DEVELOPMENT OF SPSS PRACTICUM MODULE ON COURSES STATISTICS EDUCATION

Jawasi[1], Zulkardi[2], Darmowijoyo[2]
[1]Universitas Sriwijaya Palembang, Indonesia
[2]Dept. of Education Mathematics,Universitas Sriwijaya Palembang, Indonesia
a.jawazi@radenfatah.ac.id

Abstract

This study aims to develop practical modules by utilizing SPSS software applications so that students can easily understand the learning on the statistics education course at Raden Fatah State Islamic University of Palembang. Type of research is research development or development research. This research will develop teaching materials in the form of a valid and practical Student Module in the course of Education Statistics, through two stages of preliminary study and formative study. The preliminary stage includes preparation and design, while the formative study stage includes Self Evaluation, Expert Reviews, One to One, Small Group and Field Test, taking samples of 20 semester 4 students on the Education Statistics course in Mathematics Education Study Program Raden Fatah State University Palembang. The results of the research are based on the preliminary study and formative study, and the average observation of the results is shown in the practical category of 82.58%, the SPSS Practicum Module can be used in the learning process in the Education Statistics Course.

Keywords: Development, Practicum Module, Education Statistics

INTRODUCTION

Higher education is a place in shaping the character and academic ability in the field of student scholarship so that the university must always follow the development of science and technology that develop, to make renewal on activity and learning process (Widiawati, Hestin Sri, et al, 2017: 2). Basically, the learning process is the process of individual (individual) self-study in college. One can learn if the individual is actively for a certain period of time trying to know something, this means that the student will not understand the essence of knowledge without commitment and persistence in learning the subject matter taught (Ginting, Copyright, 2003: 3).

Course Statistics Education is one of the courses that exist in Mathematics education program UIN Raden Fatah Palembang with the weight of 2 credits. According to Sudijono, Anas (2007: 9) educational statistics is a science that discusses or learns and develops the principles, methods and procedures that need to be taken or used in the framework of collecting, composing, presenting, analyzing the material description of tangible figures on matters which relates to education (special teaching and learning process), and the withdrawal of the conclusions of making estimates and forecasts scientifically (in this case mathematically) on the basis of a collection of information in the form of numbers. In the study of education statistics, many obstacles faced by

students to understand the context, in his research Shi, Ning Zhong (2009: 6) said that one of the causes of learners less interested in educational statistics because the education statistics are still theoretically and less connected with real world.

One of the important tools for educational research is statistics. It has long been known statistics as a very important assistive science to sustain various branches of science, or more specifically to help provide certainty in data analysis.

Especially for current students, the urgent importance of mastering the statistics of education as auxiliary science is to support the research process in the framework of thesis writing. Therefore, educational statistics are studied as an important part of the research methodology. Therefore theory and practice will be done simultaneously by using the tools of the computer, in this case by utilizing SPSS software.

In addition, the learning module is the smallest unit of learning program, which is studied by the student individually or taught by the student to himself (self-instructional) (Winkel, 2009: 472). Vembriarto (2007: 20), states that a learning module is a teaching package that contains a concept unit rather than a lesson. Module teaching is an individual teaching-learning effort that allows students to master a unit of lesson material before he / she moves on to the next unit. Based on some understanding of the module above it can be concluded that the learning module is one form of teaching materials that are packaged in a systematic and interesting so easy to learn independently.

Based on observations and open (unstructured) interviews conducted on lecturers and students at the Faculty of Tarbiyah and Teacher Training at Raden Fatah Palembang State Islamic University, it shows that some students' understanding of basic concepts in Education Statistics is far from satisfactory, who complain related to lectures in this course, so that students often have difficulty in studying it. Thus, the task of the lecturer is how to mix the learning of the course of Education Statistics become more meaningful, so that the student becomes easier to understand the material of the Education Statistics. This characteristic requires the lecturers to present lectures that are more activate students. So that researchers are interested to develop teaching materials that are able to motivate students to more actively learn to understand the material of self-help.

From the above background, the problem in this research is how to generate the SPSS Practicum Module in the Mathematics of Education Statistics which is practical in the Mathematics of Education Statistics at the Faculty of Tarbiyah and the Teacher of Raden Fatah State University of Palembang. In accordance with the above problems then the purpose of this study is to generate SPSS Practicum Module On the Mathematics of Education Statistics which is practical in Mathematics Education Statistics at the Faculty of Tarbiyah and Teacher Training of Raden Fatah State University of Palembang.

