DEVELOPING PSEUDO ENCYCLOPEDIA AS A TEACHING MATERIAL FOCUSING ON MATTER AND ITS STATE FOR THE THIRD GRADE STUDENTS AT MI KHADIJAH MALANG

THESIS

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May,2016

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THE DEVELOPMENT OF PSEUDO ENCYCLOPEDIA AS A TEACHING MATERIAL FOCUSING ON MATTER AND ITS STATE FOR THE THIRD GRADE STUDENTS AT MI KHADIJAH MALANG

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THESIS

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PASSED

And accepted as one of the requirements to obtain a first degree Bachelor of Islamic Education (S.Pd.I)

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DEDICATION

Hopeful prayer and dzikir to our God Swt, as a servant of worship in studying on your commands and above all Ridho that is always
accompany every step of the servant

On behalf of sincere love ananda dedicate of this thesis to be the greatest person in the world **My Father (Imam Ustadzi) dan My Mother (Ida Prastyaningsih)**

Parents who have become intermediaries in the creation of me, parents have to educate and to devote love and affection to me, always give prayer in his eyes and the spirit of the water droplets to me though the distance to between us, but i sure you want me make the best daughter in the world and the hereafter.

Mr and Ms Teacher and Mr and Ms Lecturer I say thank matchless who have provided guidance in their studies and give a very rewarding experience for the future society, especially in the world of education.

Ustadz Dr.Mokhammad Yahya, Ph.D. who has guided me in finishing thesis college in the S1 Islamic Primary Teacher Education Program, to him I say thank you profusely.

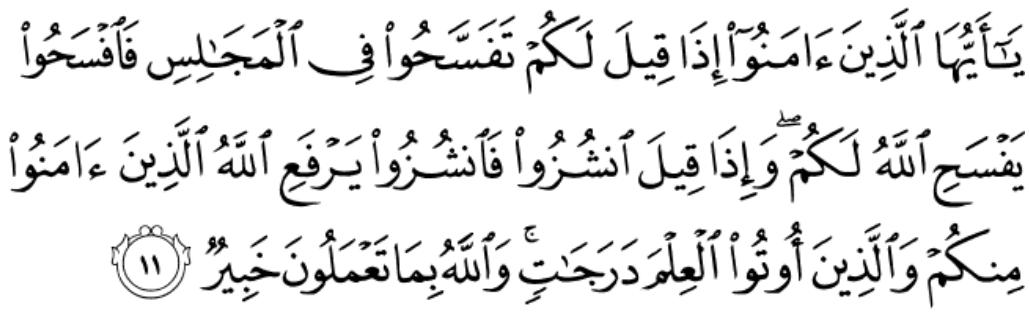
My Brother only for older brothers **Nehru Adi Prasetyo**, I say thank you always giving me advice and give my spirit in the overseas country, my brother who fought alongside providing the most beautiful and beloved my mother and my father.

Best friend are always there in my days when we are happy and sad thank you very much for the spirit we are always striving together give a beautiful gift for our parents **that Suryaningtyas PW and Hafidz Rifki Ansori**.

My beloved best friend Islamic Primary School Education Program 2012, it specially in International Class Program (**Filza, Vita, Ina, Ulfa, Tyas, Isna, Fitri, Farhan, Irma, Safirdha, Erna, Macruz, and Anawar)** Thank you for taking S1 is very energetically and feel the beauty this fraternity together with you.

Best Friend in HMJ Islamic Primary School Education Program, thanks for my friends Student Association has provided valuable experience in the organization.

MOTTO


يَٰٓأَيُّهَا ٱلَّذِينَ ءَامَنُوٓاْ إِذَا قِيلَ لَكُمۡ تَفَسَّحُواْ فِي ٱلۡمَجَٰلِسِ فَٱفۡسَحُواْ
يَفۡسَحِ ٱللَّهُ لَكُمۡۖ وَإِذَا قِيلَ ٱنشُزُواْ فَٱنشُزُواْ يَرۡفَعِ ٱللَّهُ ٱلَّذِينَ ءَامَنُواْ
مِنكُمۡ وَٱلَّذِينَ أُوتُواْ ٱلۡعِلۡمَ دَرَجَٰتٖۚ وَٱللَّهُ بِمَا تَعۡمَلُونَ خَبِيرٞ ١١

O ye who believe! when it is said unto you, Make room! in assemblies, then make room; Allah will make way for you (hereafter). And when it is said, Come up higher! go up higher; Allah will exalt those who believe among you, and those who have knowledge, to high ranks. Allah is Informed of what ye do (Al-Mujadillah :11).

Mokhammad Yahya. MA, Ph.D.
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OFFICE MEMO OF ADVISOR

Subject : Thesis of Silvy Maghfiroh Malang, 22 May 2016

Attachment : 6 (Six) Exemplars

To Whom It May Concern,
Dean of Tarbiyah and Teacher Training Faculty
Maulana Mali Ibrahim State Islamic University Malang
At
Malang
Assalamu'alaikum Wr. Wb

This office memo declares that thesis originality owned by :

Name : Silvy Maghfiroh
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Study Program : Islamic Primary School Education Program
Title of Thesis : *Developing Pseudo Encyclopedia As A Teaching Material Focusing On Matter and Its State for The Third Grade Students At MI Khadijah Malang.*

Is considered acceptable to be defended after being intensively read and regularly. Consulted in the area of research content, language, and composition.

Wassalamu'alaikum Wr. Wb

Advisor,

Dr.H.Mokhammad Yahya, Ph.D
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REPRESENTATION LETTER

I hereby declare, that in this thesis there are no works ever put forward to earn a scholarship at the College, and all of my knowledge, there is also no work or opinion ever written or published by others, except those in writing in this paper and is mentioned in the list of references.

Malang, 15 May 2016

SILVY MAGHFIROH

PREFACE

Praise the author pray toward to the divine Rabbi Allah who has shed grace, taufiq, Inayah and His guidance to us all, so with the permission of his I can finish this thesis. Prayers and greetings always remain pray to our lord the Prophet of the end, the prince revolutionary Prophet Muhammad SAW, who was sent to take the minutes and liberate Muslims from stupidity.

In writing this thesis has been a lot of parties who contributed and continues to provide a lot of guidance and motivation so that of this thesis can be resolved in a timely manner. Therefore, on this good opportunity let authors would like to thank:

1. My mother and my father who have given the greatest opportunity to be able to a feel for life with love and passion even though the distance to be dividing our togetherness.
2. Prof. Dr. H. Mudjia Raharjo, as Rector Maulana Malik Ibrahim State Islamic University Malang .
3. Dr. H. Nur Ali, M.Pd, as Dean Tarbiyah and Teacher Training Faculty Maulana Malik Ibrahim State Islamic University Malang .
4. Dr. Muhammad Walid, M.A as The Head Islamic Primary School Education Program Maulana Malik Ibrahim State Islamic University Malang.

5. H.Mokhammad Yahya, MA, Ph.D. as Advisor who always give guidance and a lot of suggestion in order complete the arrangement of research report.
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13. Great family in Jember thanks for the prayers and affection for this.
14. My friends Suryaningtyas PW and Hafidz Rifki Ansori, which has always assured me that I could pass graduated them along.
15. My friends in PGMI 2012, especially in primary class E (ICP PGMI) thanks for togetherness during this time. "The presence of You Give Meaning Its Own"
16. My friends in HMJ, brother and sister Forces in 2013 and 2014 thanks for their support in finishing thesis.

So with the accompaniment of prayer may Allah SWT will reply to all their deeds to reward of multiplied in the world and the hereafter. The author is fully aware of the existence of this thesis is still far from perfection, therefore, with all humility and open arms authors expect criticism and constructive suggestions so that the reader can improve and continue as further development and improvement. Finally, the authors hope that what the authors dedicate in the form of this thesis can be useful. Amin Ya Rabbal'alamin.

Malang,

Author

GUIDELINES FOR ARABIC-LATIN TRANSLITERATION

Arab-Latin transliteration writing in this thesis uses the transliteration guidelines based on a joint decision of the Minister of Education and Culture number. 158 year 1987 and number. 0543/b/U/1987 can be broadly described as follows:

A. Letter

ا = **a**	ز = **z**	ق = **q**
ب = **b**	س = **s**	ك = **k**
ت = **t**	ش = **sy**	ل = **l**
ث = **ts**	ص = **sh**	م = **m**
ج = **j**	ض = **dl**	ن = **n**
ح = **h**	ط = **th**	و = **w**
خ = **kh**	ظ = **zh**	ھ = **h**
د = **d**	ع = ‘	ء = **,**
ذ = **dz**	غ = **gh**	ي = **y**
ر = **r**	ف = **f**	

B. Vocal

Vocal (a) length = â

Vocal (i) length = î

Vocal (u) length = û

C. Vocal Diphthong

أَوْ = aw

أَيْ = ay

اُوْ = û

اِيْ = î

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ABSTRAK

Maghfiroh,Silvy,2016. *Pengembangan Buku Ajar Ilmu Pengetahuan Alam Berbasis Ensiklopedia untuk Meningkatkan Pemahaman Konsep pada Materi Benda dan Sifatnya di MI Khadijah Malang*. Skripsi. Jurusan Pendidikan Guru Madrasah Ibtidaiyah. Fakultas Ilmu Tarbiyah dan Keguruan. Universitas Islam Negeri Maulana Malik Ibrahim.

Pembimbing: Dr.H.Muhammad Yahya.Ph.D.

