Active learning in scientific writing skill using Indonesian textbook based on character education

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Abstract. The purpose of this study was to describe development of text-based and character-based Indonesian textbook model. The method was research and development which consists of four stages, they are: (1) Exploration, (2) Model Development, (3) Model Testing, and (4) Dissemination. The research approach in the exploration stage was qualitative descriptive approach. Data collection was done through in-depth interviews, observation, documentation, and questionnaires. Data analysis technique was done by interactive analysis model. Experimental research was done in the model testing stage. The results of this study: (1) exploration stage showed that the Indonesian textbooks used in UNS, UMS, and UNISRI Surakarta, have not been in accordance with the needs of students and lecturers, (2) model development stage produced a character-based scientific writing textbook through preliminary field testing; and (3) the effectiveness testing showed that the value of $t$ obtained was 0.17 which then compared with the value of $t$ table (with $N = 90$, $a = 0.05$) pointing 1.64. Thus, the $t$-obtained $(0.17) > t$-table $(1.64)$, the hypothesis was accepted (Ho was rejected) and the textbook was stated significant. This means that the text-based and character-based Indonesian textbook was effective to improve scientific writing skills.

1. Introduction

Writing skills for collage students is a must. College students are always involved with writing activities in their daily studies. Writing activities that they do is in the form of writing papers, writing a book report, and ultimately writing a thesis or a dissertation in accordance with the level of their education [1]. Conditions that occur in the Indonesian language learning in undergraduate degree of Elementary Teachers Education (ETE) Program in Surakarta was not encouraging. This is derived from the fact that the students' writing ability was low. Students found difficulties in finding the root of the problem to be written [2]. They also do not master the rules of the Indonesian language use. In general, students experience difficulties in writing scientific papers. These difficulties include: (1) finding topics or issues to be written, (2) finding writing materials or references, (3) composing effective sentences, (4) composing good paragraphs, and (5) mastering scientific writing techniques [3]. Some of these difficulties still occur to date.

The recent rapid development of information flow requires the academic community in college to have the ability to write in order to support the learning as well as in order to enliven and stimulate national culture [4]. Intellectuals often conveys ideas orally (as speakers) through seminars, interactive discussions, debates, and so on [5]. It would be better if they complete the materials in written form. For those reasons, this research is important to help and guide the students in following the lecture of Indonesian language learning through active learning [6]. Based on explorative study, the lecturers’ and students’ need on text-based and character-based Indonesian textbook to improve scientific writing skill,
the textbook of Indonesian language is expected to be more appropriate and in accordance with the needs and characteristics of the students.

All Indonesian language lessons start from elementary school to high school are text-based. Likewise, Indonesian language learning in college should be text-based. With text-based, students use the language not only as a means of communication, but also a means of developing the ability to think [7]. Therefore, this text-based learning needs to be understood by observers of Indonesian language teaching, teachers, lecturers, students, and related parties. It is appropriate that Text-Based Learning Textbook through Active Learning are used by undergraduate students of Elementary Teacher Training Program in Surakarta region, in order to improve the ability to write scientific writing.

The application of active learning depends on the level of the program, the material, the type of student, the type of group, as well as the discussion required by the students to improve the understanding of the material [8]. The application of active learning is needed to improve the understanding of Indonesian language receptive skills. The results of research conducted by Meyers & Jones [9] concluded that by the application of active learning strategies, students can express in four aspects of language skills: listening, speaking, reading, and writing.

The selection of active learning strategies in learning is an appropriate consideration to make learning effective. Active learning is an effective teaching technique when compared with conventional teaching techniques [10]. The success of Indonesian language learning can not be separated from the existence of textbooks. Textbooks contains specific materials used as a teaching and learning guide at school [11]. Textbooks are usually used in conjunction with other learning resources such as workbooks, teacher reference books or supporting texts [12]. Due to the need of text-based and character-based Indonesian textbook, this research is urgent to be done immediately in undergraduate ETE Program in Surakarta.

2. Research Method
Type of the research used in this study was a development study proposed by Borg and Gall [13]. Furthermore, Borg and Gall said that research and development is a process used to develop and validate educational products. The research includes four stages: (1) exploration stage, (2) model development stage, (3) model testing stage, and (4) dissemination and model implementation stage. Exploration stage was done in-depth study on the implementation of Indonesian language learning in Undergraduate ETE Program in Surakarta. The purpose of this stage was to analyze students’ and lecturers’ need on Indonesian textbooks (text-based and character-based) that are considered able to improve students’ scientific writing abilities optimally. The research approach used was qualitative descriptive approach. Researchers emphasized the observation on the interaction between students and lecturers in the implementation of Indonesian language learning in the research location. Researchers also conducted in-depth interviews and questionnaires to the students and the lecturers, and analyzed.

