Philosophy of Science with a Practical Approach: a Critical Analysis

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Abstract. There is a tendency that Philosophy of Science books for students of Philosophy and non-philosophy study programs have no fundamental differences. Philosophy of Science books on the market, which are used for philosophy of science lectures tend to be felt rather heavy to digest, less communicative, less associated with solving problems that are being faced by non-philosophy study program students in preparing the final project. The development of the Philosophy of Science book using the ADDIE procedural model is to produce a valid Philosophy of Science book based on expert validation, positive and practical responses from non-philosophy doctoral program students who are studying philosophy of science. As a result, this study produced a Philosophy of Science textbook with a very valid approach based on expert validation, and very practical and positive responses from users. It is recommended that the book can be utilized as a complementary learning resource for philosophy of science.

Keywords: philosophy of science, practical approach, critical analysis.

1 INTRODUCTION

Research on the development of textbooks for Philosophy of Science with a Practical Approach is based on the problem that: Philosophy of Science books that are used in various universities and non-philosophy study programs are felt to be very difficult to digest the content, less communicative, very abstract and complicated and less related to the problems faced by students in completing the final project (TA, Thesis, Thesis, Dissertation). Learning Philosophy of Science should be easy to digest the content, easy to understand the concepts presented, and have implications for the ease for students in completing the final project.

Learning the philosophy of science for students of Philosophy study programs and non-philosophy study programs should not be equated. Learning the philosophy of science for non-philosophy study program students is not to train them to philosophize but by understanding philosophical thoughts on various matters of science. knowledge is expected to facilitate students in completing their final project. They need to understand the philosophical umbrella of their final project research - the accuracy of raising factual problems, conceptual theoretical answers, methodological choices, data analysis processes, discussion of research results, conclusions to the theoretical and practical implications of their research results.

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There is a need for non-program students of philosophy learning resources that make it easier for them to understand the various theoretical concepts presented in their textbooks, which help them in preparing research as their final project. The learning resources needed are learning books that make it easy, easy to digest the contents, which are communicative in terms of language, and make it easier for them to complete their final project. The learning book needed is a Philosophy of Science textbook with a practical approach. It is called a practical approach because in teaching philosophy of science for non-philosophy study program students because learning philosophy should be able to facilitate students in completing their final project. The importance of studying the philosophy of science is associated with the final project because basically every subject presented in the textbook is associated with parts of scientific work that become students' final project.

Textbook (in Menristek DIKTI Regulation Number 20 of 2017) is a handbook for a course written and compiled by experts in their fields and meets the rules of textbooks and is officially published and disseminated. In the UM Chancellor's Regulation number 11 of 2015 concerning Technical Guidelines for Assessing Credit Score for Academic Position / Rank for Lecturers at State University of Malang, the author, Buku Ajar, is not mentioned as a work in the form of a book so that a detailed explanation of Buku Ajar is not found. However, it still has academic value and meets scientific principles and is valued with a credit number as "Other Types of Books" (excluding Reference books and Monographs) as long as it meets the requirements as a scientific work.

The author argues that a textbook is a book that is compiled with a limited scope of content, its content is limited by the curriculum-syllabus-and lecture plans for certain courses or subjects for students or students at a certain level (smester/class). Analogous to textbooks are Diktat or Modules (if intended for independent learning purposes). The name of the Textbook, usually, is the same as the name of the course or the name of a particular subject, for example: Introduction to Education (for S1 PGSD Smester 1 students), Integrated Learning for S1 PGSD, Social Studies Lessons for Grade 4 SD Smester 1, Qualitative Research Methodology for S2 Basic Education Students, etc.

The characteristics of teaching books include: contains teaching materials (lecture/lesson materials) for certain courses/lessons, or in the form of activity guides that allow students to construct certain knowledge independently-for constructivist-oriented curricula, being one of the learning resources for certain courses/lessons, arranged systematically and simply, and accompanied by learning instructions. Textbook Systematics Generally includes: Book Title (presented on the Front Cover), Foreword, Table of Contents, Introduction, Chapter-by-Chapter presentation in accordance with the lesson units / subject matter of the course / subject, List of References, and About the Author. Each chapter is composed of: Chapter Title (Lecture Unit / Subject Matter), Instructions on How to Study a Certain Chapter, Learning Objectives (objective aspects), Description of Lesson Content / Activity Guidelines to present certain lesson content constructively, Tasks and Exercises, Summaries, and Competency Tests.