Ilmu Pengetahuan Alam memiliki empat unsur utama, yaitu sikap, proses, produk dan aplikasi, sehingga proses pembelajarannya menekankan pada pemberian pengalaman secara langsung untuk mengembangkan kompetensi agar menjelajahi dan memahami alam sekitar secara alamiah. Untuk mewujudkan pembelajaran tersebut maka dibutuhkan pengembangan bahan ajar berupa buku ajar dan yang menjelaskan konsep melalui percobaan sehingga mampu meningkatkan prestasi belajar siswa khususnya pada materi Benda dan Sifatnya.

Penelitian ini menggunakan jenis penelitian pengembangan *Research and Development (R & D),* dengan model *Dick and Carey* yang memiliki sepuluh langkah dalam prosedur pengembangannya. Penelitian ini dilaksanakan di MI Khadijah Malang dengan mengambil kelas III yang berjumlah 37 siswa. Hasil wawancara dengan guru bidang studi sains, didapatkan bahwa dalam pembelajaran sains masih terdapat banyak permasalahan, khususnya pada materi Benda dan Sifatnya. Diantaranya: 1) Buku ajar yang digunakan adalah buku BSE; 2) Kurangnya bahan ajar yang mendukung pada pembelajaran sains materi Benda dan Sifatnya;3) Terdapat Percobaan pada materi Benda dan Sifatnya yang kurang jelas dalam menuliskan langkah- langkah percobaan.

Berdasarkan hasil penelitian didapatkan bahwa buku ajar sains berbasis *Ensiklopedia* mendapat penilaian kualifikasi yang baik, karena berdasarkan hasil validasi 92,7% yang berarti buku ajar sains berbasis *Ensiklopedia* sangat valid, dari uji coba lapangan buku ajar sains berbasis *Ensiklopedia* diperoleh nilai 90% yang berarti mendapat kualifikasi sangat valid dari semua subyek validasi uji coba lapangan. Dari ahli isi mendapat nilai 92% ,pada kualifikasi sangat valid sehingga tidak revisi, dari ahli desain media mendapat nilai 89% dan berada pada kualifikasi valid, dan berada pada kualifiasi sangat valid, tida revisi dari ahli bahasa mendapat nilai 80%.Dengan perhitungan menggunakan uji t dengan tingkat kemaknaan 0,05 diperoleh hasil $t_{hitung}^2 \geq t^2_{tabel}$ yaitu $5,65 \geq 1,687$ artinya Ho ditolak dan Ha diterima.

Jadi, buku ajar berbasis Ensiklopedia terbukti secara signifikan dapat meningkatkan prestasi belajar siswa kelas III MI Khadijah Malang. Dengan melihat rerata diketahui X_2 lebih dari X_1 (3344> 2911) juga menunjukkan bahwa post tes lebih tinggi dari pada pre test. Kesimpulannya terdapat perbedaan yang signifikan sesudah menggunakan buku ajar *Pseudo Ensiklopedia Percabaan Sains Benda dan Sifatnya* dengan

Kata Kunci : Buku Ajar, Ilmu Pengetahuan Alam, Ensiklopedia.

ABSTRACT

Maghfiroh, Silvy, 2016. Textbook Developing Pseudo *Encyclopedia* As A Teaching Material Focusing On Matter and Its State of Natural Science to Improve Understanding Concepts The Third Grade Students At MI Khadijah.*Thesis*. Islamic Primary Teacher Education Program. Tarbiyah and Teacher Training Faculty. Maulana Malik Ibrahim State Islamic Faculty University Malang.

Advisor : H.Muhammad Yahya, MA, Ph.D.

Natural Sciences has four main elements, namely attitudes, processes, products and applications, so that the learning process emphasizes providing direct experience to develop competencies in order to explore and understand the universe around naturally. To realize that learning the necessary development of teaching materials such as textbooks and that explains the concept through trial so as to improve student achievement, especially in material objects and their characteristic nature. This research uses research and development Research and Development (R & D), with Dick and Carey model of which has ten steps in the procedure development. This research was conducted in MI Khadijah Malang by taking a third grade totaling 37 students. According to interviews with teachers of science, it was found that in the learning of science there is still a lot of problems, especially on material objects and their characteristic nature. Among them: 1) Textbooks used is the book BSE; 2) Lack of material teaching support in material science learning objects and their characteristic nature; 3) There Experiments on material objects and their characteristic nature is less clear in writing the steps of trial.

Based on the results that textbook science-based *Encyclopedia* assessed good qualifying, because based on the obtained by value of validation of subject teachers gets the value 92.7%, which means natural science textbook based *Encyclopedia* very valid and not revision, from field trials based science textbooks *Encyclopedia* obtained by value of of 90%, which means gets very valid qualification of all the subjects validation field trials. Content expert gets the value of 92%, on a very valid qualification so it is not a revision, of media design experts gets the value of 89% and is at a valid qualification, and are at a very valid qualification all, not revision of linguists gets the value of 80% .

With calculations using t test with significance level of 0.05 was obtained hasil $t_{count}^{2} \geq t^{2}_{tabel}$ that is $5{,}65 \geq 1{,}687$ means Ho rejected and Ha accepted.So, textbook-based *Encyclopedia* proved to significantly improve student achievement the third grade MI Khadijah Malang. By looking at more than the average note X_2 more than X_1 (3344> 2911) also shows that the *post-test* is higher than the pre-*test*. In conclusion there are significant differences in Natural Science learning achievement after the third grade students using the textbook based-*Encyclopedia* of Natural Sciences and the learning achievement of Natural Science before using the textbook-based Encyclopedia of Natural Sciences in MI Khadijah Malang.

Keywords: Textbook, Natural Sciences, Encyclopedi

مستخلص البحث

مغفرة، سلفي، 2016 تطوير كتاب التعليم لدراسة العلوم على أساسي الموسوعة لترقبة فهم الطلاب على مفهوم مادة الاسم وصفته في المدرسة الإبتدائية خد يخة مالنق. بحث جامعي. شعبة التربية المدرس الإبتدائية . كلية العلوم التر بية والتعليم . جامعة مولانا مالك إبراهيم الإسلامية الحكومية مالانق.

المشرف : الحاج محمد يحيى الماجستير.

العلوم فية أربعة عناصير هي سلوك، عملية، انتاج وتطبيق، حتي عملية التعليم لتخقيق خبرة مباشرة لتطوير كفاءة لكى يفهم الطلاب بيئة و يحتاج تطوير كتاب التعليم ليفهم الطلاب على مفهوم بطريقة تجربة خصوصا على مفهوم مادة الاسم وصفتة. تستخدم الباحثة في هذا البحث بنموذج "ديك و كري" فيه عشر خطوات في منهج تطويرة، أما مجموع هذا البحث هو الطلاب في الفصل الثالث نتيجة من مقابلة مع مدرس العلوم أن كثير المسئلة في التعليم بالمدرسة خديجة وكان عدده 37 طلاب. العلوم وخصوصة في مادة الاسم وصفته على وهو: 1.كتاب التعليم على أساس 2. قليل كتاب التعليم بعلاقة العلوم بمادة الاسم وصفته 3. كثير تجربة من مادة الاسم وصفته غير واضح.

نتائج هذا البحث ان كتاب تعليم على أساس الموسوعة هو مقبول، بقيمة التصدقاته من مدرس التعليم على قدر29 ,7 % وقيمة التصدقات من كتاب التعليم على قدر09 %، من تصميم الوسيلة على قدر 29 % ومن اهل تصنيم 98 % ,ومن اهل اللغة 08%.

بتجربة في الئمت على معتدل50,0% بنتيجة 5, 56 < 1, 6 87 هو بمعني مردود، هو بمعن مقبول. فلذالك هذا البحث هو المقبول. كان كتاب التعليم علي أساس الموسوعة هو مقبول ويستطيع ان يشجيع الطلاب في الفصل الثالث باالمدرسة خديجة ما لانق على معتدل (4433 <1192) اختبارالبعدي أعلى من اختبار قبلى، فلذالك يتخد هذا الكتاب التعليم على أساس الموسوعة الطلاب في الفصل الثالث بالمدرسة خديجة مالانق.

.

الكلمة الرئيسة : كتاب التعليم، العلوم، الموسوع

CHAPTER I
INTRODUCTION

In this adreess several introduction explanation listed as follows 1) Background, 2) Statement of the Problem, 3) Study Objective , 4) Significant of Study, 5)Assumption for Development , 6) Scope of Development, 7) Product Specification, 8) Cop Limitation at the Study, 9) Research Subject, 10) Site of Research, 11) Definition of the Terms and, 12) Systematic Research.

A. Background

Natural Sciences consists of physical sciences (physical sciences) and life sciences (biology). Natural Sciences is very influential to human life. Thus the people of today need to know the Natural Sciences, and they need to explore and develop natural science, in hoping that the future of human life will be in a condition. Natural Sciences appears of human discovery as a progressive activity with continue experimentation and observation concept and knowledge.[1]

Based on the understanding of Natural Sciences which has been described above, the influence of Natural Sciences is essential to human life or society, because we are studying Natural Sciences so that we will know how we preserve nature and the environment for the better life. Natural Sciences utilized experientation and observation for the basis to find a fact systematically and formulate natural scientific law. Besides the Natural Sciences there are also science that is often called a knowledge gained by the study of the practice. So

[1] Subyanto, *Strategi Belajar – mengajar Ilmu Pengetahuan Alam*,(Malang : IKIP Malang),

that we realize that the Natural Sciences proceed in daily activities , therefore we need to realize that we have to learn Natural Science found in nature and the environment around us, in our daily activities, in this study the topic refer to third grade Primary. Student the learning will be explained systematically by practiced learning. So it looks very important for us to learn Natural Sciences from the earliest time as in the elementary school, in and to pursue further learning. Learning of Natural Sciences that is associated with the natural way of finding hence is not only a collection of knowledge but it is related to the mastery of fact , concepts, or principles, but also a process of discovery. In the learning process it emphasizes providing direct experiences to develop competency in order to explore and understand the universe around us scientifically.[2]

In improving the understanding of the concept in natural science, students are directed to compare the experimentation results with theoretical predictions using the scientific method. Learning science pressing on direct experience with the experiment to develop the competencies that students are able to understand the nature through the process of scientific experiment. I will define help students to gain a deeper understanding[3].