In the model development stage, the main objective was to produce Indonesian textbook model (text-based and character-based). The development of a prototype textbook model was done in a cycle, which was both research and practice. The steps taken include: preparation of prototype, implementation, evaluation of implementation, and revision in a sustainable manner. The procedure used is the Glanz model theory guide, which includes: data collection, analysis, data interpretation, reflection, and modification [13]. The next cycle was done with the same procedure. In addition, the Zuber-Skeritt model was also used [14], which includes: careful planning, implementation of plans, observation, assessment, evaluation, critical analysis of implementation results, and subsequent cycle determination. The development process was done by testing the textbook model in the field, through limited trials and extensive trials. A limited trial was conducted in Undergraduate ETE Program in Sebelas Maret University Surakarta. Extensive trials were conducted in Undergraduate ETE Program in UMS Surakarta and UNISRI Surakarta. Data collection techniques used were scientific writing test. The analysis of the research data was done through two stages, namely the requirements analysis test stage (normality test, homogeneity test, and balance test) and the data analysis stage to test the effectiveness of the model using independent t-test. The output of the model testing phase was a text-based and character-based Indonesian textbook that has been tested in a process and product.

3. Result and Discussion
Based on the findings at the exploratory stage it can be concluded that there were problems in Indonesian learning of the ETE Program. The problems were (1) the absence of Indonesian textbooks, (2) the lack
of active learning to improve students’ scientific writing skill, (3) lecturers’ lack of understanding on Indonesian scientific writing, and (4) uninnovative learning models. In principle, students, lecturers, and policy makers agreed that Indonesian textbook (text-based and character-based) needed to be developed immediately. Furthermore, based on the analysis of the students’ and lecturers’ need, the following results has achieved; (1) text-based and character-based Indonesian textbook needed to be developed to facilitate and guide students in improving scientific writing skills, (2) innovative learning procedure needed to be applied as a solution to the saturation of students in monotonous and non-varied lectures, and (3) validated scientific texts needed to be given to help improving students' scientific writing skills [15].

Based on the findings at the exploration stage, there were six phase to be done at this stage of development, they were: (1) developing prototype into textbook, (2) validating prototype through expert judgment, (3) validating and improving the prototype through limited trial in Undergraduate ETE Programs in Surakarta, (4) validating the model development outcomes though broader trials in the Undergraduate ETE Programs in Surakarta, (5) determining the textbook model, and (6) concluding the result.

This research data was in the form of scientific writing score of the Undergraduate ETE Program students in Surakarta area which used as a research sample, both for experimental group and control group. In the experimental group, 90 respondents from the Undergraduate ETE Program of Universitas Sebelas Maret, Surakarta, were given treatment in the form of teaching and learning process using Indonesian textbook model developed through active learning. On the contrary, 85 respondents from the control group who came from the students of Undergraduate ETE Program of Muhammadiyah University Surakarta were treated using old textbook model.

Referring to the above explanation, the total number of respondents was 175, ie 90 respondents in the experimental group, and 85 other respondents in the control group. In the experimental and control groups, all respondents were given a scientific writing skill test at the beginning (pre-test) before the experimental treatment was performed. Meanwhile, after treatment, all respondents performed another test, called post-test.

Based on the description above, the research data description was grouped into 6 (six) groups, namely: (1) pre-test score data of scientific writing ability on experimental group; (2) post-test score data of scientific writing skill in experimental group; (3) pre-test post-test deviation score data of scientific writing skill in experimental group (4) pre-test score data of scientific writing skill in control group; (5) post-test score data of scientific writing skill on control group; and (6) pre-test post-test deviation score data of scientific writing skill in control group. Each group of research data were described in the following statistics: (1) the calculation of central tendencies, such as: mean, median, mode; (2) spread tendency, such as: variance and standard deviation; (3) the highest score; (4) the lowest score; (5) span; (6) the frequency distribution; and (7) the histogram image frequency score.

3.1 Pre-test and Post-test score data of scientific writing ability on experimental group
Pre-test score of scientific writing skill from 90 experimental students could be reported as follows: (1) central tendency: mean = 68.81, mode = 67, and median = 68, (2) spread tendency: variance = 11.89 and standard deviation = 3.45; (3) the highest score = 77; and the lowest score = 59; (4) span = 18. Post-test score of 90 undergraduate students’ scientific writing skill of Undergraduate ETE Program in Universitas Sebelas Maret, Surakarta could be reported: (1) central tendency: Mean = 77.68, mode = 75, and median = 77; (2) spread tendencies: variance = 23.97 and standard deviation = 4.90; (3) the highest score = 88; and the lowest score = 68; (4) span = 20. Using the similar process of preparing the frequency distribution of the pre-test, the preparation of the post-test frequency distribution was: (1) range = 88-68 = 20; (2) number of interval classes = 6; (3) the interval class length 20: 6 = 3.33 rounded up to 4; and (4) the lower end of the first interval group starts from the smallest data of 68.

