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The Influence of Indonesian Instructional Books with a Scientific Approach on Students' Learning Outcomes in Scientific Writing

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This study aims to investigate the influence of Indonesian instructional books with a scientific approach on students' learning outcomes in scientific writing viewed from their academic ability. This is quasi-experimental research design. Techniques used to collect data were tests in form of multiple choice and essay, observations, and documentations. Before conducting t-test, the researchers conducted a prerequisite test. Its results for the influence of Indonesian instructional books with a scientific approach on students' learning outcomes showed significance values of 0.314 in cognitive domain, 0.032 in psychomotor domain, and 0.038 in affective domain. The results for the influence of academic ability on learning outcomes showed significance values of 0.065 in cognitive domain, 0.969 in psychomotor domain, and 0.528 in affective domain. The results for the interactions between of Indonesian instructional books with a scientific approach on students' and academic ability on cognitive, psychomotor. The conclusions of this study are: 1) Indonesian instructional books with a scientific approach influences students' learning outcomes in form of psychomotor and affective domains; 2) the academic skill does not influence students' learning outcomes in scientific writing, and 3) the interactions between Indonesian instructional books with scientific approach and academic ability have no effect on students' learning outcomes in scientific writing. It is recommended that Indonesian instructional books with a scientific approach can be developed to measure higher order thinking skills.

Keywords: instructional books, scientific approach, learning outcome, academic ability

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INTRODUCTION

Important issues regarding the development of knowledge and education, especially the writing of scientific papers learning, have become important issues in Indonesia (Wardani et al., 2017; Marselina, 2018; Izzah & Rafli, 2018; Imelda et al., 2019; Sari, et. al., 2021). This issue has also become a global issue regarding the development of scientific writing learning knowledge (Ecarnot et al., 2015; Sakamoto, 2018; Cuschieri et al., 2019; Hen-Herbst & Rosenblum, 2019; Camuffo, 2020). Learning in educational system cannot be separated from science and technology. Its development is noted that in the 21st century there is a big shift in learning. The fundamental changes to information access, computing, automation, and communication have an impact on 21st Century learning models that direct learners as the focus of learning. They have to be active in classroom learning to create student-centered learning. It is supposed to enable students to obtain knowledge easily and apply it in the process of learning. The learning process certainly cannot be separated from the curriculum that is referred to, in this case the curriculum 2013, which leads to a scientific approach, especially in Indonesian language learning in universities.

In curriculum 2013, Indonesian language learning is based on texts or more focussed on texts (Diana, 2016; Gaol & Solin, 2017; Hariadi et al., 2018). Using these texts, linguistics is being taught and character education which leads to scientific thinking is integrated. Moreover, in scientific approach, the character building is easily relized (Hidayati et al., 2020). In this approach, students are asked to observe, raise questions, make a try, associate, and communicate (Camuffo, et al., 2020). These activities are carried out by integrating attitude formation, such as observing with responsibility, asking politely, trying honestly, associating, and communicating proactively. This good attitude will continue to be instilled in the learning process. The students are accustomed to have good attitudes and it will become a trait. As a result, students as the next generation will become good individuals.

Indonesian language course is a language learning which is directed to improve students' ability in written and oral communication that implements good and correct Indonesian language (Izzah & Rafli, 2018). In the end of this course, students are expected to improve their ability to communicate in written and oral language correctly. The aims of learning Indonesian language in university cannot be separated from its curriculum which is based on the Indonesian National Qualification Framework (Darmuki, 2014). Learning of Indonesian language consists of four abilities including listening, speaking, reading and writing. Those language skills have to be mastered by students (Darmuki & Hidayati, 2019).

One of books in Indonesian language course which can support those four skills is the book for writing scientific works (Asik, 2015). Through this way, students can apply their communication skills in reading, writing, and publishing their scientific works (Sukardi, et al., 2016). It has also created a scientific tradition in university which is expected to inspire every student's activity in implementing the *Tri Dharma* of University, namely education and teaching, research, and community service (Wardani, et al., 2007). Therefore, the learning of scientific work in university is important.

University as the first line in science development has scientific responsibilities through various studies or researchs, and other scientific activities. One of indicators in achieving scientific work learning is the creations of it such as papers, theses, research results, journals, and other written forms (Marselina, 2018). Students have to be taught that writing scientific works is not just a necessity, but it is a must (Kurniadi, 2017). The competence in using correct language grammar will be implemented in scientific communication, such as compiling papers, final assignments, or theses (Marselina, 2018).

Furthermore, scientific writing is a means of communication between people living in the present and future generations in order to improve and disseminate knowledge (Asik, 2015). Language communication skills can be obtained by understanding the philosophy and the methodology of writing scientific papers. Of course, this understanding is meaningless without continuous practices. In writing Indonesian scientific papers, the references and instructional books have an important role in learning (Izzah & Rafli, 2018). Instructional book is important element that has to be prepared to achieve the learning objectives.

The qualified instructional books can resolve students' problems in order to achieve educational goals (Helaluddin, 2018; Hariadi et al., 2018). It can be said that instructional books include knowledge, skills, and attitudes that have to be mastered by students to fulfill the standard competences as stated by Sodiq (2015), it becomes teacher's responsibility in building creativity to create innovative instructional books.

A gap in learning and mastering Indonesian language especially in writing scientific papers can be viewed in several studies such as in Darmuki (2014), Sodiq (2015), Helaluddin (2018), and Hariadi, et al. (2018). It is revealed that Indonesian language is a course with low credit semester. It has 2 credits in non-Indonesian language department and the instructional books do not match the needs of students and lecturers. In addition, a study by Gaol & Solin (2017) shows that the existing Indonesian instructional books influences on students' ability in writing narrative texts. However, it has not been specified in writing scientific papers. On the other hand, a research conducted by Izzah & Rafli (2018) reveals that the instructional books have not fulfilled the needs of students and lecturers especially in writing scientific papers. In addition, Rahmiati et al. (2019) state that the Indonesian instructional books are not based on scientific thinking skill; in fact it is one of writing skill needed in the 21st century. Based on those gaps in research, teaching materials influence the learning outcomes. However, it has not led to the 2013 curriculum regarding to scientific approach. This study connects the use of Indonesian language teaching materials with scientific approach in the 2013 curriculum to improve students' learning outcomes.