A good teaching book [1] at least meets the criteria: (1) relevance: -relevant between KI-KD-Indicators-Learning objectives-material descriptions-training tasks-summaries-and competency tests, relevant to the level of development of students; (2) accuracy: in accordance with scientific truth, accuracy in citing research results, no

errors in facts-concepts-theories; (3) illustrations: in accordance with the development of students, giving a picture that is not misleading; (4) language: correct sentence structure, correct spelling, correct grammar; (5) communicativeness-using semi-spoken language; (6) complete and systematic: presents competencies that must be mastered, benefits for the lives of students, presents a table of contents, bibliography, glossary, description of the material follows the flow of thought from simple to complex, and from local to global; (7) learner-centered: - encouraging learner curiosity, encouraging learner interaction with learning resources, encouraging students to learn in groups, stimulating learners to build their own knowledge, and encouraging learners to practice the contents of the reading; (8) in favor of the ideology of the nation and state, namely Pancasila, and (9) high readability.

LP3 UM when conducting a Teaching Book assessment uses the following indicators: (1) the basis for writing is the Lecture / Learning Plan; (2) the main user-students to learn; (3) the flow and structure: According to the lesson plan, there are illustrations, there are examples, there are case studies, there are exercises/feedback; (4) language-semi-formal, describing, (5) published and disseminated and ISBN; (6) material density-according to learning needs; (7) the purpose of use-for learning.

According to [2] the steps for preparing textbooks (diktat) are: (1) planning, namely making plans; (2) athering data, namely collecting data for writing materials; (3) writing, namely writing drafts; (4) reflecting, namely thinking back about what has been written in the draft looking for deficiencies and errors that still exist to be corrected; (5) revising - revising in order to produce better writing; and (6) submitting - submitting to publishers and to readers.

In line with Jones, [4] identifies the steps for preparing modules (teaching materials) as follows: (1) prewriting-writing by: limiting the topic, formulating objectives, determining the form of writing, determining who the reader is, selecting materials, and organizing ideas; (2) drafting-pouring ideas related to the topic of writing by leaving technical and mechanical matters first; (3) revising-by reviewing the writing by focusing on the content of the writing through adding, moving, eliminating, rearranging the writing; (4) editing-editing writing related to spelling, word choice, sentence structure, with improved writing format.(4) editing-editing the writing related to spelling, word choice, sentence structure, with improvements in writing format; and (5) publishing, namely the publication of writing to obtain reader responses, revision, final editing, and publishing.

The prototype of this Philosophy of Science textbook with a Practical Approach is: (1) the introduction contains a summary of the contents of chapter to chapter so that by reading the introduction alone the reader can already describe the contents of the book as a whole; (2) the presentation of the contents of each chapter is related to research practice; (3) the presentation in each chapter illustrates the relationship between learning objectives with material descriptions, assignments and exercises, summaries, and competency tests; (3) compiled with communicative language and easy to digest.

2 METHODS

This study used the ADDIE development research design. ADDIE is a procedural model with stages: Analyze*, Design, Develop, Implementation, and Evaluate*. The model is described as follows:

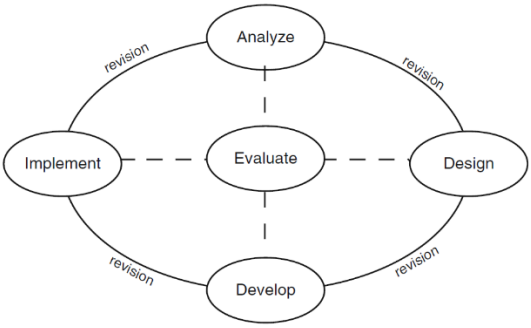


Figure 1: *ADDIE* Model (Branch, 2009:2) [3]

Referring to the ADDIE procedural model above, the research procedures that will be carried out by researchers are as follows:

a. *Analysis*

At the Analysis stage, the researchers analyzed the factual problems in the Philosophy of Science lectures related to the problems of ideal demands and practical research problems faced by doctoral students in compiling dissertations, analyzed the need for the availability of Philosophy of Science books with a practical approach that is easy for students to understand and can be used to overcome the practical problems of dissertation research faced by doctoral students, analyzed the readiness of human resources-lecturers of Philosophy of Science to use this research product, and analyzed the availability of supporting facilities related to the utilization of this research product,

b. *Design*

At this *design* stage, researchers carry out the following activities:

