An Attempt to Improve the EViews-Based Econometrics Learning
(A Case Study of Economic Education Study Program, State University of Medan)

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ABSTRACT

This study is a development research which aims to improve and produce Econometrics textbook based on EViews application and portfolio of 6 Indonesian National Qualification Framework (KKNI) assignments. This book was designed to improve students' ability at mastering Econometrics, whether manually or use EViews application. This study uses research and development method. They are as follows: 1) potential and problem, 2) data collection, 3) product design (draft 1), 4) design validation, 5) design revision (draft 2), 6) small group product testing, 7) first product revision (draft 3), 8) usage testing, 9) second product revision, 10) mass production. The preparation of this book was only up to the seventh stage, namely the revision of first product (draft 3). Data were analyzed using descriptive statistics, Cochran's Q test and paired sample of t test. The results of analysis and discussion of this study indicated that the Econometrics textbook based on EViews application and portfolio of 6 KKNI assignments are valid, effective and meet the criteria of practicality.

Keywords: *Econometrics, EViews, Portfolio of Assignments*

1. INTRODUCTION

The role of Econometrics for students, especially for students of Economics Faculty is very needed at improving student's competence. Recalling that econometrics is increasingly important when economists and business decision makers need fast and accurate information.

The econometrics is the use of computer analysis and modelling techniques to explain about relationship between major economic forces such as labor, capital, interest rates and government policies in mathematical sense, and then examines the effect of change in economic scenario. So, in essence, econometrics is a science that utilizes mathematics in finding the parameter value of economic relationship, as postulated by economic theory. Hence in practice, econometrics mixes economic theory with mathematics. However, it must be remembered that mathematics is only being a tool in helping to do econometrics analysis, which is essentially an economic analysis. This economic analysis is a profile of graduated students from the Faculty of Economy whose competence must be improved from year to year.

Referring to the era of Industrial Revolution 4.0 which is currently developing, there need to be new orientation in the education world. [1] explains that the relevance of education and job, need to be adjusted to the development of the era and science and technology while paying attention to the humanities aspects. In order to prepare graduated students to be competitive, the curriculum needs a new orientation, because old literation is not enough (reading, writing, and mathematics) as the basic capital to take parts in society. But it also equips students with 3 new literacies namely data literacy (ability to read, to analyze and to use information (Big Data) in digital world) technology Literacy (understanding how machine works, technology applications) and human literacy (humanities, communication, and design). Refers to the concept of Industrial Revolution 4.0, so there needs to be a strengthening of technological literacy to improve students 'competence in understanding how econometrics applications work, one of which is EViews.

As a result of learning, students are expected to have skills in processing and analyzing data, have knowledge and logical understanding and be able to use econometrics software and be able to read and interpret the computational result correctly in a fast time and accurate results.

The problem is that previously the lecturer team had compiled the econometrics book, but it has not been updated with the use of the application. Books used in econometrics course are only on the theory and manual calculations. Of course, this is not relevant to improve students' competence in strengthening student technology literacy. Therefore, in the process of studying econometrics, it is deemed necessary to develop teaching material that can help students to understand econometrics not only manually but also based on applications, one of which is EViews (Econometrics Views). In addition, the concept of this teaching material will be equipped with concept format of 6 KKNI assignments, consist of routine assignments, journal reviews, critical book reports, mini researches, projects and engineering ideas adopted by State University of Medan. This teaching material will be designed in such a way as to make the lecturers easy and to equalize the information's to the students about 6 KKNI assignments concept.

Based on this background, that's why this research was done on improving textbook as an effort to improve the outcomes of student learning about econometrics. The main purpose that wants to be achieved in this research is the production of an econometrics textbook based on EViews application with portfolio assessment approach of 6 KKNI assignments.

2. LITERATURE REVIEW

2.1. Teaching Materials

Teaching materials are a set of materials that are systematically arranged, both written and unwritten, so as to create an environment and situation that allow students to learn [2]. According to [8], teaching materials consist of three parts, namely the main component, the complementary component and the evaluation component. The main component contains information or main topics that will be conveyed to students or that must be mastered by the students, while the complementary components can be additional information's or additional topics that are integrated with the main teaching materials or enrichment information for students. The evaluation components consist of question devices or test that students can use during the learning process. The guidelines of this teaching material development is the fulfilment of relevant teaching material components with teaching-learning needs, including the content of the learning material, picture/illustration, summary and exercise and also tasks.