Several studies related to Indonesian instructional books have been carried out by Diana (2016), Gaol & Solin (2017), Izzah & Rafli (2018). More studies related to learning Indonesian scientific papers are carried out by Imelda et.al. (2019), and Wardani et al. (2017). Some researchs related to Indonesian instructional books with conservation content are carried out by Sukardi (2016), Pradnyawati et al. (2015), and Marselina (2018). Furthermore, several studies related to literacy-based Indonesian instructional

books are carried out by Sodiq (2015) and Rahmiati et al.(2019). Almost all studies that have been carried out are more focused on Indonesian instructional books in writing scientific papers generally. It has not been specified on Indonesian instructional books in writing papers using scientific approach in which it is suitable for writing scientific papers. It creates more scopes of study that is not only about an instructional book in writing papers, but it is also about the learning designs of planning, implementation, and evaluation which is focused on the scientific approach as an advantage of this study. The novelty of this study is focused on Indonesian instructional books in writing scientific papers with scientific approach in university where it is a prerequisite for students to finish their studies. Therefore, this study is very important to be carried out.

A research by Gaol & Solin (2017) about the effect of Indonesian instructional books on the ability to write narrative texts shows that the instructional books have an influence on the ability to write narrative texts. The aim of this research is to determine the importance of selecting instructional books to provide students' motivation to learn, and to find out the best instructional books for learning to write narrative texts. Its relevance with this study is the influence of Indonesian instructional books on the ability to write scientific papers viewed from student's academic ability. While in Gaol & Solin's research, the relevance with this study is the influence of Indonesian instructional books on the ability to write narrative texts. The similarity between these two studies is on the influence of Indonesian instructional books. The aspect of instructional books with a scientific approach has become the difference between these two studies. Gaol & Solin's research only uses text as a learning media that provides motivation to stimulate students' enthusiasm in learning language. In this study, the instructional books used are specially adapted for writing scientific papers with a scientific approach. The next related research is carried out by Hariadi et al (2018) which has formulated its findings entitled "The Need to Develop a Fast-Track-based Indonesian Language Learning Model in Higher Education Institutions". Its relevance to this study is to discuss the importance of instructional books that are in accordance with current world developments.

This phenomenon creates an assumption that Indonesian language especially writing scientific paper is a difficult book to be learned. The results of study also appear in the evaluation of written scientific papers which show a lower score than the test score of another courses (Wardani et al., 2017). Based on this phenomenon,the problem that occurs is actually a paradigm change that has not been realized by lecturers and students. The factors that cause students' failures are not their intelligences, but their characters such as self-confidence, abillity to cooperate, the ability to get along, the ability to concentrate, a sense of empathy, and ability to communicate. The scientific approach can be an effective way to overcome the problems. Its existence in Indonesi coincided with the existence of scientific learning to share courses (Hadromi et al., 2021). This approach is believed to be the best way to develop students' attitudes, skills, and knowledge (Hendriana et al., 2018). It is because scientific approach becomes a work process which fulfills scientific criteria in which the scientists prioritize inductive reasoning rather than deductive reasoning (Haenilah et al., 2021).

Based on the conditions, general problem can be raised from the question "how is the influence of Indonesian instructional books with a scientific approach on the results of learning to write scientific papers viewed from academic ability?". The answer to this question will be investigated through experimental research about the effect of Indonesian instructional books on writing scientific papers for the first year students in accounting department at University of Indonesia. The use of textbooks with scientific approach to learn Indonesian language course can improve the quality of students' learning outcomes in writing scientific papers viewed from their academic ability.

Indonesian Instructional Books with Scientific Approach

Indonesian instructional books with scientific approach have essential quality to which students are active to construct their own knowledge in collaborative groups. The socio-cultural which consists of constructivism and collaborative perspectives highlights the students' activeness in the learning process. Based on the collaborative-constructivist, students' comprehensions are derived from their activeness through the process of social interaction. It is one of reasons to create Indonesian instructional books with scientific approach. According to the Ministry of Education and Culture (2013:21), scientific approach in learning includes observing, asking, trying, processing, presenting, concluding, and creating all courses. Hosnan (2014) states that Curriculum 2013 with scientific approach is designed to fulfill the learning model in the 21st century which makes students to be focus on independent learning to find out from various references. Indonesian instructional books with scientific approach require students to learn through discussion and dialogue. It potentially empowers critical thinking, creative thinking, and improves students' mastery of science competencies. Activities in Indonesian instructional books with scientific approach contain discussion and dialogues which also have the potential to reduce the gap in students' learning achievement between upper academic (smart students) and lower academic (poor students). Indonesian instructional books with scientific approach need lecturers to consider the class as an academic community (In'am & Hajar, 2017). Students are active in learning phenomena and attempting to describe, explain, predict, and control natural objects. Irmita & Atun (2018) state that an academic community stimulates learners to study various learning sources such as lecturers' statements, instructional books, and conclusion of communication between students and lecturers.

Theoretical Review

Indonesian language course is one of the important instructional books in university (Darmuki, 2014). The aim of this learning is to make students are able to apply Indonesian language properly and correctly, and to live Indonesian language based on the situation, language objectives, and the level of students' experiences (Helaluddin, 2018). Lecturers should be able to develop instructional books as the references besides textbooks (Hariadi et al., 2018). The Government Regulation no. 19 of 2005 in article 20 states that teachers/lecturers are expected to be able to develop instructional books for educators in educational units to improve the syllabus and books . Based on those situations, the researcher considers that the development of textbooks that utilizes existing texbooks and another information is absolutely needed. These textbooks have to

be packaged in such a way to fulfill the characteristics of good textbook and to be used by students in the learning process.