1. Compile and discuss with the research team the outline of the contents of this Philosophy of Science textbook with a Practical Approach.
2. Compile and discuss with the research team the Expert Validation Instrument, User Validation, and S3 Student Response Instrument as users of this book.

d. Developement

At the *develop* stage, researchers carried out the following activities:

1. Validating the product draft - Philosophy of Science textbooks with a Practical Approach to expert validators to determine the suitability of the product draft with the theory of writing good textbooks; validating the product draft with users to determine the level of applicability of this product, and validating to

student participants to determine student responses in utilizing this research product.

2. Revising the draft based on inputs from expert validators, user validators, and students who utilize the textbooks of this research product.

e. Implementation

Because this textbook is prepared in the form of a module, at the *implementation* stage, the researchers conducted a limited trial to S3 Dikdas students participating in the philosophy of science course at the State University of Malang. They were asked to study the contents of the book independently (self instruction) and conduct a competency test on their understanding of the contents of the philosophy of science lecture. After that, based on the implementation, the researcher made revisions to the input from students.

f. Evaluation

At the *evaluation* stage, researchers reviewed the contents of this research product book, discussed the results of expert validation, users, and student responses above, then revised the product to produce the final product of this research.

2. Data Collection Technique.

Data on expert validation tests, user validation, and student responses were collected through validation instruments in semi-open questionnaires. To determine the level of validity using a closed questionnaire in the form of a rating scale, while data in the form of input from validators and students use an open questionnaire, where validators and students can write input for product improvement. In addition, validators can also give notes directly in the text of the product draft validated by the validator.

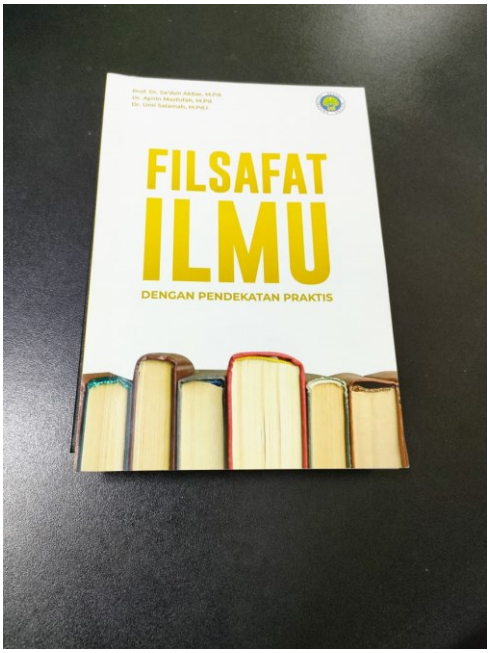
3. Data Analysis

Data from expert validation tests, user validation, and student responses will be analyzed descriptively so that researchers can conclude the level of validity of the expert test, the level of applicability of the user test, and the level of responsiveness of student responses, as well as the level of product effectiveness based on descriptive trials (%). The qualitative data on input from the validators-both expert validators and users-will be used to revise the content of the book in the process of developing this textbook.

3 RESULTS

In this results section, it is presented about: the resulting product which contains a photo of the book and a summary description of its contents, the results of expert and user validation and other research findings which are presented as follows.

The photo of the 159-page Philosophy of Science textbook with a practical approach is as follows:



Summary of Book Contents.

First, the author of this book feels that when studying philosophy, including the philosophy of science, by: reading philosophy books based on the philosopher's period of thought, based on systematics in philosophical thinking (namely the ontological, epistemological, and axiological dimensions separately), it feels roundabout, very abstract, and very heavy to digest. Based on these feelings on this occasion the author presents a paper packaged in a book Philosophy of Science with a practical approach. The practical approach is because this paper is based on the view that learning philosophy for students not majoring in philosophy should be more directed and associated with the development of science - which is carried out through research as their final assignment - such as thesis, thesis, dissertation, and the task of compiling other scientific works. This book is not for the consumption of students who are studying in the Philosophy study program, not to train students to be good at philosophizing but for non-philosophy study program students who are studying philosophy of science and are preparing scientific work as their final assignment.