2.2. The Result of Studying Econometrics

The ultimate goal of all efforts in education is to increase students 'success. Therefore, all attentions are focused on increasing the efficiency of the learning process. Competent lecturers should assess learning outcomes in the context of learning purposes and adapt learning according to the outcomes of the assessment carried out [10].

The outcomes of student learning are influenced by several learning conditions, namely internal and external conditions. Internal factors are factors that exist in the person called individual factors. These factors are maturity or growth, intelligence, practice and tests, motivation, personality. While, external factors are factors that exist outside of the individual, these factors include: family factors, lecturers, facilities, and infrastructure, and the environment [13]. External factors in this case by the way the lectures do the development of teaching materials which will be the study in this research that is one of the factors that influence learning outcomes.

The learning outcomes referred to this study are student learning outcomes in econometrics course. Learning outcomes are obtained through tests that are prepared with reference to the basic competencies specified in the syllabus. The learning outcomes in this research will be obtained later from special material from the revised draft of teaching materials from validation results.

When it is viewed from the type of material in this course, there are several concepts, principles, and procedures that require interesting learning and motivate students to learn. It means that in the econometrics learning process, it needs learning variations both in the aspects of teaching materials, models, media and others that can affect student learning outcomes, one of which is by improving teaching materials, namely through EViews which is able to explain the required econometrics testing based on relevant applied applications.

2.3. Improvement of Econometrics Teaching Materials (Books) Based on Applications (EViews) and the Portfolio Concept of 6 KKNI Assignments

This econometrics course is an important subject, that's why material mastery and student's competences in this course is a must. Therefore, improving econometrics teaching materials that are technology-adaptive is also an absolute thing to do. It can't be denied that learning outcomes are influenced by the quality of the teaching materials used by students. The problem is that the relevance of material in the econometrics course has not been adaptive to the easier development of data

analysis technology (EViews) which is easier, practical and accurate.

So, in developing the econometrics book, it will be equipped with a manual formula of each material and also compared and proven by using the application of analysis software, namely EViews. This teaching materials is also ideally relevant the 6 KKNI assignments concept and is equipped with case studies related to educational research problems. This manual formula and analysis tool (EViews) will form students' knowledge and skills in analyzing econometric data that are adaptive to today's technology. Ideally, the development of teaching materials can make it easier for students to get knowledge and also make it easier for lecturers to teach, give assignments and evaluate student learning   outcomes.

The concept of 6 KKNI assignments, namely routine tasks, reviews journals, critical book report, mini research, projects, and engineering ideas. So, in this case the development of econometric teaching materials will be equalized in assignment problems and student assessments.

2.4. Preliminary studies that have been done and the achieved results

Based on the FGD (Focus Group Discussion) conducted with lecturers who taught Econometrics courses in 2015, it was decided that it was necessary to prepare a standard SAP to be used at Economics Faculty, State University of Medan. This is deemed necessary because so far, the SAP that the econometrics lectures use is relatively different. In 2016, a teaching material was made in the form of a companion book for the econometrics course.

Furthermore, in 2017, the standardization of the Semester lesson plan for econometrics course was upgraded. However, the process of compiling this book has not yet passed a series of comprehensive and adaptive studies with the improvement of econometric analysis tools (EViews) and adjustments to the concept of 6 KKNI assignments. So that on this occasion it is necessary to improve the quality of teaching materials that have been made previously.

