re-learning Higher Education in the Age of Convergence.

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Institute for Higher Education Policy.
Bogdan, R., & Biklen, S. K. (1997). *Qualitative research for education*. Allyn & Bacon Boston, MA.
Campbell, L., & Kashy, D. A. (2002). Estimating actor, partner, and interaction effects for dyadic data using PROC MIXED and HLM: A user–friendly guide. *Personal Relationships*, *9*(3), 327–342.
Celikler, D. (2010). The effect of worksheets developed for the subject of chemical compounds on student achievement and permanent learning. *The International Journal of Research in Teacher Education*, *1*(1), 42–51.
Cumming, G. (2014). The new statistics: Why and how. *Psychological Science*, *25*(1), 7–29.
Dytham, C. (2011). *Choosing and using statistics: a biologist's guide*. John Wiley & Sons.
Glaser, R., & Bassok, M. (1989). Learning theory and the study of instruction. *Annual Review of Psychology*, *40*(1), 631–666.
Gravemeijer, K. (1998). Developmental research as a research method. In *Mathematics Education as a Research Domain: A Search for Identity: An ICMI Study Book 1. An ICMI Study Book 2* (pp. 277–295). Springer.
Kerlow, I. V. (2009). *The art of 3D computer animation and effects*. John Wiley & Sons.
Kuhlthau, C. C., Maniotes, L. K., & Caspari, A. K. (2015). *Guided inquiry: Learning in the 21st century*. Bloomsbury Publishing USA.
Kurfiss, J. G. (1988). *Critical Thinking: Theory, Research, Practice, and Possibilities. ASHE-ERIC Higher Education Report No. 2, 1988.* ERIC.
Mitten, L. K., Fink, C., & Marxer, M. (2005). *20-in-10: Linking Music and Literacy with Twenty, Ten-minute Mini-lessons and Activities for Primary Learners*. Maupin House Publishing, Inc.
Peffers, K., Tuunanen, T., Rothenberger, M. A., & Chatterjee, S. (2007). A design science research methodology for information systems research. *Journal of Management Information Systems*, *24*(3), 45–77.
Platt, J. R. (1964). Strong Inference: Certain systematic methods of scientific thinking may produce much more rapid progress than others. *Science*, *146*(3642), 347–353.
Putra, R. A., & Sudargo, F. (2014). *The Course Program Development of Invertebrate Zoology-Inquiry Laboratory Based (PPZI-BIL)*.
Rumsey, D. J. (2002). Statistical literacy as a goal for introductory statistics courses. *Journal of Statistics Education*, *10*(3).
Schoenfeld, A. H. (1988). When good teaching leads to bad results: The disasters of'well-taught'mathematics courses. *Educational Psychologist*, *23*(2), 145–166.
Simons, R.-J., Van der Linden, J., & Duffy, T. (2000). New learning: Three ways to learn in a new balance. In *New learning* (pp. 1–20). Springer.
Slavin, R. E. (1987). Ability grouping and student achievement in elementary schools: A best-evidence synthesis. *Review of Educational Research*, *57*(3), 293–336.
Takaendengan, M., & Manginsela, A. P. G. (2015). *Android Based Learning Method on Human Body Skeletal System*. Researchgate.
Ulfah, I. (2020). *An Analysis of Inquiry Based Learning Strategy to Improve Students' Achievement on Simple Past Tense at Eighth Grade Students of MTS Hifzil Qur'an Medan in Academic Year 2019/2020*. Universitas Islam Negeri Sumatera Utara.
Vivany, A. C. (2019). Expedience analysis of student worksheets (LKM) to support nuclear physics learning on the topic of natural radioactivity. *Journal of Physics: Conference Series*, *1317*(1), 12158.
Yin, R. K. (2009). *Case study research: Design and methods* (Vol. 5). sage.

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