3.2 Pre-test and Post-test score data of scientific writing skill in control group
Pre-test score of 85 undergraduate students’ scientific writing skill of ETE Program in Universitas Muhammadiyah Surakarta could be reported: (1) central tendency: mean = 63.81, mode and median = 63; (2) spread tendency: variance = 12.70 and standard deviation = 3.56; (3) the highest score = 72; and the lowest score = 54; (4) span = 18. As the steps of composing the frequency distribution, the frequency distribution of the control group pre-test score preparation was: (1) range = 72-54 = 18; (2) number of
interval classes = 5; (3) the interval class length 18: 5 = 3.6 rounded up to 4; and (4) the lower end of the first interval group starts from the smallest data of 54. Post-test score of 85 undergraduate students’ scientific writing skill of ETE Program in Universitas Muhammadiyah Surakarta could be reported: (1) central tendency: mean = 72.78, mode = 70 and median = 73; (2) spread tendency: variance = 13.36 and standard deviation = 3.67; (3) the highest score = 80; and the lowest score = 65; (4) span = 15. As the steps of composing the frequency distribution, the frequency distribution of the control group post-test score preparation was: (1) range : 80-65 = 15; (2) number of interval classes = 6; (3) the interval class length 15:6 = 2.5 rounded up to 3; and (4) the lower end of the first interval group starts from the smallest data of 65.

### 3.3 Requirement Analysis Test

Inferential data analysis which was to prove whether research hypothesis was accepted or rejected was done using statistical test of independent t-test. Data analysis with statistical technique required some requirements analyzed. These requirements include: (a) the normality test, (b) the homogeneity of variance test, and (c) the balance test. The data normality test was performed using Lilliefors technique. Meanwhile, the homogeneity of variance test was performed using the Bartlett-test technique; and the balance test was performed using independent t-test technique.

### 3.4 Hypothesis Testing

Hypothesis testing was to know whether the proposed null hypothesis (H0) was rejected, or vice versa at certain level of confidence the proposed alternative hypothesis (H1) was accepted. In accordance with those mentioned in the previous section, testing of the research hypotheses was tested by independent t-test technique. The statistical analysis technique was used to observe the effectiveness of the treatment in using text-based and character-based Indonesian textbook model through active learning, compared to those who did not use the textbook.

The effectiveness of text-based and character-based Indonesian textbook model through active learning to improve the students’ scientific writing skill of ETE Program Surakarta (UNS and UMS) was validated.

Based on statistical analysis with independent t-test technique obtained t-obtained = 0.17. Meanwhile, the critical area (df): t(0.05; 173) = 1.64 so df {t <=1.64 or t> 1.64} and t = 0.17 < dk so H0: μ1 ≠ μ2 was accepted. Thus, there was a significant difference between students’ scientific writing skill who were taught using text-based and character-based Indonesian textbook model through active learning, compared to students’ scientific writing skill taught using the existing textbook model. In other words, it could be concluded that text-based and character-based Indonesian textbook model through active learning could improve students’ scientific writing skill.

The implementation of active learning was very supportive of Indonesian language learning to improve scientific writing skill optimally. The application of active learning based on the level of the program, the material, the type of student, the type of group, as well as the discussion required by the students to improve the understanding of the material [16]. Implementation of active learning is needed to improve material understanding including scientific writing skill. The application of active learning strategies, students can express in four language skills; listening, speaking, reading, and writing [17]. Thus, the application of active learning in text-based and character-based Indonesian textbook was effective in improving students’ scientific writing skill [18].

### 4. Conclusion

The exploratory stage showed that Indonesian textbooks used in UNS, UMS, and UNISRI Surakarta, had not met the students’ and lecturers’ need. The model development stage produces text-based and character-based Indonesian textbook through preliminary field testing. Based on the effectiveness testing phase of the textbook (main field testing), the value of tobtained (0.17) was higher than table (1.64), thus the hypothesis was accepted (H0 was rejected) and the study was significant. It meant that the text-based and character-based Indonesian textbook was effective to improve students’ scientific writing skills. The dissemination phase was done through socializing the textbook in national seminars, international journals, and the publication of Indonesian textbook with ISBN. The text-based and character-based Indonesian textbook was effective for improving students' scientific writing skill. The textbook as teaching material could be accepted by teachers, policy makers, and students.
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