Based on the results of preliminary observations on 27 April 2015 in MI Khodijah Malang with Mrs. Tyas as a teacher for the third grade regarding

[2] Trianto,Model Pembelajaran Terpadu, (Jakarta : PT Bumi Aksara,2010),hlm.153

[3] Ibid,hal,152

instructional materials of science matter and its state. The teaching materials that are used for the third grade at MI Khadijah have been a lot of variations. Teachers and students there used the textbook "Senang Belajar Ilmu Pengetahuan Alam". MI Khadijah nowadays is still using KTSP curriculum, and the textbook used is a science textbooks completed with practicum. Teaching science on the topic of matter and its state needs practices that includes the procedures or steps with instructions to create an interesting practicum. This experiment is hoped to be enjoy able because it is related to our daily activities .[4]

The above problems according to the learning activities of Natural Science subjects in the third grade MI Khadijah Malang in particular on focusing the matter and its state. The problem is as follows:

1. The textbook is available from the translation of teaching materials presented on a limited basis by using the textbook " Senang Belajar Ilmu Pengetahuan Alam" for the third grade Elementary School".
2. Lack of practicum methods and examples in a textbook “Senang Belajar Ilmu Pengetahuan Alam" related to daily activities.
3. The textbook is too short in having experiments steps.

Based on the problems above it therefore needs the solution to develop science textbooks with good, nice and interesting one. The goal is to help

[4] Interview, Ibu S.Maulidiningtyas,27 april 2015, pukul : 08:37 (Malang:MI Khadijah Malang,2015)

students to achieve their competence, and expand their knowledge of science and in order to understand the topic in the teaching materials.

Seeing this condition I would try to develop the teaching materials such as textbooks for the third grade students to easily understand the material and developed the level of understanding of the concept science experiment using a step-by-step experiments and illustrations, one of which is by using teaching materials that called Natural Science based-encyclopedia which is a textbook that integrates a learning material with the experiment steps with appropriate illustrations that are attractive in its design, that can also improve students understanding of the scientific concept in Natural Science based-Encyclopedia.

Textbooks as one of learning media has an important role in the learning process as a reference for teachers and students in order to create the learning effectiveness. For learners, textbook reference materials are absorbed and studied during in the learning process. As for teachers, textbooks is used for delivery of knowledge to the students.

As (Prastowo, 2011: 79), pointed out :

> *Science textbooks as a teaching material contains the results of an analysis of the curriculum in the form of written textbooks .This is because the textbooks are compiled by the applicable curriculum. Books are prepared using simple, interesting, language with pictures, description, the content, and bibliography. The book are will greatly assist teachers and learners in studying science*[5].

[5] Ika Lestari. Pengembangan Bahan Ajar Berbasis Kompetensi (Sesuai dengan Kurikulum Tingkat Satuan Pendidikan), (Indonesia : @kademia Pernata,2013),hlm.5

This encyclopedia based-teaching materials have the attractiveness as it is designed with illustrations *(picture)* and practicum guidance, or experiments that are clear and easy to understand for the learners, as an effort to improve students understanding of the concept of learners.

In This case, (Anne Ahira, 2011), on qued:

> *Encyclopedia is a collection of writings that contain explanations of various kinds of information widely, complete and easy to understand the science or a particular branch of science which is arranged alphabetically or by category and printed in book form. Encyclopedia explains in more detail and deep*[6].

The Pseudo Encyclopedia of Natural Sciences This developing of the Natural Sciences is developed in order to maximize the understanding of the concept the scientific of by using interesting material and design.

In terms of material aspects, there is a meaningful story in the third the beginning of each section. Meaningful story contains the linkage between their matter and its state the daily experiment (activity) that is matter and its state. Textbook is complemented with steps in experiments related to matter and its state. It aims to increase understanding of the concept of knowledge for the to experiment directly on the matter and its state.

In terms of design aspects, there is a pictures related to the material support Natural Science the matter and its state. In addition the design colors,

[6] https://id.wikipedia.org/wiki/Ensiklopedia(Diakses :pada hari Senin, 02, November 2015: 12:05)

layout and fonts this pseudo encyclopedia based textbook is compiled with interesting design, and it is easy to be adapted by the user.

Based on the above background the, researcher interested in doing research and development entitled " ***Developing Pseudo Encyclopedia As A Teaching Material Focusing On Matter And Its State For The Third Grade Studetns At MI Khadijah Malang***"

B. Statement of The Problem

Based on the background above, the problems can be formulated producing a pseudo encyclopedia as a of teaching materials focusing on the matter and its state to improve the understanding of the concepts in natural science for the third grade student at MI Khadijah Malang as follows:

1) How is the product development of Pseudo Encyclopedia as a teaching material focusing on matter and its state for the third grade students at MI Khadijah Malang.
2) What is the level of validity of Pseudo Encyclopedia as a teaching material focusing on matter and its state for the third grade students at MI Khadijah.
3) How is the effectiveness of Pseudo Encyclopedia as a teaching material focusing on matter and its state for the third grade students at MI Khadijah Malang.

C. Study Objectives

Based on the formulation problems, the study objectives of this thesis are:

1) Generate the product of Pseudo Encyclopedia as a teaching material focusing on matter and its state for the third grade students at MI Khadijah Malang.
2) To know the level of attractiveness of Pseudo Encyclopedia as a teaching material focusing on matter for the third grade students at MI Khadijah Malang.
3) To determine the effectiveness of the Pseudo Encyclopedia as a teaching material focusing on matter and it is state at MI Khadijah Malang.

D. Significant Of The Study

This research, researchers expect there are some benefits that can be as follows :

Theoretically, the development of science-based teaching materials science experiments encyclopedia on the matter and its state is expected to provide input and changes in the field of science education of primary school teachers in general, and specifically to provide new innovations in the development of teaching materials.

Significant of Practically For the development of teaching materials science-based encyclopedia of science experiments contests Useful for researchers to increase knowledge and the means to apply the knowledge gained in college to the problems that exist in the field (school), especially in the

development of teaching materials, and to institutions is expected that the results of the study this can be input to the school and socialization efforts to use science teaching materials based encyclopedia on the subject matter and its state can improve the quality of understanding of the concept of learning. For teachers can be used as input in preparing a teaching material that refers to the KTSP. While those students have benefits Makes it easy to learn actively and independently.

E. Assumption For Development

The importance of the development of book-based encyclopedia helping science teachers to develop classroom materials in the learning process. And this book helps teachers to facilitate students' understanding on the material on matter and its state with fitted steps appropriate to experiment on the subject of science and its objects. With the help of teaching materials based encyclopedia book students will be easy to understand and grasp the concepts of science learning in the material on the matter and its state easily know the meaning - difficult words in the book learning. So with products based encyclopedia book Natural Science can reduce comprehension - understanding the concept of students who have not understood, so with this book students will be easier to understand the concepts of the material object and change its.

F. Scope Of Development

1) Assumption

Some of the underlying assumptions of the study are as follows:

a. With the Natural Sciences book encyclopedia based science experiments on the subject matter and its state of students will know the meaning of the difficult word on the material object and change its nature and knowing the steps in detail when it will conduct experiments at school. Students are required to conduct experiments, observe the results of the experiment and discussion. The book also contained guidance tools and materials needed to perform the experiment.

b. With preparation guide book practicum-based encyclopedia of designed as attractive as possible, students will be happy to read and easy to understand learning materials, so that students are assumed to be motivated, guided in the direction of learning by using books of Natural Science based-encyclopedia of experimental science developed as a handbook teacher or companion in learning science.

G. Product Specification

The resulting product in the form of book-based encyclopedia that consist of materials and practical implementation science teaching of the third grade focusing on material in the matter and its state of as well as the instructional media used by students with the guidance of the teacher with the following specifications :

1) Products developed teaching materials. Physical form of teaching materials in the form of research and development of print media in the form of textbooks created by using variations of the layout, colors, font variations that suit your needs so comfortable to read and interesting to learn. Textbook form using A4 size paper (210 x 297 mm), Vertical shape, typeface and use font size 14. The layout of text and images created diverse motives, it is given to the attractiveness. The language used is dialogic and communicative so sought active interaction between the textbook by learners.
2) The science textbooks are being developed to improve the understanding of the concept of students in the subject matter and its state, a character developed in the textbook of Natural Sciences, namely on the material aspects and design aspects. The concept of the preparation of teaching materials on the subject of science on matter and its state are as follows:
    a. Before entering the section of material, there is a meaningful story that contains a link to the material on the subject matter and its state direct experience with linkages that occur in daily activities.
    b. There is a pictures that supports appropriate to the material on matter and its state.
    c. There are steps experiment clearly written and accompanied by illustrations image in accordance with steps experiment.
    d. There is a review and discussion of the results of experiments on the matter and its state.

e. There are explanations of words or word reminder - an important word in each experiment.

f. Color design, layout and font type interesting customizable user character.