3. RESEARCH METHOD

This research used research and development methods. This research was done for 6 months in the Economics Education Study Program, Economy Faculty, State University of Medan. Research subjects as data sources in this study were lecturers who taught econometrics course at Economy Faculty, State University of Medan and lecturers who were at Lecturer Group Performance in the Field of Studies or known as KDBK of economic education learning program and economic education students. Data analysis in this study is to analyze the development of Econometric teaching materials. The analysis of the development of Econometric teaching materials has good quality if it meets 3 aspects, namely aspects of validity, practicality and effectiveness. To test the validity aspect of the textbook content, it will be assessed in 16 aspects
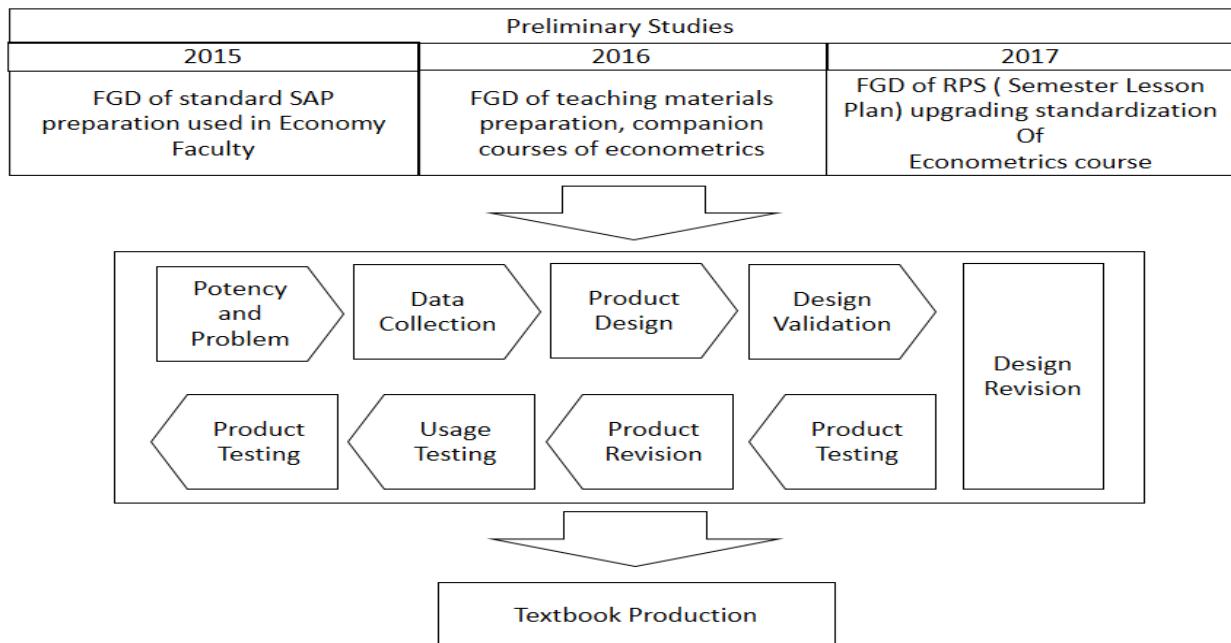

Figure 1. Stages of Research with the Method Research and Development (R&D)

observed by 3 expert validators, then the results are tested using nonparametric statistics with the Q-Cochran's test. While, to test practicality aspect, it will be assessed by students later to test assessment of their ability at reading the book on the limited sample to the textbook that has been made by using Likert scale. And to test the effectiveness aspect of the teaching material, test will be done later to the limited small group with before-after (one to one) experiment design by using paired sample of t-test.

4. RESULTS AND DISCUSSION

The improvement of teaching materials has gone through a series of research and development which refers to [3] with the following steps:

4.1. Potential and Problems

Potentials and problems, are discussing the availability of potential studies and problems in developing econometric teaching materials. At this stage, it discusses the background of improving Econometric Book teaching commonly used by students. As a result of evaluating to the students, there are several obstacles including the following:

1) The material taught is still based on manual or excel calculations only. Meanwhile, to respond the era of the Industrial Revolution 4.0, it is necessary to be adaptive to improve students' technological literacy competencies by completing the manual calculations material and also using econometric analysis applications in this case is EViews.

2) To facilitate and to equalize the information of the 6 KKNI assignments applied at State University of Medan, the concept of this teaching material will be complemented by the concept of a portfolio of 6 KKNI assignments.

4.2. Data Collection

Data collection namely the availability of information that can be used for planning the preparation of Econometric teaching material products in this study are:

a. Standardized RPS documents of Econometrics courses.

b. Instructional documents of Econometrics courses

c. Concept documents of 6 KKNI assignments of Econometrics courses

d. Instrument documents for assessment of Econometric learning outcomes

Table 1. Validation of Module Questionaire

No.	Name	Validation
1	Dr. Arnita, M.Pd	• have not questioned the description of 6 KKNI assignments • Language editorial needs to be improved
2	Dr. M. Fitri Ramadana, M.Si.	• The context of the question is good, it needs improvement in the language editorial and the content of the questions about the assignments.