Instructional book is printed learning media which is used to facilitate educators in improving their competencies (Gaol & Solin, 2017). According to Diana (2016), it is handbook of a course which is written and compiled by experts and fulfills the rules of instructional books, so it is officially published and disseminated. The use of instructional books in learning process is very important for lecturers and students in group, individual, and classical learning (Sodiq, 2015; Izzah & Rafli, 2018; Rahmiati et al., 2019). For educators, instructional books have a role to save time in teaching. The existence of it supports the learning process. The students can be assigned to learn the book first, so the lecturer does not need to give too many lectures. In changing the role of educator as facilitator, the existence of instructional books drive the educator to facilitate students rather than delivering books .

Putra, et. al. (2020) state that learning which implements modern pedagogic approach is emphasized in scientific approach of curriculum 2013. According to the Ministry of Education and Culture (2013:21), scientific approach in learning includes observing, asking, trying, processing, presenting, concluding, and creating for all courses. Hosnan (2014) states that curriculum 2013 with scientific approach is designed to fulfill the learning model in 21st century which makes students to be focus on independent learning to find out from various references. Scientific-based learning includes observing, asking, collecting data, reasoning, creating, and communicating.

Students are able to study actively in which scientific approach is implemented in the learning stages (Sodik & Wijaya, 2017). This approach establishes students' spiritual way of thinking and comprehension in applying subject matter (Amin et al., 2018; Haenilah et al., 2021). Moreover, students are stated as learning subjects. The lecturer is as a facilitator and motivator. Lecturers do not need to explain everything about the books , and students play an active role in learning both in asking, discussing and expressing their opinions as the results of reasoning; and they are required to be skilled in communicating the results (Darmuki, 2014). The implementation of the scientific approach involves five steps of learning process such as observing, asking, reasoning, associating, and communicating (In'am & Hajar, 2017). It is reinforced by Hadromi et al. (2021) who suggest that the process of implementing scientific approach includes three important domains (Darmuki & Hidayati, 2019), namely: the affective (attitude), cognitive (knowledge) and psychomotor (skills). Emphasizing these three domains creates effective learning and makes students to be productive, creative, innovative, and have a strong attitude in achieving the skills (Darmuki & Hariyadi, 2019).

In curriculum 2013, learning with a scientific approach is a skill that is in accordance with the requirements of 21st century which refer to the future curriculum (Hosnan, 2014; Supena et al., 2021). The demands of education in a competitive era need the skills to write scientific papers in solving various problems appropriately (Wardani et al., 2017). Students who are accustomed and skilled in compiling scientific works have broad insight and knowledge (Imeld et al, 2019). They will also get used to think systematically, carefully, and not carelessly in identifying and solving problems (Irmita

& Atun, 2018). Writing scientific papers has an important role and position, and it is a part of formal academic requirements (Sari et al., 2021). In every university especially in Indonesia, composing scientific papers can be part of course assignments given by lecturers such as essays, scientific papers, reports, articles, or it is as one of requirements for finishing studies to obtain a bachelor, master degree, and doctorates in forms of *skripsi*, theses, and dissertations (Wardani et al., 2017).

Writing scientific papers is a human product on the basis of knowledge, attitudes, and scientific thinking ways (Sudjana , 2020: 21). It is in line with Dewanto (2020) who states that scientific work is an essay that contains science and scientific truth that presents facts; it is systematically arranged based on the writing method using scientific languages. It is reinforced by Gaol & Solin (2017) who state that scientific essays are the essays that present general facts that can be proven, presented based on correct writing methodologies, and use scientific languages.

Hariadi et al. (2018) state that scientific papers contain scientific reviews. Written work is presented by delivering "scientific papers which contain scientific reviews". It is arranged by someone who discusses a subject as a result of research. The organization of scientific papers is always equipped by references that have to be written according to the rules of writing. A scientific paper is usually obtained from research results. As revealed by Sari et al. (2021) which state that scientific papers are written and published reports that describe the results of research or studies that have been carried out by a person or a team by implementing scientific rules and ethics. However, there are several papers obtained from the results of literature studies.

Based on its substances or contents, the characteristics of scientific works are (Wardani et al., 2017) (1) containing facts that can be proven, (2) supported by existing theories, (3) not being emotional. Based on the writing techniques, scientific works have the characteristics of (1) using a variety of scientific Indonesian language, (2) following a predetermined systematic, (3) being proportional, (4) having clear references, (5) being consistent.

Scientific work or paper is an article that contains a problem expressed using scientific method. In other words, the problems in scientific works is based on facts. It is objective, not emotional and personal. It is systematically arranged in a logical manner. According to Rahmiati et al.(2019), scientific works are written works that have been recognized in the fields of science, technology, or art. It is written in line with scientific procedures and follows scientific guidelines that have been agreed or established by university or institution. This study aims to investigate the influence of Indonesian instructional books with a scientific approach on students' learning outcomes in scientific writing viewed from their academic ability.

METHOD

Research Design

This study implements a non-equivalent posttest only. Therefore, it belongs to quasi-experimental study. Two groups which are utilized in this study are experimental and control groups. The control group implemented conventional instructional books , while

the experimental group implemented instructional books with a scientific approach in learning to write scientific papers. As stated by Sugiyono (2020), experimental and control groups were experienced a post-test. Primary data was collected and investigated to decide the impact of instructional books with scientific approach on the students' academic ability in writing scientific papers.

The procedures of research were started from stages of preparation, planning, implementation, observation, evaluation, analysis, and follow-up. Learning tools in form of syllabus and lesson plans were collected in planning stage. It would be used to provide treatments for research subjects. Moreover, the research proposal was also prepared in this stage. Scientific approach has prominent characteristics in terms of observation, discovery, reinforcement, and explanation of truth. This approach is included in scientific learning because it emphasizes on the importance of being active in collaboration between students to solve the learning problems. The Indonesian language textbooks used in this study have been designed by lecturers with a scientific approach that has been validated by linguists and textbook/learning experts. After that, instruments used to collect data are created.