H. Cop Limitation at the Study

The subject matter in the book that is the object and its nature as found Competence Standard and Basic Competence in Permendiknas 22 Thn.2006 on the subjects of Natural Sciences the third grade Semester I.

1. The Limitations of Matter

Development of science based-Encyclopedia book is only limited to material objects and changing its nature of the third grade Semester 1 consisting of the following subjects[7] :

a. The nature of solids and liquid, and gas

(a) Solid Characteristics:

- Shape Fixed
- Volume Fixed
- Massa Fixed

[7] S.Rositawaty, Senang Belajar Ilmu Pengetahuan Alam untuk Kelas III SD/MI,(Surabaya : PT. Jepe Press Media Utama,2008),65

(b) Liquid Characteristics :

- The shape changes according to its place
- Volume and period of stay

(c) Gas Characteristic :

- The volume changes according to shape and place
- fixed masses

b. Being the change of object and nature

(a) Combustion : Things that burned will change its nature

Example: burned wood becomes charcoal

(b) Heating :This heating process will change the nature of things.

Example: The cake dough put into oven

(c) The placement in the open air:

Example: apples are peeled and left turns brown.

c. The Usefulness of Objects

(a) The Usefulness of Objects Made of Glass

(b) The Usefulness of Objects Made of Wood

(c) The Usefulness of Objects Made of Paper

(d) The Usefulness of Objects Made of Plastic

I. Research Subjects

Subjects were students of the third grade in MI Khadijah Malang.

J. Site of Research

Islamic Elementary School (MI) Khadjah Jl.Arjuno, 19A. The reason for choosing these locations is due in MI Khadijah Malang is not contained encyclopedia based teaching materials are accompanied by step guide experiments. Fact-based book encyclopedia very help teachers in presenting the material and easier for students to understand the concept of science learning, especially the material on matter and its state. MI Khadijah had never conducted research on the development of teaching materials based encyclopedia science books. So the researchers will try to develop a science textbook on the material on matter and its state based encyclopedia for students of the third grade MI Khadijah Malang.

K. Definition of Terms

To avoid confusion in understanding or interpreting the terms that exists, the authors give an affirmation and a discussion of the terms related to the title.

1. Development

Development is a process or a steps to develop a new product or improve existing products, which can be accounted[8].

[8] Nana Syaodih Sukmadinata,*Metode Penelitian Pendidikan*, (Bandung:PT Remaja Rosdakarya Offset,2007),hlm.164.

In this development to develop instructional materials science writer based encyclopedia on the subject matter and its state to enhance the learners' understanding of the concept of third grade in MI Khadijah Malang.

2. Teaching Materials

Teaching Materials are material or material of learning activities that are arranged systematically used by students and teachers in the learning process. Teaching materials so determining educational success of students in demanding subjects in school. Teaching development.

Teaching materials are supporting the learning process in class, teaching materials developed by drawing it will be easier for students to understand learning material.[9] Teaching materials referred to in this research and development is in the form of text books based encyclopedia contained interesting illustrations appropriate to the subject matter and its state for students of in the class the third grade MI Khadijah Malang.

3. The Natural Sciences

The Natural Sciences is a collection of systematic theory, its application is generally limited to a natural phenomenon, was born and developed through scientific methods such as observation and experimentation

[9] Ika Lestari. Op. Cit,hlm,2.

as well as demanding scientific attitudes such as curiosity, open, honest, and etc.[10]

The Natural Sciences (IPA) which is referred to in research and development is one of the subjects contained Islamic Elementary School curriculum that includes some of topics that will be used students to solve or resolve problems in daily activities.

4. Pseudo

Pseudo is a code that is similar to the actual programming. Pseudo code Pseudo comes from the word that means imitation, similar to, or resembling the programming language code.[11]

So researchers use textbooks Pseudo-based encyclopedia of science is to facilitate discussion and itemize appropriate language or learning material developed specifically.

5. Encyclopedia

Encyclopedia is a collection of writings that contain explanations of various kinds of information widely, complete and easy to understand the science or special about a particular branch of science which is arranged

[10] Trianto,Op.Cit,hlm,135

[11] http://mastamm.blogspot.co.id/2014/10/pdf-pengertian-pseudocode-dan-contohnya.html(Diakses : pada hari senin 02 November 2015: 07:25)

alphabetically or by category and printed in book form. Encyclopedia explains in more detail and depth of the word is meant.

6. Science Experiments

Experiments are an integral part of the Natural Sciences. Therefore, the Education Natural Sciences course very important position experiments. One of the goals of Education Natural Sciences is the growing understanding of the experimental method. Experiments and laboratory work is almost, but not entirely a term synonymous in the education of Natural Sciences[12].

7. Understanding of the concept

Understanding this concept aims to deepen the concepts, understanding, and the fact that he learned, because the process of skills, students are trying to find out, and find the concept.[13]

In the development of science teaching materials encyclopedia based on the subject matter and nature there are some of experiments with experimental step, as an effort to improve understanding of the concept students by conducting experiments as direct experience.

L. Systematic Research

Systematic discussion in development research is divided into six chapters, each chapter has its own sub-chapters :

[12] Trianto. Op.Cit.hlm,150.

[13] Subiyanto,Op.Cit,hlm,51

The first chapter suggests preliminary descriptions of the background of the problem, formulation of the problem, the purpose of development, product specifications developed projections, the importance of research and development, assumptions and limitations, the definition of the term and systematic writing**.**

The second chapter, contains a literature review that discusses the previous research and theory study consisted of learning of Natural Sciences (IPA) in primary school, review, on the subject of chapter 4 of material objects and nature, development of textbooks and learning outcomes**.**

The third chapter, contains the development method describes the development of a simplified design, procedure development and testing of product development of teaching materials**.**

The fourth chapter, contains the exposure results of the development of the description of the development of teaching materials and presentation of data obtained after the test subject content experts, instructional design expert test, the test subject teachers and field trials.

The fifth chapter, contains a discussion of the analysis of the development of teaching materials, the analysis of the results of expert validation, analysis of the level of attractiveness of the media props and analysis of the effect of the development of textbooks.

The Sixth, is the final part of the thesis includes the conclusions of the development of teaching materials such as textbooks based encyclopedia.

At the end there is a list of libraries used to reference the theory and appendices that support the report.

CHAPTER II

REVIEW LITERATURE

Study of the developing Pseudo Encyclopedia As A Teaching Focusing on Matter and its state in MI Khadijah Malang, we will discussion includes: 1) Review of the Literature and 2) Previous Studies. Previous Studies include: 1) Definition of Learning Natural Science; 2) The Scope of The third Grade Material ; 3) Definition of Teaching materials; 4) The Essence of the Encyclopedia; 5) Understanding of The Concept.

A. Review Literature

In this study, researchers conducted a pre-thesis research by conducting a survey of previous studies related to the title of the study, and also the study of various literature book, as follows:

1. *Development of Practical Handbook Guided Inquiry Based on Material Objects and Its Grade II MI Bahrul Ulum Ngoro Mojokerto*.[14]

   Rohiatul Miskiyah in 2013,entitled "Development of Practical Handbook Guided Inquiry Based on Material Objects And Its To Improve Student Achievement Motivation and grade II MI Bahrul Ulum Mojokerto Ngoro. This study aimed to develop teaching materials lab guide book on the

[14] Rohiyatul Miskiyah, " Pengembangan Buku Panduan Praktikum Berbasis Inkuiri Terbimbing pada Materi Benda dan Sifatnya Kelas II MI Bahrul Ulum Ngoro Mojokerto"."Skripsi".(Malang : Program Studi Pendidikan Madrasah Ibtidaiyah Universitas Mulana Malik Ibrahim Malang,2013)

material subject matter and its state the second grade. This study reveals that the science lab manual material objects and nature got a good qualification assessment, because based on the validation results obtained value of subject teachers by 90%, which means a very decent guide book and does not need to be revised. And proven practical guide book can significantly improve motivation and student achievement of grade II MI Bahrul Ulum Ngoro Mojokerto .

2. *Development of Teaching Materials Materials-Based Encyclopedia of Rock and Kind Concept to Improve Grade Students of SDN Ketawanggede Malang.*[15]

Aprilia Indah Prasanti in 2014 titled "The Development Teaching Materials and Kind Based Encyclopedia to Improve Student the fifth Grade Concept SDN Ketawanggede Malang. This study aimed to develop teaching materials based encyclopedia media facilitate the understanding of students in rock material and type. This study revealed that revealed that develop instructional Material. Materials rocky material and type of class v meet the criteria Valid with test results matter experts reached a level of validity of 81%, a design reaches 88%, the expert subjects reached 90%, and the results of field trials reached 84% , This indicates that the product developed has the

[15] Aprilia Indah Prasanti,"Pengembangan Bahan Ajar Materi Batuan dan Jenisnya Berbasis Ensiklopedia untuk Meningkatkan Pemahaman Konsep Siswa Kelas V SDN Ketawanggede Malang"."Skripsi".(Malang:Program studi Pendidikan Madrasah Ibtidaiyah Universitas Maulana Malik ibrahim malang,2014)

validity of high-level qualifications, so that viable instructional materials used in learning .

3. *Development of Instructional Materials science encyclopedias and CD-Based Learning Content Lifecycle Animal Grade IV MI Bahrul Ulum*[16].