Second, in the context of seeking truth, there are three sources of truth that are very influential on human thought in this world. The sources of truth are religion, philosophy, and science. Religious truth tends to be based on faith in God, its truth is absolute, and religious in nature. Philosophical truth tends to be based more on the power of human thinking, and because the human mind is also very limited,

philosophical truth tends to be speculative. Whereas the truth of science (theory) is based more on empirical facts, and the nature of the truth is relative. Because it is relative, the science of previous research results can be aborted and replaced with newer, more recent science. The three sources of truth - namely religion, philosophy, and science - can be a source of inspiration for conducting research in order to develop science as a product, namely theory. So science can be developed based on philosophy, theory, and religions.

Third, the practice of research, which essentially seeks scientific truth, is certainly based on theories of truth, both theories of coherence, correspondence, pragmatism, revealing and others. For this reason, students also need to understand the theory of truth theory and its implications for research practice. This understanding will have an impact on the appearance of their scientific work. Questions about why in scientific work there are always parts such as the introduction which has an initial study in it, there is a section of theoretical studies or literature review and what the literature review is for, then there is data exposure and research findings arranged with inductive thinking patterns, there is a discussion section with an alternating mindset between deductive and inductive, until the presentation of conclusions. They need to understand that the systematics of scientific work is an implication of the philosophy of science that underlies it.

Fourth, there are different views on the nature of reality among scholars in the schools of philosophy of science. Differences in views on reality, the relationship between the researcher and the researched, the freedom or unfreedom of value in science, and the purpose of research among these schools of philosophy of science, have implications for the tradition of research practice. The positivist view gave birth to the quantitative research tradition. Naturalism-interpretivism became the basis of qualitative research. Criticism of quantitative and qualitative research by the school of criticalism which states that quantitative and qualitative research has no follow-up because the parties studied have not changed and improved anything. The view of critism then underlies the practice of action research whose purpose is to solve problems.

Fifth, by studying the history of the development of science and scientific ideas, the reader becomes more aware that knowledge has existed since the existence of humans, which from time to time continues to develop, research is carried out to develop science (theory) where the latest research complements, strengthens, and even abolishes the previous theory. The development of scientific ideas is generally complementary and evolutionary, however, there are also times when the development of scientific ideas is revolutionary and radical. The truth of a previous theory can be overthrown by the results of recent research. It is possible that in a certain period of time there are two truths that are equally believed by scientists - because some scientists still believe in the old truth, and some others believe in a newer truth (there is confusion/anomaly about the truth about certain realities). This confusion will eventually end because the two truths will continue to be confirmed with more sophisticated research and eventually one of the two truths will be defeated - and the establishment of certain truths is more solid.

Sixth, there are many views on what science is, often used interchangeably between knowledge, science, science, and others. In this book, science is seen more as *"any systematic body of knowledge"*, which is a systematic set of knowledge that does

not separate science as a research activity, scientific method, and theoretical products. Once we discuss a certain theory, we must be able to explain how the research process is carried out, what kind of scientific method is used, and the research that uses the scientific method produces a product (theory) with the position of *the levels of knowledge* where - because theoretical science is multilevel. Among the levels presented in this book, for example, from low to high: there are hypotheses, theories, and laws / there are also identified theoretical structures into (from low to high to: facts, concepts, and generalizations.

A scientist in conducting research is like a dreamer, a game player, and like a ditective. There are things that he dreams of, aspires to, for certain achievements even though there are times when his dreams remain dreams, what is aspired to is not realized. A person who is playing a game (game) sometimes reaches defeat and is disappointed, and wins (feels satisfied). A ditektief works by pursuing and tracking and tracking with passion and hard work until he succeeds in what he is looking for even though there are times when what he is looking for is also not found. When a researcher is optimistic that the hypothesis he has built will be tested, there are times when he has to make hypotheses up to many times because his hypothesis often fails to be proven. They keep trying to build new hypotheses until they can be tested correctly.

The scientific method actually works on three axes - namely *discovery, prediction,* and *confirmation.* In the *discovery* process, researchers work inductively to build hypotheses, which are theoretical in nature. In testing hypotheses, which are deductively patterned, predictive and mechanical in nature, to obtain confirmation with empirical facts. The results may strengthen or weaken a previous theory.