Treatments for research subjects were provided in the implementation stage. In this stage, researchers obtain data needed. Research proposal and instruments were prepared in it. Moreover, teaching and learning activities were also planned. Conventional instructional books with lecturing method were implemented in control group. In experimental class, it was implemented instructional books with scientific approach. The learning process was observed by two persons to monitor the implementation of scientific approach using observation sheets. The next step is to conduct a post-test.
When the data was obtained, it had to be analyzed using SPPSS program version 16. The results of it had to be reported. It was carried out in analysis stage.

Participants

The population of study were all first year students of accounting department in University of Indonesia as the oldest state university in Indonesia. They were chosen because Indonesian language course for writing scientific papers was general course for personality development in all departments. It has to be taken by the first-year students in any department, especially accounting department. In addition, the Indonesian language course for writing scientific papers was a prerequisite course in completing their studies, especially in writing scientific papers in form of *skripsi*/final project. In order to implement the results of study, research samples had to represent total population of study (Sugiyono, 2020). The samples or participants of this study were two groups (class IA and class IB) and two lecturers. Control group of this study was class IA which consisted of 36 students including 27 females and 9 males. Experimental group of this study was class IB which consisted of 38 students including 28 females and 10 males. The lecturers had 5-10 years of teaching experiences. They taught Indonesian language course in accounting department at University of Indonesia. As stated by Sugiyono (2020), cluster sampling was utilized to take subject of study randomly from members of groups with similar characteristics. Budiyono (2019) stated that in determining control and experimental classes use random sampling.

Data Collection

In collecting research data, this study utilized test, documentation, and observation methods. Test was conducted systematically by providing questions to obtain participants' responses which could be calculated. According to Budiyono (2019), it was an instrument to evaluate individual's skill or understanding. This method was used to measure students' scientific writing skill. Test developed in this study was in form of performance test in scientific paper writing. To obtain data in forms of notes and class review, documentation was used in this study.

Budiyono (2019) argued that in investigating the classroom activities, observation was conducted directly in the teaching and learning process. The stages of implementing instructional books with scientific approach were examined using observation sheet. It was implemented in a classroom monitored by an observer. She observed all of teaching and learning process such as students' and teacher activities, and classroom situation.

The object of observation covers the entire teaching and learning process in the classroom activities including teacher's activity, students' activities, and classroom condition during the learning process.

Data Analysis

In analyzing data, this study implemented two kinds of analyses. The first is descriptive statistical analysis. It was used in describing data, i.e. the profile of first-year students' ability to write scientific papers in accounting department at University of Indonesia. The second is inferential statistical analysis. It was utilized in hypothesis testing which implemented two-sample of t-test with level of significance (α) was 0,050. It utilized SPSS program version 16. Before t-test was carried out, a prerequisite test was done first. It consisted of normality and homogeneity tests. In testing data normality, Kolmogorov-Smirnov test was utilized. Moreover, Levene's test was utilized to examine data homogeneity. According to Budiyono (2019), the conclusion of hypothesis could be stated whether H_0 was accepted or rejected; it could be rejected when the value of significance probability (*Sig.*) was less than α (0,05); it could be accepted when the value of significance probability (*Sig.*) was more than α (0,05).

Data Accuracy Validation

Essay was used to assess students' scientific paper writing. Therefore, its feasibility had to be examined first by conducting validity and reliability tests. Sugiyono (2020) stated that validity was an important test to examine instrument's accuracy. In other words, an instrument was stated to be valid when it could measure needed things. In this study, validity test was conducted to ensure that the instrument used was appropriate for learning of Indonesian instructional books. There are two kinds of validity, i.e. internal and external validity.

Validity of content stated whether the test included a representative sample of behavioral domains being measured. It could be controlled by: (1) identifying the concepts on the subject matter to be tested; (2) compiling a grid of books to be tested; (3) creating test questions based on the grid and making key answers along with the

assessment rubric; (4) re-examining the questions, key answers, and assessment rubrics before it was printed (Budiyono, 2019).

Construct validity was a validation form regarding whether the instrument was in accordance with the data and indicators of book concepts being tested. Indicators were used to describe a concept by collecting relevant instruments.

When the construct was examined, it also examined the indicators. It could be concluded that if the instrument was appropriate in measuring indicators, it would be appropriate in measuring concepts of books (Sugiyono, 2020). Construct validity could be determined by expert. However, it could also be tested by parts of population. In this study, construct validity of the instrument was tested using expert review.

Research instruments had to be compared with empirical data in testing external validity (Sugiyono, 2020). It was carried out by trying out the instrument on the sample of research population. Validity could be measured by correlating the total scores of students in one item (X) with the total scores obtained by all students (Y) using the correlation technique of Pearson product moment.

T-test needed to examine the value of r_{XY}. According to Budiyono (2019), when research samples represented total population, t-test had to be calculated. The following step was to look at the distribution (t-table) for the significance level (α) = 0,05 and the degree of freedom (df= N-2). The comparison resulted in a test decision. When $t_{count} < t_{table}$, the item was invalid. When $t_{count} > t_{table}$, the item was stated as valid question although it was tested repeatedly (Budiyono, 2019). Test questions were stated to be reliable when it provided the same results in different times. In this study, Cronbach's Alpha was utilized to determine research instruments in forms of test and questionnaire items. Both test instruments and questionnaire items were said to be reliable when $R_{count} > 0,6$ (Sugiyono, 2020).

Validity and reliability test were conducted to the questions used in obtaining data.