Anita Anggraini.2013"Development of Instructional Materials Science Encyclopedia and CD-Based Learning Content Lifecycle Animal Class IV MI Bahrul Ulum Malang". According to researchers, the development of teaching materials science thesis is more emphasis on the life cycle of the title material of living things, according to the researchers the title is not appropriate, because living things including humans, animals and plants - plants. While the material in the book only describes the life cycle of animals. This is not in accordance with the basic competencies specified in the curriculum subjects manuscript educational unit elementary school. So researchers voiced their more specific headings such materials if called life cycle of animals. So the researchers focused on the development of teaching materials science encyclopedias and CD-Based Learning Content Lifecycle Animal grade IV MI Bahrul Ulum. Anita Anggraini a researcher pick the similarity with the researchers that the similarity in the development of science teaching

[16] Anita Anggraini, "Pengembangan Bahan Ajar IPA Berbasis Ensiklopedia dan CD Pembelajaran Materi Daur Hidup Hewan Kelas IV MI Bahrul Ulmum Malanhg"."Skripsi". (Malang : Program Studi Pendidikan Madrasah Ibtidaiyah Universitas Maulana Malik Ibrahim Malang,2013)

materials, and the same - the same as the development of materials based Encyclopedia. Medium difference Anita anggraini research and researchers that differences in the focus of the development of teaching materials .From the three previous studies, then studies may conclude the same equation - equally develop the teaching materials for students Elementary School. While the average difference between this study lies in the focus of research methods and focus of the research object problems. The difference with this study is that the study raised the instructional materials that are different from previous research. For ease of understanding, the following researchers differences include tables, equations, and originality of the study.

2.1 Table of Originality Research

Research Title	Equetion	Difference	Originality Research
Development of Practical Handbook Guided Inquiry Based on Material Objects And Nature To Improve Student Achievement Motivation and Class II MI Bahr Ulum Ngoro Mojokerto.	Develop teaching materials Natural Sciences and nature of material objects	1. Teaching materials developed in the form of practical guide book 2. Inquiry-based practical guide book Guided	1. Based on the characteristics of the subjects that became the theme of this study, that this study Natural Sciences wants to try to develop teaching materials Natural Sciences that already exist and are used grip for students and teachers in the learning process becomes the object of study in MI Khadijah Malang-based Guided Inquiry. 2. The teaching materials developed form Practical Handbook Guided Inquiry

			Based on the material objects and nature. 3. This type of research is research and development. 4. The development model used in this development is the model of Walter Dick and Carey.
Development of Teaching Material Matter rocks and Kind Based Encyclopedia to Improve Student Class V Concept SDN Ketawanggede Malang	Develop Teaching Material based Encyclopedia	1. which is developed teaching materials on the subjects of Social Sciences	1. Based on the characteristics of the subjects used in this study is the subject of Social Science, researchers are trying to IPS develop teaching materials that have been used. 2. The material was developed in the form of development of teaching materials based encyclopedia. The type of

			research that is developed is a research and development 3. The model used in this development is the model of Walter Dick & Carey
Development of Science Instructional Materials Encyclopedia and CD-Based Learning Content Lifecycle Animal Class IV MI Bahrul Ulum	Develop teaching materials based encyclopedia	1. The teaching materials developed in the material Life Cycle Animals 2. In addition encyclopedia-based development, the researchers also used pngembangan learning CD	1. Based on the characteristics researchers use science subjects, researchers want to try to develop teaching materials in schools as an object-based development of teaching materials and learning CD encyclopedia 2. The development of the use of researchers, namely research and development. 3. The model of development used Walter Dick & Carey.

B. Previous Studies.

1. The Characteristics of Natural Sciences

a. Definition of Natural Science

Natural Sciences has a meaning as a discipline that consists of physical sciences (physical sciences) and life sciences (biology). Natural Sciences is very influential to human life. Thus the people of today need to know the Natural Sciences, and even some members of the public need to explore and develop natural science, in the hope that thanks to them, the future of human life for the better.[17]

If we open the various dictionaries and encyclopedias, we can see various "definitions" Science as follows [18] :

a) A branch of knowledge concerning the facts systematically arranged and showing the enactment of common laws.

b) The knowledge gained by the study of the practice.

c) A branch of study concerned with observation and classification of the facts, especially in the formulation of the common laws with induction and hypothesis.

[17] Op,Cit,Subiyanto,hal3

[18] Ibid,hal 4

Based on the understanding of Natural Sciences which has been described above that the influence of Natural Sciences is essential to human life or society, because we are studying Natural Sciences then we will know how we preserve nature and the environment for the better.

b. The Essence of Natural Science

In essence, the Natural Sciences can be viewed in terms of products, processes and terms of attitude development. That is studying Natural Sciences has the dimensions of the process, the dimensions of the results (products), and the dimensions of the development of scientific attitude. Three dimensions are interrelated. This means that the learning. process of Natural Sciences is supposed to contain the three-dimensional[19] :

a) The Natural Sciences as a product

Natural Sciences as the product of an accumulation result of the pioneering efforts of previous Natural Science and generally has been fully and systematically arranged in the form of a text book. Textbooks Natural Sciences is the body of Natural Science. Textbooks are important, but there is another side Natural Science are not importance of the dimensions of the "process", meaning the process of getting the science itself. In teaching science teacher is required to be able to invite their students take advantage of the

[19] Bariwijaya soewendi dan Estu sindu ningrum,"Ilmu Kealaman Dasar" (Bogor :Ghaliya indonesia), hal 65

natural surroundings as a learning resource. Nature is a source of learning about the most authentic and will not be used up.

b) The Natural Science as a process

What is meant by "process" here is the process of getting the Natural Sciences. We know that the Natural Science prepared and obtained through the scientific method. So Natural Science process is none other than the scientific method. For elementary school children, the scientific method developed gradually and continuously, with the hope that it will eventually form a more complete alloy so that elementary school children can do simple research. In addition, the phasing of development adapted to the stages of a process research or experimentation, and includes: (1) Observation (2) classification (3) interpretation (4) prediction (5) hypothesis (6) controls the variable (7) to plan and carry out research (8) inference (9) applications (10) communication.

So in essence in the process of obtaining the necessary the Natural Sciences ten basic skills. Therefore the kind of - kind of basic skills needed in the process of getting Natural Science called "process skills". To understand something concepts, students are not told by the teacher, but the teacher provide opportunities to students develop basic skills through trial and make conclusions. Why is it so important discovery for the students' learning process.

c) The Natural Science as fertilization Attitude

In this book, the meaning of "attitude" on the teaching of Natural Science SD / MI limited understanding on the "scientific attitude towards the natural surroundings". According to Hendro Darmodjo Wynne Harlen (1993), there are at least nine aspects of the scientific attitude that can be developed at primary school age children / MI.

c. Basic Concepts Learning Science

The Natural Sciences related to how to find out about a systematic nature, so that the Natural Science is not only a mastery of knowledge in the form of a collection of facts, concepts, or principles, but also a process of discovery[20].

d. The Objective of Natural Science Subjects in primary school

Natural Science is required in everyday life to fulfill human needs through the solution of the problems that can be identified. The application of Natural Science to be done wisely so as not to be bad for the environment. On the level of SD/MI expected learning emphasis Salingtemas (science, environment, technology, and society) directed at a learning experience to design and make of a work through the application of the concept of scientific work and competence of Natural Science wisely. As written in the curriculum unit level education, learning science in class include studies the third grade that contain

[20] Trianto, "Model Pembelajaran"(jakarta : PT Bumi Aksara) 2010, hal 155

aspects of Natural Science subjects in elementary school aims so that learners have the ability as follows[21] :

a) Obtain a conviction against the greatness of the Almighty God upon the existence and regularity of nature, the beauty of his creation.
b) Develop knowledge and understanding of Science concepts that are useful and can be applied in everyday life.
c) Develop curiosity, positive attitude and awareness about the existence of the relationship of the interplay between science, environment, technology and society.
d) Develop skills to investigate natural processes around, solve problems and make decisions.
e) Raise awareness for useful in preserving, maintaining and preserving the natural environment.
f) Raise awareness to respect nature and all the as one of God's creation.
g) Acquiring the stock of knowledge, concepts and skills in the IPA as the basis for continuing education to the SMP/MTs .

e. The Scope of Material The Third Grade Primary School

As written in the curriculum unit level education, learning science in the third grade in primary school include studies that contain aspects of living things and life process, namely, humans, animals,

[21] http://teloanyar.blogspot.co.id/2012/04/kurikulum-ktsp-biologi-sdmi.html(Diakses: Pada hari,jumat 28 Agustus 2015)

plants and their interaction with the environment, as well as health, objects/materials, properties and their uses include: liquid, solid and gas, energy and changes include: the style, sound, heat, magnetic, electrical, light and simple aircraft, Earth and the universe covers : the land, the Earth, the solar system, and other heavenly bodies[22].