Science as a product of research activity is theory. A theory is a conceptual generalization about experience. The theory is conceptual (conceptualization of empirical reality), can be confirmed by empirical facts, can explain reality scientifically - scientific explanation, and is generally applicable. The higher the generality of a theory, the more robust it is. Theory is structured and has *levels of knowledge.* →→→→The theory is structured from low to high: facts concepts generalizations or arranged in levels from low to high: hypotheses theories laws.

Seventh, science is not without weaknesses. The truth of science is very limited. Many flaws and weaknesses are inherent to science. The truth of science can be dubious or at the level of being possibly true due to methodological errors, confirmation problems in the range of inductive and deductive patterns - where sometimes the premises are correct but the conclusion can be wrong, and problems of prejudice, stereotypical attitudes of the researcher and others. Since scientific truth has many weaknesses, integrate the various sources of truth between science, religion, and philosophy. Philosophy, religion, and previous science (theory) can be used as a source of inspiration (a foundation as well as to build a framework) in developing science.

Eighth, due to the various limitations of science, researchers should ethically uphold ethical values in carrying out the entire research process. Researchers should be honest and objective - telling the truth in their research, sticking to the correct research methodology, openly pointing out the shortcomings and weaknesses of their research, and willing to accept criticism and input to achieve scientific truth.

Validation Test Results.

Expert Validation. The test of product suitability with the theory of how a textbook should be arranged is presented as follows:

The results of the expert validation test conducted to determine the suitability of the product with the theory of how to prepare a textbook are presented as follows:

No.	Indicator	Score
1	Relevance between learning objectives and material description.	4
2	Relevance between learning objectives and assignments.	4
3	Relevance between learning objectives and summary.	4
4	Relevance between learning objectives and competency tests.	4
5	Substantial accuracy of material content	4
6	Accuracy in quoting from reference sources.	3
7	Spelling usage	3
8	Sentence structure writing	3
9	Ease of book content to digest	4
10	Communicability of the book content to the reader	4
11	Ability to inspire in the development of science.	4
12	The level of comprehension of the book's content for the reader	4
13	Systematization of the book as a whole.	4
14	Book graphic design.	3
15	Practicality of book content with research practice.	4
16	Load of Ethical Values in the book.	4
Total		60

Based on the data above, the Validity Value is calculated by the formula and calculated as follows:

$$\text{Mean Empirical Score} \Rightarrow \text{Validity score: } \left(\frac{60}{64}\right) \times 100\% = 93,75\%.$$

$$\frac{\text{Mean Empirical Score}}{\text{Maximum Score What to expect}} \times 100\ \%.$$

So the validity value based on expert validation reaches 93.75%, which means it is very valid, can be utilized in the learning process in the Philosophy of Science course.

User Validation.

At this stage, the researchers conducted a pilot test on doctoral students in the Basic Education study program at the State University of Malang for 11 doctoral students of Dikdas who were taking the Philosophy of Science course to obtain data on user responses. The data obtained are as follows.

No.	Indicator	Respondents (11 doctoral students of Basic Education)											Total
		1	2	3	4	5	6	7	8	9	10	11	
1	Ease of book content to digest	4	3	4	4	4	4	4	4	3	3	4	41
2	The role of books in inspiring the development of knowledge.	4	4	4	4	4	4	4	4	4	4	4	44
3	Practicality of books in relation to research.	4	4	4	4	4	4	4	4	3	3	4	42
4	Communicability of the book content When studied.	4	4	4	4	4	4	4	4	4	4	4	44
5	Ease of understanding science.	4	4	4	3	4	4	4	4	3	3	4	41
6	Systematicity of the book's content	3	4	4	4	4	4	4	4	3	3	3	40
7	Spelling accuracy.	3	1	3	3	3	2	3	3	4	4	3	32
8	Correctness of sentence structure.	4	4	4	3	4	4	3	4	4	4	3	41
9	Graphics value.	4	4	4	3	4	4	4	3	3	3	3	39
10	Useful for students who are studying philosophy of science.	4	4	4	4	4	4	4	4	4	4	4	44

11	Ethical value content in books.	4	4	4	4	4	4	4	4	4	4	4	44
Total	Total/Average Score.	42	40	43	44	43	42	42	42	39	40	40	452

Based on the data above, the Validity Value is calculated by the formula and calculated as follows:

$$\text{Mean Empirical Score} \over \text{Maximum Score What to expect} \times 100\ \%.$$

$$\text{Validity Value: } \left(\frac{452}{11}\right) = 41{,}09/44 \times 100\% = 93{,}386\ \%.$$

It was concluded that the user validity value reached 93.386% of the maximum expected value. So based on the user's response when this book is utilized, the book from this development research is very practical with a very positive response.