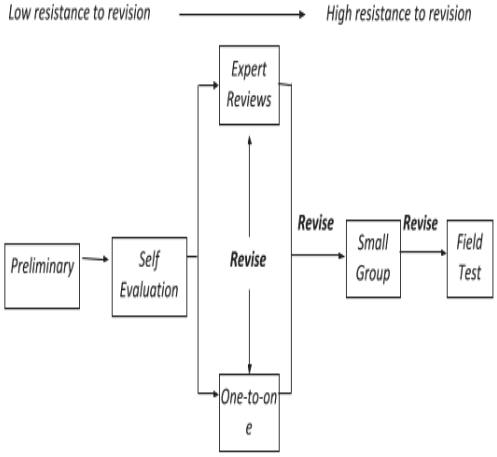
RESEARCH METHODS

Research subject

The study was conducted on even semester of the academic year 2017/2018. The subjects of the study were the students of Semester IV at the Faculty of Tarbiyah and the Teachers of Raden Fatah Palembang State Islamic University, amounting to 20 students, consisting of men and women.

RESEARCH METHOD AND PROCEDURES

In this study, researchers used research methods development or development research (Nieveen, 2012: 221). This research will develop teaching materials in the form of a valid and practical Student Module in the course of Education Statistics, through two stages of preliminary study and formative study. Preliminary stage includes preparation and design, while the formative study stage includes Self Evaluation, Expert Reviews, One to One, Small Group and Field Test. The stages can be seen in Figure 3.1below.



Preliminary

Preliminary is divided into 2 stages:

1. Preparation

This stage includes student analysis, curriculum analysis and material analysis in accordance with the Curriculum of the Faculty of Tarbiyah and Teacher Training of Raden Fatah State Islamic University of Palembang. Communicate with lecturers and prepare research purposes such as schedule and how to implement it with lecturer of Education Statistics.

2. Design

At this stage the researchers design or design teaching materials in the form of Student Module, called the first prototype. Prototyping consists of three cycles: the first prototype, the second prototype and the third prototype as the final prototype (product). At the end of the cycle is always formative and revised evaluation. Each prototype focuses on three characteristics: content, constructs and language. At this stage also prepared an observation sheet that is used to observe the activities of students during the lecture process took place.

Formative Study

Self Evaluation

Self evaluation, conducted by the researchers own assessment of the design of teaching materials in the form of Student Module developed through a constructivism approach, called the first prototype.

Expert Reviews.

The design result on the first prototype developed on the basis of self evaluation is given to the expert (expert review). This stage is also named as a validity test.

3. One to One

In the one-to-one stage, prototype teaching materials are tested against one or more people as a tester. This is done in the hope of seeing the practicality of design of teaching materials through observations and questionnaires in the use of prototypes. The results of this trial were analyzed and used to revise the first prototype. The revised result is called the second prototype.

4. Revision

Suggestions and observations and questionnaires on students are used as a basis for revising teaching materials using a constructivism approach.

5. Small Group

At this stage, the second prototype is tested on a group of students outside the classroom studied, or to the same peers residing within the researcher's environment. Furthermore, the test results are analyzed in such a way as to produce suggestions for revisions.

6. Revision

Students' opinions and student work can serve as a basis for revising the second prototype. The revised result is called the third prototype.

Field Test

This stage of the third prototype as the final product is tested against the students of Semester IV Tarbiyah Faculty of Science and Teacher Training of Raden Fatah State Islamic University of Palembang. In this case is expected to see the potential effects of teaching materials that have been developed.

Final Revision

Suggestions and results of student work serve as a basis for revising the prototype of instructional materials for students of the fourth semester Faculty of Science Tarbiyah and Teacher Training Raden Fatah State University of Palembang.

RESULTS AND DISCUSSION

1. Results of Module Development

The study was conducted on the statistics of education, research and development of SPSS practicum module conducted at Raden Fatah Palebang State Islamic University. Respondents in this study are students of Mathematics Education semester 4 amounted to 20 students who are undergoing lectures Education Statistics.

The steps in this research are preliminary (preparation stage and module development stage) and formative study (self evaluation, prototyping and field test), as follows.

Preliminary

a. Stage of Research Preparation

At this stage of the research conducted early observation to identify problems in the field by conducting interviews on lecturers who teach on the education statistics course of the interview the researchers found the core problem that is the students are less interested and less understanding of the education statistics course so that researchers are interested in using SPSS practice module on the course of educational statistics to make it easier for students to understand. The document used in the development of SPSS practicum module uses RPS and Syllabus which is in accordance with the curriculum at the Raden Fatah State Islamic University of Palembang.

b. Stage of Module Development

In the module development stage there are two stages: the analysis phase and the design stage as follows:

Stage Analysis

• Student Analysis

At this stage the researchers conducted an analysis of students who will be the subject of research, and also a class trial of the use of teaching materials in the form of SPSS Pratikum Module. Students who are the subject is the fourth semester student of UIN Raden Fatah Palembang, amounting to 20 students.