On the scope of the learning of natural science which have been designed in the curriculum that has been mentioned above, researchers now are taking more specific material objects and their nature and it uses include: solid, liquid, and gas. Researchers will develop this textbook material science-based encyclopedia in which there are some experiments to prove from the nature of things, a change of nature, and reading about the usefulness of objects. The following summary of the subject matter and nature of matter as follows:

1) Object and Their Characteristic Nature

An object is anything that has mass and occupies space. In everyday life we often come across beyond objects that is a form of liquid, gas, and dense. The third form of these things definitely have their respective properties and benefits in everyday life. As the word of God Almighty as follows: God is explained in (*QS Al-Qamar: 49*):

إِنَّا كُلَّ شَيْءٍ خَلَقْنَاهُ بِقَدَرٍ

That is to say: "truly, we created something by size" (*QS Al-Qamar : 49*)

[22] Ibid

a) Liquid

Liquid is an object composed of molecules that rift, so easy to split off or entered by solid objects. Liquid has the nature of flows from high to low spots, and has a fixed volume. Fluid shape follows the space occupied room, measuring, always keep, and heavy anti-surface gunship air always flat. God explained in *(QS: Qoof : 9):*

وَنَزَّلْنَا مِنَ السَّمَاءِ مَاءً مُبَارَكًا فَأَنْبَتْنَا بِهِ جَنَّاتٍ وَحَبَّ الْحَصِيدِ

That is to say: And we sent down water from the sky that carries a blessing, and with it Our collision and seeds that can be harvested. (*QS :Qaaf: 9*).

b) Gases

Objects of gas is an object composed of molecules which are very difficult and have many particles arranged like oxygen, water vapor. Objects of gas filling the whole room that raise gas shapes change according their vessels, and the corresponding volumes or its container. God have explained in *QS Al Furqon :48*:

وَهُوَ الَّذِي أَرْسَلَ الرِّيَاحَ بُشْرًا بَيْنَ يَدَيْ رَحْمَتِهِ ۚ وَأَنْزَلْنَا مِنَ السَّمَاءِ مَاءً طَهُورًا

That is to say: he is the blowing wind (as) bearer of good news close before the arrival of his grace (rain); and we sent down water from the sky, very clean. (*QS Al-Furqon:48*)

c) Solid

Solid objects are solid tangible objects. Solid body we can find around us. For example, table, stone, iron, and buckets. Solid objects have the properties of shapes and sizes are always fixed. God explains in the *QS Al-Baqarah: 74*.

ثُمَّ قَسَتْ قُلُوبُكُمْ مِنْ بَعْدِ ذَلِكَ فَهِيَ كَالْحِجَارَةِ أَوْ أَشَدُّ قَسْوَةً

That is to say : "then after that heart you guys become hard as a rock, even harder." (*QS Al-Baqarah : 74*)

2) The Changes Nature of Object

Changes in nature of this thing happens to an object that can be caused by the treatment of an object can change shape, smell, and taste. Changes in nature of these objects is usually caused by heating, burning, and placed in the open air.

a) Heating

Heating is the provision of heat on an object Benda change the nature of objects as heated.

b) Burning

Burning of is a chemical reaction that occurs in the fuel and oxidant, accompanied product heat that produces light in the form of fire.

c) Laying in the Open Air

Laying in the open air is when an object or one of them apples are placed in the open air will changing Shape, color, and odor. This is due to the oxidized apple.

3) Objects and its Use

An object has a function or usage of each, an object is created will look at the material, size, and shape are made in accordance their uses.

a) Objects is Made Of Glass

Objects is made of glass now a lot of examples that can be encountered every day. One example of mirror glass, which every day we use to reflect themselves.

b) Objects is Made Of Wood

Objects made of wood now a lot of examples that can be encountered every day. One example desks, which have uses for our use everyday learning both at school and at home.

c) Objects is Made of Paper

Objects made of paper are now a lot of examples that can be encountered every day. One example envelopes, which have uses for a letter that can not be read by other people and ready to be sent by the receiver.

d) Object is Made of Plastic

Objects made of plastic now a lot of examples that can be encountered every day. One example plastic cups, which have uses for drinking, the object is made of plastic materials that are not easily broken.

2. Characteristics of Teaching Materials

a. Definition of Teaching Materials

Teaching materials is a set of suggestions or learning tool that contains learning materials, methods, limits and how to evaluate the design systematically and attractive in order to achieve the objectives expected, reaching competencies or sub-competencies in all its complexity (Widodo & Jasmadi 2008: 40). So in this sense we can pull the knot that a teaching material should be designed and written by mindless instructional rules will be used by teachers to helps learning process[23].

The positive impact of teaching materials is a teacher will have more time to guide students in the learning process, helping students to acquire new knowledge from all sources or references used in teaching materials, and the role of the teacher as the one by one source of knowledge is reduced. In this case the teacher's ability in designing and preparing instructional materials become very instrumental in the success to deter learning process and learning through instructional

[23] Ika lestari," *pengembangan Bahan Ajar Berbasis Kompetensi*" (@kademia : jakarta) 2013.hal 1

materials. Instructional materials also mean any kind of material systematically arranged that enable students can learn with a curriculum designed according to regulations, With the instructional materials, teachers will be more coherently in working on materials to students and achieved all the competencies predetermined.

Teaching materials will be born of a lesson plan created by the teacher. In principle, all books can be used as learning materials for students, it's just that differentiate instructional materials from other books is the way the preparation because it is based on the learning needs student and the student has not mastered properly. Its development was based on the concept of learning design, which is based on a competence or achieve the learning objectives. In writing instructional materials, teachers need a lot of resources such as reference books that can be found in stores or electronic books, newspapers, magazines, and also the results of the seminar discussion that followed The ability of teachers to write and develop instructional materials to train teachers to think comprehensively on the competency achieved by students.

There are various forms of books, both of which are used for schools and colleges for example reference books, teaching modules, practical books, teaching materials, and books diktat. Some things to consider in to make teaching materials that makes the

students to learn independently and acquire mastery in the learning process as follows:[24]

a) Give examples and illustrations are interesting in order to support the learning material exposure.
b) Provide the possibility for students to give feedback or domination measure of the material given by providing questions - exercises, assignments, and the like.
c) Contextual are presented materials associated with the atmosphere or the context of the task and the student environment.
d) The language used is quite simple because students only when self-learning instructional materials.

Use instructional materials enable students can learn a competence in a coherent and systematic so that cumulatively able to master all the competencies intact and integrated as well. A decent instructional materials if they meet the eligibility content, language and presentation. A test was needed to test the readability of a printed instructional materials in the form of modules in order to know the extent to which easily understood by students.

b. The Function Of Teaching Materials

In broad outline, the function instructional materials for teachers is to direct all the activities in the learning process as well as a substance of competence which should be studied. Instructional materials also

[24] Ibid,hlm 3

serves as an evaluation tool achievement of learning outcomes. Instructional materials are good at - least include instructions to learn, competence to be achieved, the content supporting information, training, work instructions, evaluation, and response to the evaluation results.

When the instructional materials have been made with the appropriate rules, teachers will easily direct all of its activities in the learning process, in which there will be some competencies that should be taught or trained to students. Also in terms of students with instructional materials will better know what competencies that must be mastered during the learning program is underway. Students thus have a picture of learning scenarios through or using instructional materials.

Based learning strategies are used, the function of instructional materials can be divided into three kinds, namely functions in classical learning, individual learning and group learning[25].

1) The function of instructional materials in classical learning, among others:
    a) As the one source of information as well as the supervisory and controlling the learning process (in this case, the students are passive and learning pace of students in learning)
    b) As support material organized learning process.
2) The function of instructional materials in individual learning include:
    a) As the main media in the learning process.

[25] Op,Cit.Ika Lestari,hal 7.

b) As a tool used to draw up and oversee the process of learners in obtaining information, and as supporting individual learning other media.

3) The function of instructional materials in the learning group, among others.

a) As the material integrated with the group learning process, by providing information about the role of people - those who are involved in the study group, as well as instructions about the process of learning his own group.

b) As the main learning materials supporting materials, and if it is designed in such a way, then it can increase students' motivation.

c. The types Teaching Materials

The types teaching Materials Kind should be adjusted first to the curriculum and after that made learning design, like following examples [26]:

a) Teaching materials of view (visual) consists of printed materials (printed) such as, among others, handouts, books, modules, student worksheets, brochures, leaflets, wall chat, photos / images, and non-printing (non-printed), such as model.

b) Teaching materials hear (audio), such as cassette, radio, phonograph records and compact discs, films interactive multimedia Instructional materials (interactive teaching material) such as CAI

[26] Sofyan Amri, " Kontruksi Pengembangan Pembelajaran" (Jakarta: PT.Prestasi Pustakarya,2010) hlm,161.

(Computer Assisted Instructional), compact disk (CD) multimedia interactive learning and web-based teaching materials (web-based learning materials)

d. Preparation Techniques of Teaching Material In Primary School

Preparation techniques Instructional materials engineering preparation of instructional materials should be adjusted first. to the curriculum essentially, as follows[27]:

a) Analysis of KD (Basic Curriculum) and Indicators.
b) Analysis of Learning Resources
c) Selection and determination of teaching Materials

e. Preparation of Teaching Materials Print

Preparation of instructional materials print previewing its design, if it is appropriate can be adjusted as follows:

a) Composition of view
b) The language is easy
c) Test understanding
d) Stimulants
e) Ease of reading
f) Instructional Materials

Teaching Materials or learning materials (instructional materials) are the knowledge, skills, and attitudes students need to learn in the chain achieve competency standards have been determined. In detail, the

[27] Ibid,hlm,161.

type - the type of learning material consists of knowledge (facts, concepts, principles, procedures), skills, and attitudes or values.

f. The Principles of Teaching Materials

Principles - principles in selecting learning materials include:[28] :

(a) Principles of relevance

(b) Consistency

(c) Adequacy

Principle of relevance means relevant learning material should have relevance to achievement standards and basic competencies. The principle of consistency means the firmness between instructional materials with the basic competencies that must be mastered students. For example, the basic competencies that must be mastered four different students, the teaching materials to be taught also have to include four kinds.