Table 1
Instrument Validity

Number of question	r count	r table	Conclusion
1	0.3128	0.3120	Valid
2	0.3128	0.3120	Valid
3	0.3128	0.3120	Valid
4	0.3128	0.3120	Valid
5	0.3131	0.3120	Valid
6	0.3128	0.3120	Valid
7	0.3033	0.3120	Invalid
8	0.3131	0.3120	Valid
9	0.3131	0.3120	Valid
10	0.3043	0.3120	Invalid
11	0.3131	0.3120	Valid
12	0.3128	0.3120	Valid
13	0.3043	0.3120	Invalid
14	0.3033	0.3120	Invalid
15	0.3033	0.3120	Invalid

Table 2
Results of Reliability Test

Cronbach's Alpha	Value of Cronbach's Alpha Based on Standardized Items	Number of Items	Conclusion
0.69	0.60	10	Reliable

RESEARCH FINDINGS

The Research Results

The purpose of this study was to analyze the impact of Indonesian instructional books with scientific approach on students' learning outcomes in writing scientific papers viewed from their academic ability. The Indonesian instructional books with scientific approach were implemented to the experimental group (Class IB) which consisted of 38 students. While the control group (Class IA) which consisted of 36 students implemented instructional books using lecturing method. The determination of both groups was carried out by using cluster sampling in which balance value had been examined for total population of first year students in accounting department at University of Indonesia. The results of posttest in writing scientific papers from both groups were compared. It could be known whether there was an influence of Indonesian instructional books with scientific approach on the students' learning outcomes in writing scientific papers viewed from their academic ability.

The data about students' ability to write scientific papers in Indonesian language course was obtained from the results of written test. It was in form of essay to write papers in the end of learning process (posttest) on the book about scientific thinking with basic competence to explain the use of deductive and inductive thinking in obtaining knowledge. The essay consisted of 8 items which included aspects of writing scientific papers, authenticity of writing, suitability of title with content, the scope of study, novelty, systematic, and linguistics. The distribution results of students' ability to write scientific papers through Indonesian instructional book with scientific approach in the experimental group and through instructional book with lecturing method in the control group could be viewed in figure 1.

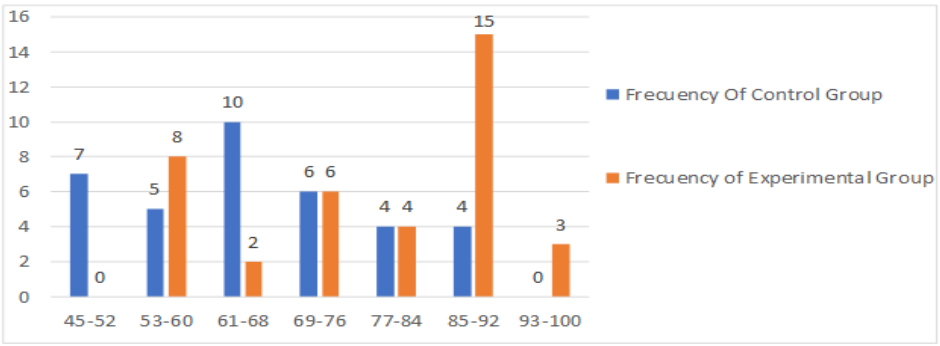

Figure 1
The frequency of critical thinking ability in both groups

Figure 1 provided information related to interval score in critical thinking ability for control group and experimental group. The largest frequency of control group was in the interval score of 61-68 with total frequency of 10. The largest frequency of experimental group was in the interval score of 85-92 with total frequency of 15. The data indicated that the students' level of scientific writing ability in experimental group were higher than those who were in control group. A brief description of students' scientific writing ability could be viewed in figure 2.

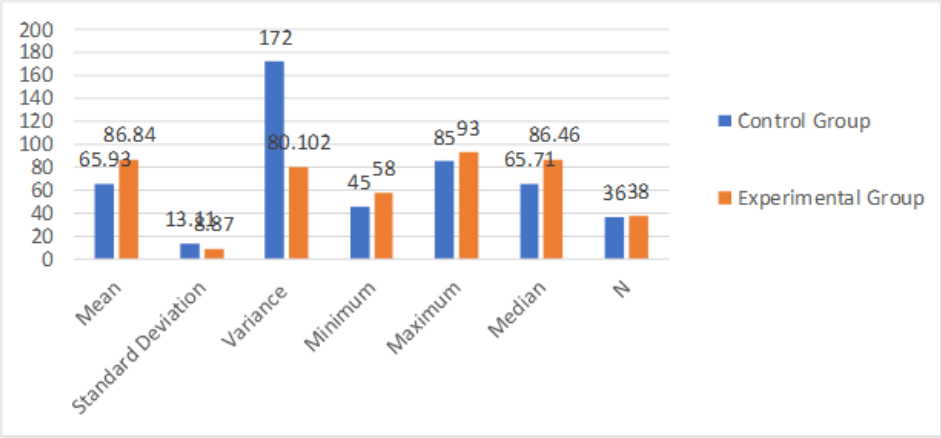

Figure 2
The description of students' scientific writing ability

Figure 2 showed that the average score of students' writing ability in experimental group could be stated to be higher than control group. It can be viewed that control group's mean score was 65,93. Experimental group's mean score was 86,84. The value of standard deviation indicated data heterogeneity. It could be stated as heterogeneous when it was getting larger. Conversely, data could be stated as homogeneous when it was getting smaller. Based on figure 2, standard deviation of control group was 13,11 and the standard deviation of experimental group was 8,87. Variance of control group was 171,872 and the variance of experimental group was 80,102. This condition showed that the standard deviation and variance of control group were higher than experimental group which meant that the level of diversity (variability) in control group was greater (Budiyono, 2017). The best and lowest scores of experimental group were higher than control group's scores. The median value of experimental group was also higher than control group. Based on those results, it could be stated descriptively that the students' ability to write scientific papers in experimental group was better than the control group.

In table 4, it could be known that the average value of experimental group which implemented Indonesian instructional book with scientific approach was higher than the control group which implemented instructional book with lecturing method. The comparison of average score for each aspect of the ability to write scientific papers in both groups could be viewed in figure 3.