4.3. Product Design

Product design (draft 1) namely the availability of a draft book on Econometrics. The material of the book

Table 2. Enter the Revised Module from the Validator

No.	Name	Validation
1	Dr. Arnita, M.Pd	• It is necessary to have same examples of exercises with cases that are more relevant to student research. • Make the book layout more attractive
2	Dr. M. Fitri Ramadana, M.Si.	• Question examples need to be directed to the economics not to the accounting case. • Improve the language editorial to make it easier for students to understand.

was prepared in 11 chapters, consisted of Chapter 1 Introduction; Chapter 2 Descriptive Statistics; Chapter 3 Simple Regression; Chapter 4 Multiple Regression Analysis; Chapter 5 Multicollinearity; Chapter 6 Autocorrelation; Chapter 7 Heteroscedasticity; Chapter 8 Panel Data Regression Analysis; Chapter 9 The Simultaneous Equation Model; Chapter 10 Cointegration Model and Error Correction Model (ECM); Chapter 11 Regression Models with Qualitative Independent Variables.

Each of the chapters above consisted of descriptions of the subject matter of learning, case examples according to the subject matter, and was equipped with examples of both manual case calculations and the EViews application. Question exercises were designed to be evaluated with a portfolio-based assessment of 6 KKNI assignments.

4.4. Design Validation

Design Validation namely the availability of validation test results through expert validation for the contents.

Table 3. Validity Aspect of Textbook Contents

No.	Observed Aspects	Validator		
		1	2	3
1	Book is in accordance with the curriculum syllabus	1	1	1
2	Book is in accordance with the expected basic competences	1	1	1
3	Book is relevant to the material that students must study	1	1	1
4	The content of the material has corrected and right concept	1	0	1
5	Book helps explaining the concept	1	1	0
6	Book contains manual example questions and application	1	1	1
7	Book contains 6 KKNI assignments-based exercises	1	1	1
8	The suitability of exercise questions with the studied material	1	1	1
9	The suitability of question examples and exercise questions with ability to be improved	0	1	1
10	Available exercise questions have met the proportion of the difficulty level	1	0	1
11	The language used is good and correct	1	1	1
12	The language used is easy to know and to understand	1	1	1
13	The appearance and arrangement of the book are attractive	1	1	0
14	The arrangement of pictures and tables is attractive	0	1	1
15	The font size used is clear	1	1	0
16	Students can use the book independently	1	1	1

Textbooks that have been compiled at the product design stage are draft 1, then tested through several stages. The first stage is the textbook validation test using expert validity assessments. The validation consists of two stages, namely 1) validation of the validation questionnaire sheet that will be used by expert team in assessing the module, 2) validation of books through a questionnaire given to expert team after revision. The validation of the questionnaire was carried out by three validators who are experts in the field of econometrics.

Before the designed textbook is declared valid and reliable and can be used in small group trials, first the book is validated by several experts. Some of the experts

Mathematics Study Program); and (2) Dr. M. Fitri Ramadana, M.Si (Lecturer in Econometrics Course in Economic Education Study Program).

After the validation sheet was revised, the validator provided an assessment of the module description. The following are the results of the revision of teaching materials by the validator.

Several aspects and assessments observed by validators in textbook validation can be seen in Table 3.

Table 4. Cochran's Q Test Calculation Results Statistics Test

N	16
Cochran's Q	$.286^{a}$
Df	2
Asymp. Sig.	.867

a. 1 is treated as a success.

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair	Before 1 – After	-21	5.676	1.795	-25.06	-16.93	-11.699	9	.000

who gave consideration to the validity of the content of econometric textbooks.

EViews application and portfolio of the 6 KKNI assingments are (1) Dr. Arnita, M.Pd. (Mathematics,

Based on the consideration results of the two experts on the 16 aspects observed from the 11 chapters that have been compiled, then an analysis was carried out using the Cochran's Q Test which aims to find out whether the experts have the same considerations related to the validity of the contents of the textbooks compiled with the calculation results as shown in Table 4.

high assessment of all indicators of book readability. The results of the readability of the textbooks made, then measured by converting the Likert scale values with the lowest to highest total value ranges (0 - 50). Based on this range, then the criteria for whether an indicator was good or not from the textbook decided to determine the practicality of using textbooks according to Table 7.