• Curriculum Analysis

At this stage is to identify the subject matter of Education Statistics. In determining the material and the title of the module, the researcher analyzed the RPS and syllabus.

• Materials Analysis

The teaching materials are modules developed using SPSS.

2. Stage Design

This design stage includes drafting module and module layout.

a. Creation of module design

The module design illustrates the overall relationship between the inside of the module, the module's design is made to facilitate the process of making the next module and functions like a map in the module making guide.

b. Preparation of materials, exercises and assignments

The materials, exercises and tasks contained in the modules are composed of various references. The material presented in the module is typed in the format of times new romans with fonts size 12, using Miscrosoft Word 2007.c.Pengumpulan dan pembuatan background, cover dan layout

The drawings and backgrounds that will be used in the manufacture of cover modules are compiled into one with layouts created using corel draw (cdr) format using CorelDRaw X3 progam. The size of the selected module using paper latter (21.59 X 27.94 cm). The image used is the result of downloads from various sources from the internet. Here's a look at the modules that have been done by researchers:

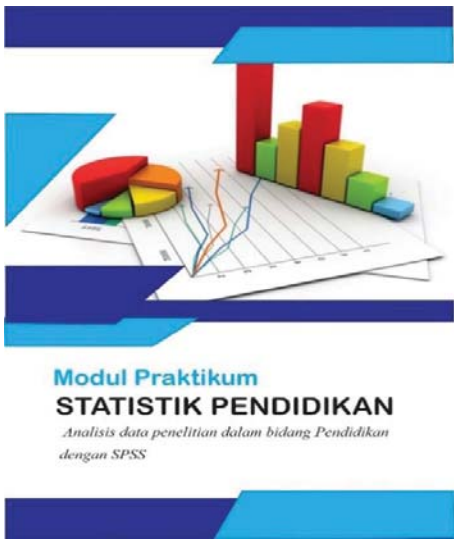
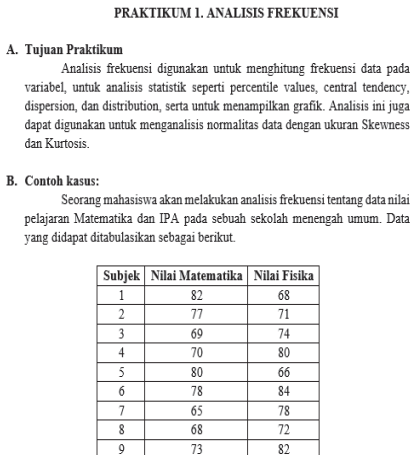


Figure 1 display of module cover



PRAKTIKUM 1. ANALISIS FREKUENSI

A. Tujuan Praktikum

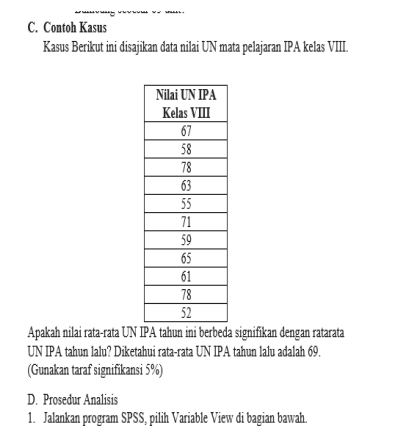
Analisis frekuensi digunakan untuk menghitung frekuensi data pada variabel, untuk analisis statistik seperti percentile values, central tendency, dispersion, dan distribution, serta untuk menampilkan grafik. Analisis ini juga dapat digunakan untuk menganalisis normalitas data dengan ukuran Skewness dan Kurtosis.

B. Contoh kasus:

Seorang mahasiswa akan melakukan analisis frekuensi tentang data nilai pelajaran Matematika dan IPA pada sebuah sekolah menengah umum. Data yang didapat ditabulasikan sebagai berikut.

Subjek	Nilai Matematika	Nilai Fisika
1	82	68
2	77	71
3	69	74
4	70	80
5	80	66
6	78	84
7	65	78
8	68	72
9	73	82

Figure 2 Learning view



C. Contoh Kasus

Kasus Berikut ini disajikan data nilai UN mata pelajaran IPA kelas VIII.