The principle of sufficiency means that the material being taught should be sufficient to help students master basic competencies taught. The material should not be too little, and should not be too much. If too little to be of less help to achieve standards and basic competencies. Conversely, if too much will waste time and energy does not need to learn[29].

[28] Ibid,hlm,162.

[29] Ibid,hlm,162.

g. Advantages and Limitations of Teaching Materials

According Mulyasa (2006: 46-47), there are several advantages of instructional materials, which are as follows[30].

a) Focusing on the individual skills of the students, because essentially the student has the ability to work alone and be responsible for the actions - actions.

b) The existence of control over the learning outcomes on the use of standards of competence performance any instructional materials that must be achieved by the students.

c) Relevance curriculum shown with the objectives and way of achievement, so that students can know the relationship between learning and results to be obtained.

While the limitations of the use instructional materials, among others [31] :

a) Preparation of teaching materials which either requires a certain expertise. the success or failure depends on the preparation instructional materials.

b) Difficult to determine the scheduling process and graduation, as well as the management education requires very different from conventional learning. Because each student completed the instructional materials in different times, depending on the speed and abilities of each.

[30] Ika Lestari,Op.Cit,hlm,8.

[31] Ika Lestari,Op.Cit,hlm,9.

c) Learning support in the form of learning resources, is generally quite expensive, because each student must find their own.

h. Definition Textbooks

As mentioned in the previous section that the textbook is one type of educational books. Textbook is a book that contains a description of the subject matter or field of study, systematically arranged and has been selected based on specific objectives, learning orientation, and student progress, to be assimilated[32].

Chambliss and Calfee (1998) explain it in more detail.

> *Textbooks are aids students to understand and learn from the things that are read and to understand the world (outside of himself). Textbooks have a tremendous power to change students' brains. Textbooks can affect children's knowledge and certain values.*

National Education Minister Regulation No. 11 of 2005 explains that:

> *Textbook (textbook) is a reference book mandatory for use in schools which contains learning materials in order to increase faith and piety, character and personality, ability mastery of science and technology, the sensitivity and the ability of aesthetic, physical potential and health which is based on standards education nationwide*.

i. In terms of the order, the teaching materials that take into account factors:

a) The purpose of learning

b) The structure of the curriculum and educational programs

c) The level of student development goals

[32] http://masnur-muslich.blogspot.co.id/2008/10/hakikat-dan-fungsi-buku-teks.html(Diakses : pada hari senin,12 Oktober 2015 :11:12)

d) conditions and school facilities.

e) The conditions of teachers wearer. In terms of functions, in addition to having a general function as a figure of books, textbooks have function as a means of instructional materials developers

f) programs in the educational curriculum

g) The means of facilitating the task of the academic teacher

h) The means of facilitating the achievement of learning objectives

i) means of facilitating the efficiency and effectiveness of learning activities.

j. Ten categories are as follows[33]:

a) Textbooks should attract students who use it.

b) Textbooks must be able to motivate the students who wear them.

c) Textbooks must contain illustrations that attracts students who use it.

d) Textbooks should consider linguistic aspects that fit with the ability of the students who wear them.

e) The contents of textbooks should be closely linked to other subjects, even better if it can support it with everything planned so that a determination is intact and unified.

f) Textbooks must be able to stimulate, stimulate the activities of private students who use it.

[33] Ibid

g) Textbooks must be consciously and firmly avoid concepts vague and unusual, so as not to confuse students who wear it arouses.

h) Textbooks must have a viewpoint or "point of view" a clear and unequivocal so that there is finally also the viewpoint of the wearer faithful.

i) Textbooks must give stabilization, emphasis on the values of children and adults.

j) Textbooks should be able to appreciate the personal differences of the wearer.

3. The Characteristics of Encyclopedia

a. Definition Encyclopedia

“Encyclopedia" According to Wikipedia Indonesia. "Encyclopedia is the number of posts that explain that store information comprehensively and quickly understood and to understand the whole branch of science or specialized in one branch of science certain arrayed in parts of the articles with a topic of discussion on each article arranged in alphabetical order, category or volume of publications and are generally printed in the form of a series of books which depends on the amount of material included[34].

[34]https://id.wikipedia.org/wiki/Ensiklopedia(diakses: pada hari, selasa 27 oktober 2015:08:16)

b. Traits Of Encyclopedia

In general encyclopedia have characteristics :

a) Compiled with particular order, usually alphabetical

b) Do not need to read it from beginning to run out, encyclopedias can be read by any entries that fit the needs of information.

Based on the above explanation of the definition and characteristics of encyclopedia books, encyclopedias have advantages including the set book arranged encyclopedia detailed, complete with illustrations attractive, and easy to understand when read. However, this encyclopedia book has a weakness on the content or information that is very broad or general, so that when the reading of children at primary school level it will feel a little hard to understand. So the researchers developed a textbook-based encyclopedia is devoted to see the standard of competence, basic competence and indicator learning materials.

Based on the above characteristics the researchers do not fully manufacture based encyclopedia textbook meets traits - traits encyclopedias above, as researchers further customize the subject or the object and its material for students of the third grade.

c. Type of Encyclopedia

Encyclopedia can be divided into several types, namely general encyclopedia / national, specialized encyclopedia or subject encyclopedia encyclopedias international / universal[35] :

a) General Encyclopedia

Public or national encyclopedia is an encyclopedia that contains basic information about things, abstract, concept or event a common occurrence

b) Special Encyclopedia

Special Encyclopedia is an encyclopedia that limit the scope of the problem or the contents on a subject.

c) International Encyclopedia

International Encyclopedia is an encyclopedia that contains information) in the world, without the member emphasis on information derived from a particular country or group of countries.

Based on the kind of - kind of encyclopedia of the above no researchers use based teaching materials science experiments in the form of the free encyclopedia, because on this teaching material researchers specialized subject matter and its object of the third grade based encyclopedia of science experiments.

[35] Ibid,https://id.wikipedia.org/wiki/Ensiklopedia(Diakses : Pada hari, selasa 27 Oktober 2015:10:02)

d. Benefits encyclopedia, among others, the following[36]:

a) As a means to find basic information on different issues.

b) As the primary means in the first step to doing something about something the subject of study.

c) As a means to determine the truth of the information.

d) As the world's information window.

e. The Advantage and Weakness

In writing the book would certainly have advantages and weakness, as well as in writing a book based on this encyclopedia will have advantages and weaknesses as follows:

Advantages of Encyclopedia

1) The material you want to read, can be searched directly correspond alphabetical arrangement.
2) The information obtained is very wide.
3) Encyclopedias with pictures and a good design, that can cause a person's interest in reading.

Weakness of Encyclopedia :

1) Information that is usually too wide, so for students in lower classes are still difficult to obtain information.
2) This encyclopedia book often found without the reference, so the information is there, readers want to know the reference is difficult to know.

[36] Ibid

4. The Essence Science Experiments

a. Definition of Experiments

Experiments are an integral part of the Natural Sciences. Therefore, the Education Natural Sciences course very important position experiments. One of the goals of Education Natural Sciences is the growing understanding of the experimental method. Experiments and laboratory work is almost, but not entirely a term synonymous in the education of Natural Sciences[37].Experiments spanning from simple activities such as the above until a very complex activity. Seen from the Natural Science Education, a simple experiment has an important meaning, because it solves the problem more easily adapted to everyday situations[38].

b. Various Stages of Experiments Method

a. Doing Observations

b. Formulate the problem

c. Collate Hypotheses

d. Doing Experiments

e. Make a Conclusions

Experiments are actually concerned with the further considerable thought. The students need to be trained to recognize and formulate problems. They feel they have the challenge of finding how or methods to

[37] Subiyanto,Op.Cit,hlm,51

[38] Ibid,hlm,52

solve problems. They will be familiar with the limitations of the data and feel the need to be careful in make a conclusions, and they will develop the habit of critical thinking.

5. Understanding Of The Concept

Teaching and learning process for learning in the classroom, the need for stimulus or stimulus for learners to easily understand the material that has been delivered using a learning concrete and can in practice directly by learners is as an improved understanding of the concept.

a. Definition of Concept

From the repertoire of science there are theories as Natural Science product. By theory, can be built with an explanation or prediction that will occur in the future, then by empirical testing through observation or experiment, obtained generalizations that can complement (strengthen, revise or reject) the theory that previously existed in the realm of product Natural Science[39].

On a concrete level, the concept is a picture of some real object or event. At the level of abstract and complex, the concept is a synthesis of a number of conclusions have been drawn from the experience with a particular object or event[40].

Definition of the concept advanced by Ausubel (1978: 105):

[39] Muslimin Ibrahim" Konsep, Miskonsepsi, dan Cara Pembelajarannya", (Unesa University Press:Surabaya).2012.hal,3.

[40] Ibid.hal,3

Concept is an objects, events, situations, or properties that process common critical attribute and are designated in any given culture by some accepted sign or symbol.

b. The Importance of Understanding Concepts

An understanding of the concept is very important for everyone. How important it is for us to understand the concept can be seen from the inclusion of understanding of the concept at every level of education curriculum[41].

According to Gagne, Briggs and Wagner (1988):

Mastery of concepts is the ability that allows one to do something. This may imply that without mastering certain concepts, people can not do much and perhaps its survival will be disrupted.