User feedback:

- 1. Many incorrect spellings and hyphens, some typos,
- 2. There are some words that are mistyped, wrong spacing, table arrangement,
- 3. There are pages that do not match the table of contents,
- 4. Numbering of the reference list.
- 5. There are some mistyped words in the preface.
- 6. Need to add triggers for questioning to enhance the criticality of philosophical practices, and stimulate critical and creative thinking.
- 7. The table writing on pages 136, 130 is not neat.
- 8. Image caption is missing.
- 9. The study needs to be deepened.

Based on the input from the experts and users mentioned above, the researchers made revisions based on these inputs. Based on the validation test by experts and field tests by user validators, it is concluded that this Philosophy of Science textbook with a Practical Approach is very feasible to be utilized in learning in the Philosophy of Science course. Of course it is very possible that in the utilization of these products there are still input from users and endless revisions in the process of utilization.

4 DISCUSSION

The appearance of the Philosophy of Science textbook for non-philosophy students should be different from the Philosophy of Science textbook for students in the Philosophy department. For students majoring in philosophy, the textbook of philosophy of science is of course more directed at pure philosophy of science both

from the dimensions: [5] identifies them as ontological, epistemological and axiological. They are trained to philosophize about science - so that they can give birth to new thoughts about the philosophy of science. For students majoring in non-philosophy. For students majoring in non-philosophy, the learning of the Philosophy of Science course should be more directed at understanding from the ontological side-what is the nature of science, from the epistemological side-how the process of obtaining science-that is, the philosophy of the scientific method, the development of science, and from the axiological side-for what science is used.

Tafsir, Ahmad (1995) states that there are several approaches in learning philosophy - namely historical, systematic, and practical approaches. Philosophy of Science with a Practical Approach is considered more appropriate as a textbook on the philosophy of science for students not majoring in philosophy so that they can use it to solve practical problems faced by students not majoring in philosophy who are studying philosophy of science. The practical problem is that many of them experience difficulties when they have to compile their final assignments in compiling theses-for undergraduate students, theses-for master students, and dissertations-for doctoral students. Philosophy learning for students in non-philosophy majors should be more directed to facilitate them in completing their final project.

The first difficulty that students often face is when determining the problem that will be raised as the title of their final project [6]. Many students determine the type of approach and research design first before finding the research problem. In a scientific work, students should at least be able to describe the factual problem and then confirm it with the ideal demands, both philosophically and theoretically, so that it can bring up the research-gap that will be raised as a research problem. For this reason, students should recognize the nature of reality and facts because they have to present factual problems that are extracted from preliminary studies so that they are able to present factual problems as an initial step in determining their research problems. Understanding the facts and realities studied in the philosophy of science book is very important because it has implications for the appearance of the background of the problem in the final project.

Scientific work for non-philosophy students is basically training students to seek and find truth scientifically. For this reason, students need to learn the sources of truth, which may inspire the development of science. Scientific truth can basically be built based on religious truth, philosophical truth, and (previous) scientific truth. Students should not hesitate to base their research on religious teachings, philosophical teachings, or based on previous theories in scientific work.

Theories of truth that include theories of coherence, correspondence, pragmatism, and revelation [8] need to be presented in the Philosophy of Science textbook so that students realize that the research systematics that are usually presented in the PPKI of a college as an implication of the theory of truth so that in a scientific work requires that scientific work must have a theoretical basis, present its benefits, present its limitations, and use a mindset that alternates between deduction and induction.

It is also important for students to understand the relationship between philosophical schools of science and research practice [9] so that they are aware of the philosophical basis of their research, able to understand that their scientific work is based on a philosophical umbrella, from a particular school of philosophy of science.

The choice of research method is also an implication of understanding the underlying philosophy of science.

The presentation of what science is in terms of its research activities, scientific methods, and the theoretical products it produces is very important [10] so that they realize that the theory is the result of research-so that when presenting the theoretical basis presented is the real theory-which has the content of science-not presenting the origin of the written material presented in the various sources referred to. The understanding of what the theory actually is will greatly color the appearance of the literature review section in the scientific work. Whatever the name, whether it is named literature review, theoretical study, or theoretical basis, what should be presented and studied is the real theory. When students are unable to understand what the theory is, it can be assumed that what is presented in the theoretical basis of their scientific work is not necessarily a theory.