Table 5. Book Readability Assessment of Limited Samples

No	Indicators	College Students										Total
		1	2	3	4	5	6	7	8	9	10	
A	Variable: Ease for User (Learnability)											
1	Instructions for the use of teaching materials	4	4	5	4	4	3	4	4	5	4	41
2	Use of language and sentence structure according to the level of ability of students.	4	4	3	5	4	5	4	4	4	4	41
3	Can support individual or group learning processes	4	4	4	3	4	5	4	4	4	5	41
4	Exercises can help students understand the concepts	5	4	3	4	5	4	4	4	5	4	42
B	Variable : Efficiency											
1	Teaching materials can help students to deepen their understanding about the materials	4	4	4	4	3	5	4	4	4	5	41
2	Pictures in teaching materials can help students find the concepts	4	4	4	4	4	3	5	4	4	4	40
3	The teaching materials are easy to understand	4	4	5	4	4	5	4	4	3	5	42
4	Assignments on teaching materials can help students understand the concepts	4	4	4	4	4	3	5	4	5	4	41
5	Teaching materials are more practical and can be adjusted according to the abilities of students without differentiate SARA	4	3	5	4	4	5	4	4	4	4	41
6	The attractiveness of the display of teaching materials can motivate students to learn	5	4	4	4	4	5	4	4	4	3	41
C	Variable: Effectiveness of time											
1	The use of teaching materials can make learning time be efficient	4	5	4	4	5	4	4	4	4	4	42

Based on the Table 4, the t value obtained was 11.69 with a Sig value < 0.00. Because Sig 0.00 <0.05, it could be concluded that there were differences in student learning outcomes in small group samples before and after treatment using the textbook.

After the pairing test was complete, next draft 2. This textbook was carried out by readability test of the book. A textbook readability test was carried out with the aim of testing the readability of the book so that it could be used in a larger sample.

The indicators and assessments of the textbook readability test observed by 10 students can be seen in the following table:

Based on the results of the book readability assessment, it can be seen that the ten students gave a

Based on the results of the assessment on a limited sample, it could be concluded that most of the indicators of book readability were at strong and very strong criteria. So, it could be said that the book developed had met the criteria for readability and practicality.

4.5. Product Revision II

Product Revision II (draft 3) namely the availability of a revision draft of the limited sample test input results. After going through the product trial stage on a small sample and also a readability test for students, then a second revision was carried out to produce an econometric textbook draft 3 that were ready to be tested

Table 6. Criteria for Textbook Practicality

Interval	Criteria
0 – 10	Very weak
11 – 20	Weak
21 – 30	Enough
31 – 40	Strong
41 – 50	So strong

on a large group sample. Based on the results of the questionnaire given to students, it was found that most students felt good benefits after using the EViews application-based Econometrics textbook and portfolio of 6 KKNI assignments. Students already seemed interested in reading books because the books were complete with calculation guides, both manuals and EViews. The results of the questionnaire generally explained that students expected more supportive learning facilities of this econometrics course, namely studying in the computer laboratory. This is because not all students have laptops and not all their laptops installed with EViews, so it will make easier for students to be more understand about econometrics both in terms of manuals and the EViews application with applied concepts.

5. CONCLUSION

Improving econometric textbook for students, especially for students at Faculty of Economics, is needed to improve students 'competence. Econometrics is increasingly important when economists and business decision makers need fast information. Econometrics itself means a science which makes use of mathematics and statistical theory in looking for parameter values of the economic relationship as postulated by economic theory.

Referring to the era of the Industrial Revolution 4.0. currently developing, there needs to be a new orientation in the world of education. Ahmad [1] explains that the relevance of education and work needs to be adjusted to the development of the era and science and technology, especially in the economic field. Refers to the concept of the industrial revolution 4.0. So there needs to be a strengthening of technological literacy to improve students 'competence in understanding how econometric applications work, one of which is EViews.

Based on the results of research that has been carried out using the teaching material development method, it can be concluded that the econometric textbooks were designed based on EViews application and portfolio of KKNI assignments. This econometric textbook was created through research and development (R&D) lines based on expert considerations, limited sample testing to measure practicality or book readability. The development of this teaching material was based on the Borg and Gall models. After going through the product trial stage on a small sample and also a readability test for students, then a second revision was carried out to produce an econometric textbook draft 3 that are ready to be tested on a large group sample.

Based on the results of the questionnaire given to students, it was found that most students felt good benefits after using the EViews application-based Econometrics textbook and portfolio of 6 KKNI assignments. Students already seemed interested in reading books because the books were complete with manual calculation guides and EViews. Based on this model, the developed textbook can be used for lectures in the Econometrics course for the next large sample trial stage

AUTHORS' CONTRIBUTIONS

Authors had made this book to make students easier at studying econometrics and it was proven based on the research showed that most students felt good benefits after using the EViews application-based Econometrics textbook and portfolio of 6 KKNI assignments. Students already seemed interested in reading books because the books were complete with manual calculation guides and EViews. Based on this model, the developed textbook can be used for lectures in the Econometrics course for the next large sample trial stage.

ACKNOWLEDGMENTS

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