Nilai UN IPA Kelas VIII
67
58
78
63
55
71
59
65
61
78
52

Apakah nilai rata-rata UN IPA tahun ini berbeda signifikan dengan ratarata UN IPA tahun lalu? Diketahui rata-rata UN IPA tahun lalu adalah 69. (Gunakan taraf signifikansi 5%)

D. Prosedur Analisis

1. Jalankan program SPSS, pilih Variable View di bagian bawah.

Figure 3 Case Study or Problem

At this stage the determination of the contents of the material is based on RPS and Syllabus that have been predetermined and the module page is a form of presentation of material or information in the form of brief material description and sample questions. The presentation of this material uses a combination of visual information such as text, images, and so on, in order to facilitate student understanding in practicum as well as add to the attraction in the module.

The teaching materials of the module consists of several pages Sub Subject / learning are:

Page Cover is the first page or sheet in a scientific work or a study that contains the title, the symbol of an institution, the year and so forth in accordance with the provisions in a scientific paper.

Page Code of Conduct, contains rules applicable at a University in the learning process that must be obeyed by the students so that the atmosphere can be conducive pengajran walk.

The Preface is a page containing the words of the author upon the completion of a scientific work containing gratitude, thanksgiving, the purpose and the benefits of writing as well as constructive criticism and suggestions.

Table of Contents is an information about sub-sub, content, and pages in a scientific work so readers can understand the contents of a scientific work.

Introduction consisting of background and learning objectives, Introduction in a scientific work is the first chapter that contains an explanation of why a study was conducted, on this introductory page provides an overview of the topics to be discussed.

Literature Review contains the theories or ideas of experts in a variable to be discussed and explains the relationship between several concepts used to explain the problem in learning / research.

Data Processing Method is a way in a process of processing a data in a certain form that is more meaningful than an activity or an event or process a data into information.

The Case and Problem Study is an instrument given to students to assess students' level of understanding in a lesson or material that has been discussed.

Bibliography is an article composed at the end of a scientific paper containing the author's name, title, publisher, identity of the publisher and the year published as the source or reference of a writer.

Formative Study (expert reviwes, one to one, small group dan field test)

At this stage pre-designed prototypes are validated by experts and peers. Then the prototype was tested on five students as a tester (one-to-one), and ten students (small group), then the actual research subject as many as 20 students (field test).

Expert evaluations, peers, one-to-one, and small group are the stages to see the validity and practicality of the teaching materials being developed, while field tests are the stage to see the potential effects on student learning outcomes.

First Prototype

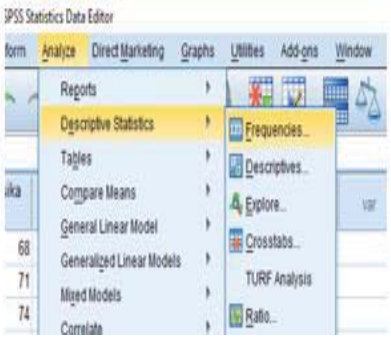
The result of Self Evaluation was obtained by draft of Learning SPSS PPS module of Education Statistic, as the first prototype. The first prototype focuses on content, constructs and languages, content, construct (structure and navigation) ie material presented well and according to the design used. Meanwhile, the language already contains interactive and non-meaningful sentences, good and correct language and the consistency of letters and images. Module design example as the first prototype can be seen in the attachment

Expert Riview

In the early stages the researcher asks expert opinion and colleagues who have experienced as a lecturer. The expert is Dr. H. Purwoko, M.Pd lecturer of Mathematics Education TAMSIS.

Feedback and suggestions from experts and colleagues about the designs that have been made are written on the validation sheet as material for revising and declaring that the resource is valid. The comments and suggestions generated are shown in Table 4.1 below.

Table 4.1 Comments and Validator Suggestions to Modules

<table>
<tr><td>No</td><td>Comments and Validator Suggestions to Modules</td></tr>
<tr><td>1</td><td>Langkah penyelesaian:
1. Persiapkan alat tulis, lembar kerja/ lembar pengamatan, dan software SPSS.
2. Lakukan pengolahan data dengan menu Analyze-Descriptive Statistics (Frequencies) pada Program SPSS.
3. Analisis dan interpretasi.
Comments Jawaban:
To be more interesting enter Print screen in addition to dancing will be more clear (Pitriani, M.Pd)</td></tr>
<tr><td></td><td>Revision 