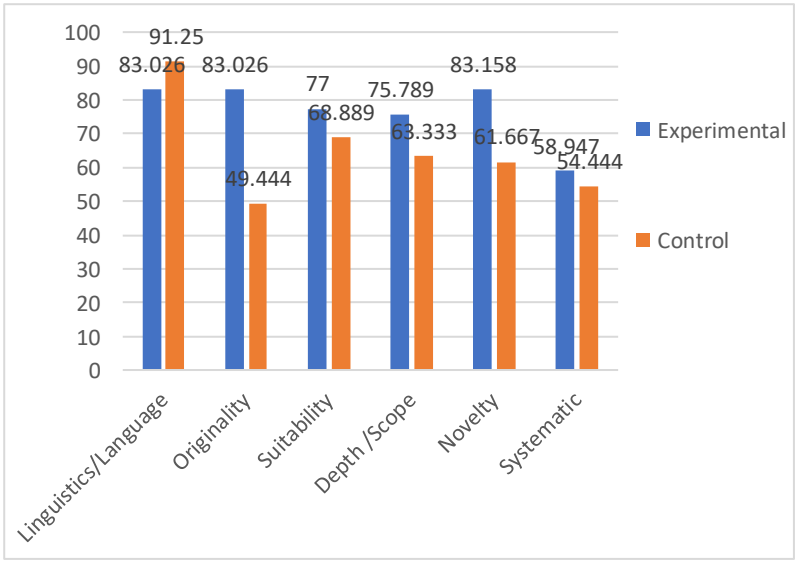

Figure 3
The comparison of average scores of ability to write scientific papers for each aspect

In figure 3, it could be viewed that the average scores of control class were lower than experimental class. The experimental group obtained higher score in five aspects including originality of writing, suitability of title with content, depth/scope of study, novelty, and systematic. The control group obtainded higher score in one aspect of writing scientific papers. It was the linguistics aspect.

The control group's ability to write scientific papers in the linguistics aspect was 91,250. It was higher than experimental group which was only 83,026. The value of originality aspect in control group was 49,444. It was lower than experimental group which obtained 83,026. Experimental group's score in suitability aspect was 77,36. Control group's score in suitability aspect was 68,889. The value of depth aspect in control group was 63,333. It was lower than experimental group which obtained 75,789. The value of novelty aspect in control group was 61,667. The experimental group's score in novelty aspect was 83,158. The value of systematic aspect in control group was 54,444. It was lower than experimental group which obtained 58,947. The highest average score of scientific writing ability in experimental group was in the aspect of novelty. While the highest average score in control group was in the linguistics aspect. The lowest average score of scientific writing ability in experimental group was in the systematic aspect. While the lowest average score in control group was in the originality aspect. Based on the average difference in the ability to write scientific papers between both groups for each aspect, it was arranged from the largest to the smallest difference, i.e. originality aspect of 33,582, novelty aspect of 21,491, depth/scope aspect of 12,456, suitability aspect of 8,479, linguistics aspect of 8,224, and systematic aspect of 4,503.

Normality Test

Testing assumption as a prerequisite for the difference analysis of two treatments using t-test needed to be tested statistically. There were pre-requisite tests before conducting t-test analysis, i.e. normality test and homogeneity test. The first requirement was that the data had to be normally distributed. The normality test aimed to determine whether both groups came from normally distributed population or not. H_0 was stated that research samples were a part of normally distributed population. H_1 was stated that research samples were not a part of normally distributed population. The normality test on the results of students' scientific writing ability in both groups used the Kolmogorov-Smirnov test with the $\alpha = 0{,}050$ assisted by the SPSS program version 16. The decision of normality test was stated based on the value of *Sig.* and the value of α (0,050). If the value of *Sig.* was higher than α (*sig* > 0,050), H_0 would be accepted, so it was concluded that data was from normal distribution. Therefore, table 3 provided normality test results.

Table 3
Results of normality test in critical thinking ability

Group	Kolmogorov-Smirnov	KS_{Table}	N	Sig	Result	
					Description	Decision
Control	0,107	0,227	36	0,809	Sig > 0,05	Normal
Experimental	0,077	0,221	38	0,455	Sig > 0,05	Normal

Table 3 showed that the value of *Sig.* was more than 0,05. Therefore, H_0 could be accepted. In other words, the data obtained from control group and experimental group had normal distribution.

Homogeneity Test

Before t-test was carried out, researchers had to ensure that data was from homogeneous distribution. Therefore, it needed to conduct homogeneity test. The purpose of this test was to examine the variance of both groups was heterogeneous or homogeneous. When the data of both groups had the same variance, it could be said that data was homogeneous. In this study, Levene's test was utilized to measure data homogeneity related to students' skill in writing scientific papers. It was measured using SPSS program version 16 in which the value of α was 0,05. The variance between both groups was stated to be homogeneous when the significance value was more than 0,05 (*sig*>0,05). Conversely, when the significance value was less than 0,05, the variance was stated to be heterogeneous. H_0 was stated that each group had the same variance (homogeneous). H_1 was stated that each group did not have the same variance (heterogeneous). The result of homogeneity test could be viewed in table 4.

Table 4
The homogeneity test result of scientific writing ability

Homogeneity Test	N	df1	df2	F_{Count}	F_{Table}	Sig	Decision Test of H_o
Scientific writing ability	74	1	72	3,883	3,974	0,053	Accepted

Table 4 provided information that the value of F_{count} was 3,883 and the value of $F_{table(0,05)(1)(72)}$ was 3,974. Based on the calculation results, the value of F_{count} was less than $F_{table(0,05)(1)(72)}$. Moreover, its significance value was more than 0,05. These

calculations showed that H_0 was accepted, so the ability to write scientific papers in both groups was homogeneous. The hypothesis testing requirement for the data on students' ability to write scientific paper had been fulfilled. The data came from the normally distributed population and had homogeneous variance. So, the parametric testing of research hypothesis through t-test could be carried out.