By presenting the development of scientific ideas, which sometimes develop evolutionarily (complementing and perfecting each other) and revolutionarily (radical changes-the latest theory can overthrow the previous theory), it can make readers aware of the importance of prioritizing the latest references-if indeed the old theory has been revised by the latest theory, and not denying the old references-even more than the last 10 years if the old theory is still solid and has not been replaced by the latest theories.

A correct understanding of the limitations (shortcomings, weaknesses) of science also needs to be presented in the Philosophy of Science book. The truth of science (theory) is indeed very weak due to the limitations of human senses, methodological errors, confirmation problems between the principles of deduction and induction, and human error factors. Awareness of the weak truth of science (theory) so that students do not deny the truth of philosophy and religion, not taboo linking science with religion, and can bring together philosophy, religion, and science in their scientific work and not make them arrogant when they succeed in finding scientific truth.

Non-philosophy students who are studying philosophy of science usually come from various different study programs. By studying the philosophy of science which presents material on the development of science and a platform for the body of knowledge of a particular discipline (Basic Education Science, for example), using the verification standards of a particular discipline [11] they are expected to be able to develop a paying research program in their respective study programs, and be able to plan their academic careers based on their research roadmaps developed based on the research umbrella in their study programs, and be able to contribute to the development of the disciplines of the fields of study they are engaged in with students through their research.

With the ethics of scientific work, the values of honesty, openness, and responsibility are embedded as scientists [12] who develop science - because the development of science should be oriented towards improving the quality of human life with the principle of usefulness and blessing of the theories developed through their research.

5 CONCLUSIONS AND SUGGESTIONS

CONCLUSIONS

The book Philosophy of Science with a Practical Approach which contains topics on: approaches to learning philosophy, sources of truth, theories of truth, what science is, the limitations of science, the relationship between schools of philosophy of science and research practices, the body of knowledge of science and paying research programs, and ethics in scientific work based on expert validation is declared very feasible to be used in Philosophy of Science lectures with minor revisions, the results of user testing also show that the book developed is very practical and interesting-with minor revisions.

SUGGESTIONS

Based on expert validation and user testing, it is suggested that this book can be mass published after minor revisions are made, utilized by the public, of course there will be input from wider users so that endless revisions will occur continuously in line with the times that continue to change including the development of science.

References

1. Akbar, Sa'dun, 2017. Instrumen Perangkat Pembelajaran, Bandung: Penerbit Rosdakarya.
2. Jones, W. Paul (1981) Writing Scientific Papers and Report, Iowa: WM C Brown Company Publisher.
3. Branch, Robert Maribe, 2009. Instructional Design: The ADDIE Approach, Springer Science Business Media, LLC 2009.
4. Tompkins, Gail E, 1990. Teaching Writing Balancing Process and Product, New York: Macmillan Publishing Company.
5. Kattsoff, L. O. (1986). Pengantar filsafat : sebuah buku pegangan untuk mengenal filsafat / Louis O. Kattsoff ; alih bahasa, Soejono Soemargono. Yogyakarta : Tiara Wacana.
6. Ahmad Sanusi, Ahmad 1996. Bahan Perkuliahan Filsafat Ilmu, Bandung: Universitas Pendidikan Indonesia.
7. Tafsir, 2005. Filsafat Umum: Akal dan Hati sejak Tale sampai Capra, Bandung: Rosdakarya.
8. Anshari, Endang Saifuddin, 1979. Ilmu, Filsafat, dan Agama, Surabaya: Penerbit PT Bina Ilmu.
9. Akbar, Sa'dun 2009. Penelitian Tindakan Kelas: Filosofi, Metodologi, dan Implementasi, Yogyakarta: Ciptamedia.
10. Mannoia, V. James, 1980, What Is Science, Boston: University Press of America.
11. Christensen, J. E. (1981). Perspectives On Education As Educology. America: University Press of America.
12. Muhadjir, Noeng, 1998. FilsafatIlmu: Telaah Sistematis Fungsional Komparatif, Yogyakarta: Penerbit Rake Sarasin.