The print screen is already added</td></tr>
<tr><td>2</td><td>Jawaban:
Tabel hasil Pengelolahan Data dan Histogram.
Comment Add an Answer Key to practice questions (Dr. H. Purwoko, M.Pd)</td></tr>
</table>

	Revision Statistics Nilai Matematika / Nilai Fisika N Valid 15 15 Missing 0 0 Mean 75.67 75.67 Std. Error of Mean 1.899 1.695 Median 77.00 74.00 Mode 65[a] 74 Std. Deviation 7.355 6.565 Variance 54.095 43.095 Skewness .049 -.018 Answer key has been added
3	Comment **IV. STUDI KASUS** 1. Seorang mahasiswa akan melakukan analisis frekuensi tentang data nilai pelajaran Matematika dan Sejarah pada sebuah sekolah menengah umum. Data yang didapat ditabulasikan sebagai berikut. Subjek / Nilai Matematika / Nilai Sejarah 1 / 82 / 68 Case Studies should be replaced by case examples as examples of problem work (Dr. Abdurrahamsyah. M.Pd)
	Revision **B. Contoh kasus:** Seorang mahasiswa akan melakukan analisis frekuensi tentang data nilai pelajaran Matematika dan IPA pada sebuah sekolah menengah umum. Data yang didapat ditabulasikan sebagai berikut. **Subjek / Nilai Matematika / Nilai Fisika** 1 / 82 / 68 Case example already added
4	Comment

IV. STUDI KASUS

1. Seorang mahasiswa akan melakukan analisis frekuensi tentang data nilai pelajaran Matematika dan Sejarah pada sebuah sekolah menengah umum. Data yang didapat ditabulasikan sebagai berikut.

Subjek	Nilai Matematika	Nilai Sejarah
1	82	68
2	77	71
3	69	74

Add the words Practicum 1, 2, and so on (Dr. Abdurrahamsyah. M.Pd)

Revisi

PRAKTIKUM 1. ANALISIS FREKUENSI

A. Tujuan Praktikum

Analisis frekuensi digunakan untuk menghitung frekuensi data pada variabel, untuk analisis statistik seperti percentile values, central tendency, dispersion, dan distribution, serta untuk menampilkan grafik. Analisis ini juga dapat digunakan untuk menganalisis normalitas data dengan ukuran Skewness dan Kurtosis.

B. Contoh kasus:

Seorang mahasiswa akan melakukan analisis frekuensi tentang data nilai pelajaran Matematika dan IPA pada sebuah sekolah menengah umum. Data yang didapat ditabulasikan sebagai berikut.

Subjek	Nilai Matematika	Nilai Fisika
1	82	68
2	77	71

Practice 1, Practicum 2, and so on are already added

5

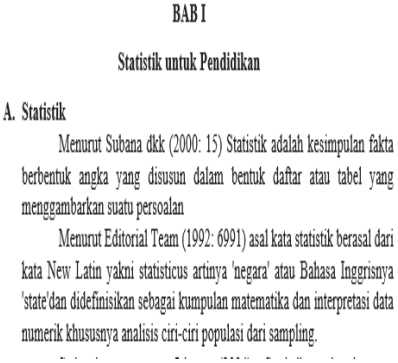
Langkah penyelesaian:

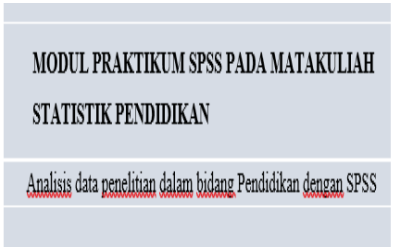
1. Persiapkan alat tulis, lembar kerja/ lembar pengamatan, dan *software* SPSS.
2. Lakukan pengolahan data dengan menu Analyze-Descriptive Statistics (Frequencies) pada Program SPSS.
3. Analisis dan interpretasi.

Comment

The steps must be in the process of clarifying again (Dr. Abdurrahamsyah. M.Pd)