Hypothesis Testing

In this study, t-test was conducted to test hypothesis using SPSS program version 16. The purpose of two-sample t-test was to compare whether two variables (data) were the same or different (Sugiyono, 2020). The result of prerequisite test showed that the data on the students' ability to write scientific papers were normal and homogeneous. So, it had fulfilled. Decision making was based on the value of significance level (α) = 0,05. When the value of significance of probability (*sig*) was less than α, it could be concluded that H_0 was rejected. Conversely, when the value of significance of probability (*sig*) was more than 0,05, it could be said that H_0 was accepted. In this study, H_0 was stated that there is no difference between the implementation of Indonesian instructional book with scientific approach and the implementation of instructional book with lecturing method on the students' ability to write scientific papers. H_1 was stated that there was a difference between the implementation of Indonesian instructional book with scientific approach and the implementation of instructional book with lecturing method on the students' ability to write scientific papers. The analysis result through t-test related to the influence of Indonesian instructional book with scientific approach on the students' ability to write scientific papers could be viewed in table 5.

Table 5
T-test result about the influence of instructional book on students' ability to write scientific papers

Variable	N	df	T_{count}	t_{table}	Sig	Description	Decision Test of H_o
Ability to write scientific papers	74	72	4,485	1,993	0,00	Sig > 0,01	Rejected

Table 5 showed the result of decision test. It can be viewed that the significance value (Sig) was 0,00. It is less than 0,05. Based on the results, it could be concluded that H_0 which stated that there was no difference between the implementation of Indonesian instructional book with scientific approach and the implementation of instructional book with lecturing method on the students' ability to write scientific papers was rejected. And H_1 which stated that there was a difference between the implementation of Indonesian instructional book with scientific approach and the implementation of instructional book with lecturing method on the students' ability to write scientific papers was accepted. It showed that the implementation of Indonesian instructional book with scientific approach influenced on the students' ability to write scientific papers because the significance value was less than 0,01 (0,00<0,01).

DISCUSSION

The result of data analysis with t-test shows that Indonesian instructional books with scientific approach has influenced on students' ability to write scientific paper. The result of test decision shows that the value of sig is 0,00 (*sig* < 0,05), the value of t_{count} is

4,845 , and the value of t_{table} was 1,993. So, it can be said that $t_{count} > t_{table}$. The students' average scores of scientific writing in experimental class which implements Indonesian instructional book with scientific approach is higher than those who are in the control class which implements instructional book with conventioal learning. There is a large difference in the average score of students' ability to write scientific paper. In the experimental group, the average score is 86,84. In the control group, the average score is 65,92. This is because in Indonesian instructional book with scientific approach. They are asked to find problems, create hypothesis, and examine it in group discussions. It creates inquiry process which results in students' logical and scientfic thinking on the book . It is in line with Wardani, et. al. (2017) who state that there is a difference in the ability to write scientific papers in the aspects of analysis, evaluation, conclusion, deduction, and induction between the class which implements case-based learning and the class which implements traditional learning. The learning process runs well and creates interaction between lecturers and students, so the objective of learning Indonesian language course can be achieved.

Indonesian instructional book with scientific approach is a process of approaching scientific understanding by implementing the concepts of scientific study to create emoirical, active, creative, and effective learning. The scientific approach is defined as collaboration of constructivism and collaborative view which are compatible. In constructivism, students have to build their understanding based on their ideas. Collaborative view requires students to work in groups and have social interaction. Scientific approach becomes a basis in teaching and learning process. This approach is characterized by emphasizing the dimensions of observation, reasoning, discovery, validation, and explanation of truth (Ministry of Education and Culture, 2013). It is in line with Irmita & Atun (2018) who state that scientific research involves students in original research problems by exposing them to the field of investigation, helping them to identify conceptual or methodological problems, and inviting them to design ways of solving problems. There are several students who have low academic skill are not active in the learning process. It becomes a reason for researchers in conducting collaborative group which consists of several students with different academic skill levels. In the learning process, the student with high academic skill is able to facilitate other students with low academic skill. In line with Darmuki, et. al. (2018), Darmuki & Hariyadi (2019), Darmuki & Hidayati (2019) who state that in the collaborative learning, students have to be placed in groups to work together, be able to interact or discuss with their peers, have a strong intention to teach other friends in groups, and take the advantage of interactions in the collaborative group.

Learning using instructional book with scientific approach in experimental group runs effectively. It is shown by students' enthusiasm during the learning activities. It can be viewed when the lecturer carrys out learning steps that encourage them to build their own knowledge. It is carried out in an interactive and fun situation on the book for using deductive and inductive thinking to write scientific papers. The implementation of this learning has been carried out well by the lecturer.

The implementation of instructional book with scientific approach to the experimental group begins with organizing the learning. In this stage, groups of students are created in

which one group consists of 5 students with various academic skills. This heterogeneity aims to foster students in conducting peer learning. It is intended to drive students with high academic ability are able to develop the concepts of knowledge of the students with medium and low academic ability. It is supposed to reduce students' gab in thinking. The second stage is by exploring students' initial concepts about the environmental pollution through the video presentation on the phenomena of using deductive and inductive thinking in writing scientific papers. They are asked to develop their primary ideas. In this case, lecturer provides questions related to it. Through video observation, the use of deductive and inductive thinking in writing scientific papers makes students to be more interested in recognizing and clarifying their own understanding and ideas. The purpose of uncovering students' initial concepts is to drive the conceptual changes which are in line with constructivist ideas which allow students to create new conceptions that are more scientific than their initial conceptions. Concepts are formed by students through a process of assimilation and accommodation. The process of integration enables students to adjust them to the latest idea. While in accommodation process, they can change their scheme to respond to new situations so that a cognitive balance occurs (Said et al., 2017).