Revision

	Berikut akan dilakukan analisis frekuensi data, central tendency, menampilkan grafik histogram, dan menganalisis normalitas data. Langkah-langkah analisis pada SPSS adalah sebagai berikut. 1. Klik Start > All Programs > IBM SPSS Statistics > IBM SPSS Statistics. 2. Pada halaman SPSS terdapat dua sheet, yaitu Data View (untuk memasukkan data) dan Variable View (untuk mende- finisikan variabel). Langkah pertama mendefinisikan variabel terlebih dahulu. Lakukan dengan mengklik Variable View. Pengistan dilakukan sebagai berikut. The steps have been added (Dr. Abdurrahamsyah. M.Pd)
6	Comment In the Module add a statistical sense (Dr. Abdurrahamsyah. M.Pd)
	Revision  BAB I Statistik untuk Pendidikan A. Statistik Menurut Subana dkk (2000: 15) Statistik adalah kesimpulan fakta berbentuk angka yang disusun dalam bentuk daftar atau tabel yang menggambarkan suatu persoalan Menurut Editorial Team (1992: 6991) asal kata statistik berasal dari kata New Latin yakni statisticus artinya 'negara' atau Bahasa Inggrisnya 'state'dan didefinisikan sebagai kumpulan matematika dan interpretasi data numerik khususnya analisis ciri-ciri populasi dari sampling. A concise understanding of educational statistics has been added
7	In the Module add SPSS (Dr. Abdurrahamsyah. M.Pd)
	Revision **B. SPSS** Menurut Priyatno (2012) SPSS merupakan program olah data statistik yang sangat populer dan banyak penggunaya. baik untuk penelitian umum, penelitian skripsi, tesis, desertasi, dan sebagainya. SPSS nsendni merupakan Singkatan dari Slalislical Program For Social Science yaitu sofwarc untuk keperluan mengolah data. Keunggulan dari SPSS diantaranya adalah diwujudkan dalam menu kotak-kotak dialog antar muka yang cukup memudahkan para user dalam perekaman data, memberikan perinlah dan sub-sub perinlah analisis hingga menampilakan hasilnya. Disaniping itu SPSS juga memiliki kehandalan dalam menampilkan chart atau plot hasil analisis sekaligus penyuntingan bilamana diperlukan

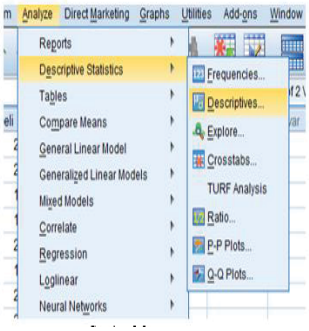
	SPSS Summary already added
8	 Comment Cover Modules should be revised instead of the SPSS practice module in the education education statistics course, but the Education Statistics Module
	 Revision Title Cover Already in fox

2) One to One

In addition to soliciting assessments, suggestions or comments from validators, the first prtotypes were tested on three sementer IV students, namely: A, AS, and MS. Tests are conducted to see the difficulties that may occur in the use of modules during the learning process. The researcher interacts with the student to see the difficulties that may occur during the workmanship of the Module, so as to provide input or correction whether the module needs to be repaired or not. Having tested the researchers asked students to comment freely about SPSS Pratikum module. And his comments can be seen in the following table

Tabel 4.1 Student Comments on Stage One to One

No	Comment
1	Comment

	Step processing data less clear Lakukan pengolahan data dengan menu Analyze-Descriptive Statistics (Frequencies) pada Program SPSS.
	Revision 5. Untuk analisis data, klik menu Analyze > Descriptive Statistics > Descriptives.  The steps have been described with the image
2	Comment The examples are not there
	Revision Examples already added
2	Good for learning data analysis and quite helpful in learning education statistics.
3	1. Module is quite interesting, the language used is short and clear. We recommend that you add the image to make it more interesting so that it does not saturate viewing the text.

b. Second prototype

The second prototype test was conducted on the students with the form of small group discussion learning which amounted to 10 students of 4th semester of UIN Raden Fatah Palembang. The implementation of small group testing was done in a computer lab. At this stage the researcher sees student comments after using the module of education statistics

The second prototype revision was made based on comments from students as well as analysis on small group trials. The second prototype revision also aims to fix the deficiencies in the second prototype in order to produce a third prototype. Here's a student comment on the second prototype :

Table. Comments and Second Prototype Revision

No	Comment
1	1. From the module view is pretty good 2. The contents of the module is not boring
2	Modules are easy to learn
3	Image is quite clear Language is not difficult to understand
4	Unsaturated lecture activities Discussions are more interesting and the atmosphere is fun
5	A lot of knowledge gained in data processing using SPSS software
6	College education statistics make me not bored because in addition to learning with the help of modules also direct practice to the computer. I am easy to understand about the lesson of using SPSS
7	The modules provide many benefits in my understanding of descriptive analysis, frequency analysis, one sample T test, independent T test, Paired T test and one way anova.
8	I became aware of how to run SPSS because of direct practice to computer media.
9	Interesting enough to learn because it is easy to understand
10	There are images so it can be applied directly practice time.

The table above is a revision on the second prototype to produce a third prototype obtained walkthrough. This third prototype is regarded as a valid and practical teaching material design product.

e. Field Test Results

After obtaining a valid third prototype and practical, then tested field tests to see the potential effects on student learning activities on this module. Tests conducted since

July 2, 2018 to July 6, 2017 Students Semester 4 UIN Raden Fatah Palembang which amounted to 20 students (List of Student Names Attached). The lessons are held three times, the first meeting of students conducting Practicum 1 and Practicum 2, the two students meeting Practicum 3 and 4, the meeting of the three students carry out Practicum 5 and 6 and perform the Task Mandiri. In Task Mandiri, students solve problems individually. Problem given as many as three questions.

Student activity data collecting is done by observation during learning process. At each meeting, the researcher is assisted by 1 observer who is in charge of observing the student activity to know the potential effect of the module designed. In this lesson, each student is given a Task that they must do and discuss with their group members.

REFERENCES

Apriyani, Dwi Cahyani Nur & Suminar, Eka Putra Wahyu. 2016. Pengembangan Modul Mahasiswa Pada Matakuliah Struktur Aljabar Unutk Mahasiswa STKIP PGRI Pacitan. Vol.4 No.1 http://ejournal.stkippacitan.ac.id/index.php/jh/article/view/24

Anna Cesaria dan Dewi Yuliana Fitri (2014), Efektivitas Pengembangan Modul Mahasiswa pada Perkuliahan Bahasa Inggris Untuk Matematika, Jurnal Pelangi, Volume 6, Nomor 2, Juni 2014 (85-91), ISSN: 2085-1057, E-ISSN: 2460-3740, Anna: E-mail: annacesaria13@gmail.com dan Dewi: dewie_ssi@yahoo.co.id, Program Studi Pendidikan Matematika STKIP PGRI Sumatera Barat, Website: http://ejournal.stkip-pgri-sumbar.ac.id/index.php/pelangi

Amir, Taufiq. 2009. Inovasi Pendidikan Melalui Problem Based Learning, Bagaimana Pendidik Memberdayakan Pemelajaran di Era Pengetahuan. Jakarta: Prenadamedia Group.

Arends, Richard I. 2008. Learning To Teach (Belajar Untuk Mengajar). Yogyakarta: Pustaka Belajar

Dwi Cahyani Nur Apriyani dan Eka Putra Wahyu Suminar (2016), Pengembangan Modul Mahasiswa pada Mata Kuliah Struktur Aljabar untuk Mahasiswa STKIP PGRI Pacitan, Jurnal Humaniora, Vol. 04, No. 01, Oktober 2016, Hal. 410-473, Dwi: E-mail: yaa_latiif@yahoo.com, Eka: E-mail: azhaire1303@gmail.com, Program Studi Pendidikan Matematika STKIP PGRI Pacitan.

Emy Artuti (2013), Pengembangan Modul Mahasiswa dengan Meta-Cognisi Questioning pada Materi Teknik Pengintegralan, Edu Sains, Volume 1, Nomor 1, Juni 2013, ISSN 2338-4387.

Erviyenni dan Elva Yasmi (2012), Pengembangan Modul Mahasiswa Berbasis Kontekstual pada Mata Kuliah Kimia Anorganik,Laboratorium Program Studi Pendidikan Kimia FKIP Universitas Riau, E-mail: erviyenni@gmail.com

Efendi, Nursalam Ferry. 2015. Pendidikan Dalam Keperawatan. Jakarta Selatan: Salemba Medika

Fitri, Amalia. 2012. Efektivitas Metode Problem Based Learning dan Pendidikan Karakter dalam Matakuliah Statistika Dasar. Vol.22 No.1 http://www.unikal.ac.id/Journal/index.php/lppm/article/view/128

Ginting, Cipta. 2003. Kiat Belajar di Perguruan Tinggi. Jakarta: PT Grasindo Anggota Ikapi.

Hmelo-Silver, C. E. (2004). Problem-Based Learning: What And How Do Students Learn?. Educational Psychology Review, 16(3), 235-266.