In this stage, students are able to develop their primary ideas based on instructional book provided. They are also able to develop their ability to write scientific papers in linguistics aspect. The linguistic aspect is the students' ability to classify problems or phenomena using correct language, so it has clear meaning. It is in accordance with Piaget's theory about constructivist learning. Piaget (1996) conveys that students will be able to create their own knowledge and understanding based on their learning experiences including references and peers. The linguistics aspect has an average difference of 8,224 between experimental group and control group. The score of experimental group in linguistic aspect is 83,026. The score of control group in linguistic aspect is 91,250. This is happened because the control group started with the book presentation by the lecturer before doing the pratices. So, students are easily guided when compared to the control group who have practiced using the inquiry process first.

The following stage is making cognitive conflicts. The purpose of this stage is to encourage students' cognitive ability. They are asked to present their findings in front of the class. In this case, their abilities to think deductively and inductively are needed to solve problems found. The lecturer facilitates students to convey their ideas by providing classroom discussion. They are challenged to study because of cognitive conflicts. They are encouraged to find the best solution of it. Unconsciously, they increase their ability to write scientific papers in the aspects of originality and novelty. The originality aspect is viewed when they test ideas and analyze the causes of problems. The difference value of originality aspect between experimental group and control group is 33,582. The score of experimental group in originality aspect is 83,026. It is higher than the average value of control group which is only 49,444. It happens because the constructivist process in students goes better in the experimental group rather than in control group which only obtains the book from the lecturer. The novelty aspect is viewed when learners deliver their ideas related to problems and solutions

provided. The difference value of novelty aspect between experimental group and control group is 21,491. The score of experimental group in novelty aspect is 83,158. The score of control group in novelty aspect is 61,667. It can be concluded that experimental group's score is higher than control group's score because the experimental group provides more opportunity and time for students to present results of their group discussion.

Creating concept is the next stage which utilizing integration and adjustment processes.in this stage, learners are asked to investigate an experiment in groups. They have to find problems, create hypothesis, and examine it. It is in line with Gaol & Solin (2018) who state that through collaborative groups, students obtain the basic for writing scientific papers freely and depend on each other while expressing opinions during the discussion, making decisions, and solving problems. The ability to write scientific paper depends on one's understanding, belief in his own ability, his level of maturity, and his experiences.

Through scientific thinking, students are more focused on the learning process than the achievement of facts on phenomena. Writing scientific papers helps students to create and apply new knowledge to the real life. It makes students be more creative and responsible when they use their scientific thinking ability. Students are asked to formulate problems by classifying data. This activity is able to practice the ability to write scientific paper in the aspect of interpretation. In creating hypothesis, students are asked to examine data, relate it logically, and make hypothesis statements. In this way, students are able to practice their ability to write scientific writing in analysis aspect. Moreover, they are able to compile data, analyze, and conclude it in testing indefinite answers. They are asked to deliver ideas or opinions in compiling data. Therefore, they are able to more increase their scientific writing skill in explanation and evaluation aspects. Experimental and control groups have the average difference value of 8,479 in the aspect of suitability. Experimental group provides average value of 77,389. Control group provides average value of 68,889. In other words, average value of control group is less than experimental group. It happens because learning using Indonesian instructional books with scientific approach in writing scientific papers on problems or phenomena is able to motivate learners to determine reliable statements based on research findings. After conducting independent experiment, they are able to evaluate ideas using inductive or deductive thinking. In line with Irmita and Atun (2018) who say that scientific approach influence students' ability in finding problems and its solutions.

The next step, after the data of experimental activity is obtained, is to determine the depth/scope of study. The aspect of depth writing has an avearage difference of 12,456. Experimental group provides average value of 75,789. It is higher than the average value of control group which is only 63,333. It can be concluded that experimental group provides better average value than control group. Students of experimental group are able to draw up problems and make its hypothesis. It drives them to be able to recognize evidences, create hypothesis, and conclude the materials by thinking inductively or deductively, so the depth/scope of this study can be viewed clearly. In line with Imelda et al. (2019) and Sari et al. (2021) who state that students are able to develop the aspects of writing scientific papers through recognizing and obtaining the

elements needed to draw reasonable conclusions, solving problems and hypothesis, obtaining the relevant information, reducing the consequences arising from data, statements, principles, evidences, assessment, beliefs, opinions, concepts, descriptions, statements, or another representations.

Students deliver the outcomes of collaborative group discussion orally. In this way, lecturers are able to observe students' understanding by providing suggestions. Therefore, students can construct their own knowledge. They will be able to determine which book that has been understood and which one that has not been understood. In this activity, the systematic aspect can be trained in which the lecturer acts as a facilitator. The systematic aspect of both groups has an average difference of 4,503. The average value of systematic aspect in control group is 54,444. It is lower than the experimental group which is 58,947.

Quiz in form of essay is the next step conducted in the end of classroom learning. It aims to determine the students' understanding on the materials which have been taught. In the final stage, the best group performance that is active in the learning process will be appreciated. It can be team scores and individual score. In other words, a student is able to get recognition when he shows his progress score and contribution in collaborative group discussion.

Izzah & Rafli (2018) argue that Indonesian instructional books with scientific approach provide the blueprint, guided practice, combination, integration, and cognitive disproportion that encourage learners to construct their own knowledge by having group discussions. It can train students' scientific writing ability. Another research that support it is carried out by Diana (2016) who states that through learning using Indonesian instructional books with scientific approach, it can improve the learning outcomes on the ability to write scientific paper and scientific thinking ability.

CONCLUSION

The conclusions of this study are: 1) Indonesian instructional books with scientific approach have a significant influence on students' learning outcomes to write scientific papers, 2) students' academic abilities have no effect on their learning outcomes in scientific writing, and 3) the interactions between Indonesian instructional books with scientific approach and academic ability have no effect on first year students' learning outcomes in accounting department at University of Indonesia in academic year 2021/2022. The implementation of learning using Indonesian instructional books with scientific approach can train the components of students' scientific thinking ability, especially their ability to write scientific papers. In the future research, it needs to determine the effect of students' academic skill on their critical thinking and learning outcomes with larger group of participants by testing the effectiveness of instructional books with scientific approach and its practicality.

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