Jackson Pasini Mairing dan Dadang Lorida, (2013), Pengembangan Modul Mahasiswa Berbasis Masalah dan Proyek pada Mata Kuliah Analisis Data, Jurnal Pendidikan, Volume 14, Nomor 2, September 2013, 53-61, E-mail: jacksonmairing@yahoo.co.id, Prodi Pendidikan Matematika FKIP Universitas Palangka Raya

Mihardi Satria, Mara Bangun Harahap, Ridwan Abdullah Sani.2013. The Effect of Project Based Learning Model with KWL Worksheet on Student Creative Thinking Process in Physics Problems, Journal of Education and Practice, ISSN 2222-1735 (Paper) ISSN 2222-288X (Online), Vol.4, No.25, 2013, http://www.iiste.org/Journals/index.php/JEP/article/view/9086/9298

Nieveen, N. & Plomp, T. (2012). Formative Evaluation in Educational Design Research (EDS). An Introduction to Educational Design Research. Enschede: SLO.

Nyoman Rohadi (2013), Pengembangan Modul Mahasiswa Berbasis Keterampilan Berpikir Menerapkan Model Pembelajaran Berdasarkan Masalah pada Perkuliahan Medan Elektromagnet, Prosiding Semirata FMIPA, Universitas Lampung, 2013, E-mail: rohadi_nyo@yahoo.com, Prodi Pendidikan Fisika FKIP Universitas Bengkulu.

Prastowo, Andi. 2011. Panduan Kreatif Membuat Bahan Ajar Inovatif, Menciptakan Metode Pembelajaran yang Menarik dan Menyenangkan. Jogjakarta: Diva Press.

Rahmi, Villia Anggraini, dan Melisa (2014), Pengembangan Modul Mahasiswa Berbasis Problem Based Learning pada Perkuliahan Persamaan Diferensial Biasa, Prosiding Seminar Nasional Sains dan Pendidikan Sains IX, Fakultas Sains dan Matematika, UKSW Salatiga, 21 Juni 2014, Vol 5, No.1, ISSN :2087-0922, Rahmi: E-mail: rahmi_65@yahoo.com, Villia: E-mail: villia_doang@yahoo.com, Melisa: E-mail: icamelisa87@gmail.com, Program Studi Pendidikan Matematika. STKIP PGRI SUMBAR, Padang, Indonesia.

Riyanto, Yatim. 2010. Paradigma Baru Pembelajaran Sebagai Referensi bagi Pendidik dalam Implementasi Pembelajaran yang Efektif dan Berkualitas. Cetakan Ke 2. Jakarta: Kencana Prenada.

Savery, John R. 2006. Overview of Problem Based Learning: Definitions and Distinction. The Interdisplynary Journal of Problem Based Learning. Volume 1, no. 1 (2006). 9-20 http://docs.lib.purdue.edu/ijpbl/vol1/iss1/3/

Semra Sungur and Ceren Tekkaya (2006), Effects of Problem-Based Learning and Traditional Instruction on Self-Regulated Learning, The Journal of Educational Research, Vol. 99(No. 5), May/June 2006, Middle East Technical University. https://fortress.wa.gov/cjtc/www/images/docs/classes/PBL/Articles/effects%20of%20pbl%20learning%20and%20traditional%20learning%20on%20self%20regulated%20learning.pdf

Shi, Ning-zhon. 2009. Understanding Statistics and Statistics Education: A Chinese Perspective. Journal of Statistics Education. 17 (3), (1-8) https://pdfs.semanticscholar.org/1bed/23964242d332dfe1742e08f50f37d4bd58fb.pdf/05-06-2017, 20.00 WIB

Shobirin, Ma'as. Konsep dan Implementasi Kurikulum 2013 di Sekolah Dasar. Yogyakarta: Deepublish.

Sudijono, Anas. 2007. Pengantar Statistik Pendidikan. Jakarta: PT Raja Grafindo Persada.

Sardiman. 2011. Interaksi & Motivasi Belajar Mengajar. Jakarta: Rajawali Pers.

Sugiyono. 2013. Metode Penelitian Pendidikan, Pendekatan Kualitatif dan Kuantitatif dan R & D. Bandung. Alfabeta.

Trianto. 2012. Model Pembelajaran Terpadu dalam Teori dan Praktek. Jakarta: Prestasi Pustaka.

Wardoyo, Sigit Mangun. 2013. Pembelajaran Berbasis Riset. Jakarta Barat: Akademia Permata.

Widiawati, Hestin Sri & Prastyaningtyas, Efa Wahyu. 2017. Pengembangan Modul Mahasiswa Berbasis Problem Based Learning Pada Mata Kuliah Akuntansi Koperasi Mahasiswa Pendidikan Ekonomi Universitas Nusantara PGRI Kediri. file:///C:/Users/PUSPITA/Downloads/361-582-1-SM%20(4).pdf

Zhang, D. (2010). Study on the Teaching Model Based on Multimedia and Network Environment. International Education Studies, Vol. 3, No. 1, 161-164.