The progress of science, technology and art (science and technology) as is the case in today's highly dependent on understanding and mastery of concepts possessed by everyone, *especially* experts in the field of science concerned.

[41] Ibid.hal,9

CHAPTER III

RESEARCH METHODS

In this third chapter will be discussed about this development research methods, such as, 1) Type of Research, 2) Model of Development, 3) Design of Development, 4) Trails, 5) Product Validation Product, 6) Instrument Validity, 7) Instrument Data Collection.

A. Type of Research

This research included into the research and development (research and development) oriented products in the field of education. This study aims to produce a product of teaching materials that provide a meaningful conclusion and understanding and producing Natural Science teaching materials that are beneficial to readers.

Based on observations of teaching and learning activities in science subjects in the third grade MI Khadijah against the use of teaching materials, are still many weaknesses and the selection of books and instructional media utilization.

This end has developed research development. Attention to this development proved much research done research development. In the world of education and learning in particular, studies are focus of research development in the field of design or design, whether it's a design model and design materials, products such as the media and also processes[42].

[42] Punaji Setyosari,"Metode Penelitian Pendidikan dan Pengembangan" (Jakarta : Kencana Prenada Media Group,2010),hlm,194

Research and development or research and Development (R & D) is a method of research to develop new products or improve products. The product can be in the form of objects or hardware (hardware), such as books, modules, learning tools in class or lab or software (software) such as computer programs, instructional models, and others. In research and development, there are several methods: a descriptive, evaluative, and experimental. Variations of this method underlying the substance of the proposals to be are prepared[43].

Researchers use this type of research and development that aims to produce teaching materials in the form of Natural Science-based encyclopedia focusing on matter and its state in the third grade MI Khadijah Malang. It is used to improve the understanding and student learning outcomes are easy to understand using the textbook in the third grade MI Khadijah Malang.

B. Model Of Development

According Sudjana (2001: 92), to carry out the development of the necessary teaching model - a model of development in accordance with the education system. respect that there are several models of development to teaching. In the development of the learning device known three kinds of software development models, namely: Model Dick - Carey, Four-D Model and Model Kemp.

[43] Trianto, "Model Pembelajaran Terpadu Teori dan Praktek"(Jakarta : Prestasi Pustaka),2007 hal,62

Based on the assessment results of several studies, researchers often find in the development model of learning by Dick & Carey .Teaching planning system according to Dick & Carey model approach, which was developed by Walter Dick and Lou Carey (1990). According to this approach, there are several components that will be passed on in the development process and the design. The sequence design and development:

a. Identity Instructional Goals

The early stages of this model is to determine what is desired for students to do when they have completed their teaching programs. Definition of teaching objectives may refer to a particular curriculum or may also be derived from the list of destinations as a result of needs assessment, or from practical experience with learning difficulties of students in the classroom.

b. Conducting a goal analysis

After identifying the learning objectives, it will be determined what types of learning that students need. The purpose of which is analyzed to identify more specific skills that must be learned. This analysis will produce a chart of skill - skill / concept and shows the relationship between skills / concepts.

c. Identity entry behaviors, characteristics

When conducting an analysis of the skills that need to be trained and procedural steps that need to be passed should also be considered what skills already possessed when the students begin to follow the instruction,

which is important also to be identified is the specific characteristics of students who might have something to do with the design of the teaching activity.

d. Write Performance Objectives

Based on analysis of instructional and statements about the early behavior of students, will then formulate specific statements about what to do after completing the learning students.

e. Develop criterian –referenced test items

Based on the goals that have been formulated then made the development of assessment items. To measure the student's ability as predicted in goals.

f. Develop instructional strategy

Information from the five before stages, then the next will be identified that will be used to achieve the ultimate goal. The strategy will follow before the instructional activity, the delivery of information, practice and feedback, testing, which is done through activity.

g. Develop and select instructional materials

This stage of will be used to produce teaching strategies that include guidance for students, teaching materials, tests, and teacher guides.

h. Design and conduct formative evaluation

The evaluation was done to collect data that is used to identify how to improve teaching.

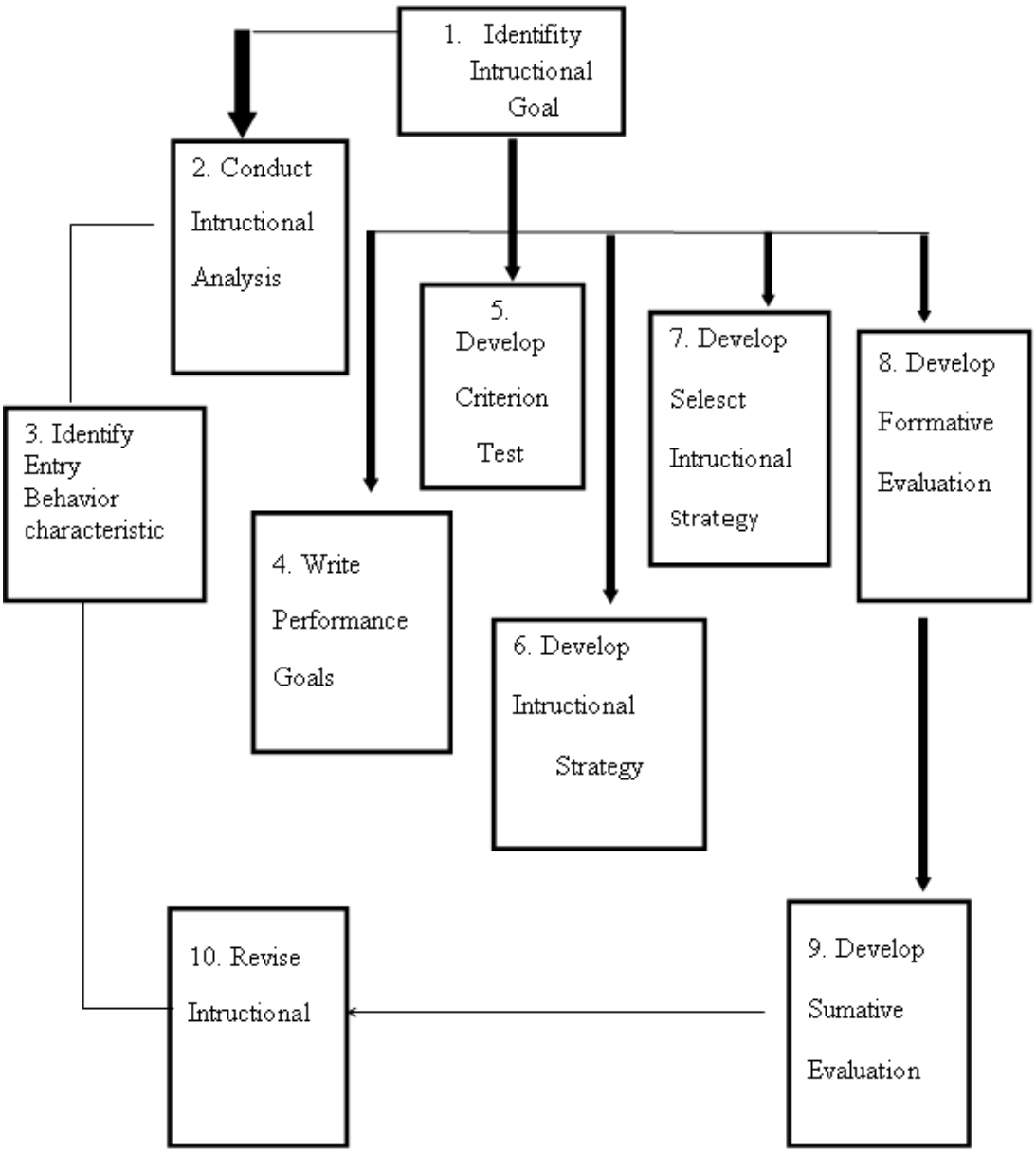
i. Design and conduct summative evaluation

Results at this stage of the above as a basis for assessing the necessary tools. Results of further devices in the validation and testing in class / class implementation.

j. Instructional revisions

This stage of the development cycle repeats teaching device. Data from summative evaluation has been done in the previous stage summarized and analyzed and interpreted for the identified difficulties experienced by students in achieving the learning objectives. Similarly, the input of the results of implementation and expert or validator.

Image 3.1 Instructional Systems Design Model from Dick and Carry [44]



[44] Wina Sanjaya,"Perencanaan dan Desain Sistem Pembelajaran"(Jakarta:Kencana Prenada Media Group,2008),hlm76.

C. Design of development

The first step taken to identify common objectives Natural Science learning by doing a needs analysis to determine the destination.

1. *Identifying Instructional Goal*

The first step taken to identify common objectives Natural Sciences learning by doing a needs analysis to determine the destination. The first step taken to know the general purpose of learning of Natural Sciences with analyze the need to set goals. This step means determining what you want to do learners after participating in learning activities of Natural Science. General purpose learning science that describes the ability of what will be obtained learners after participating in learning activities in the classroom Natural Sciences.

The first stage of research drawing ability - the ability to be owned by the students after using Natural Sciences textbook after textbook development using Natural Science-based Encyclopedia of matter and its state of the third grade Subjects Natural Science in MI / SD intended that learners have the following capabilities :

a. Skills to work and think regularly and systematically according to the steps of the scientific method.
    1) Skills and competence in the conduct of observation, using a tool - experimental tools to solve problems.
    2) Have the necessary scientific attitude in solving problems both in terms of science and life lessons. (Prihantro Laksmi, 1986).

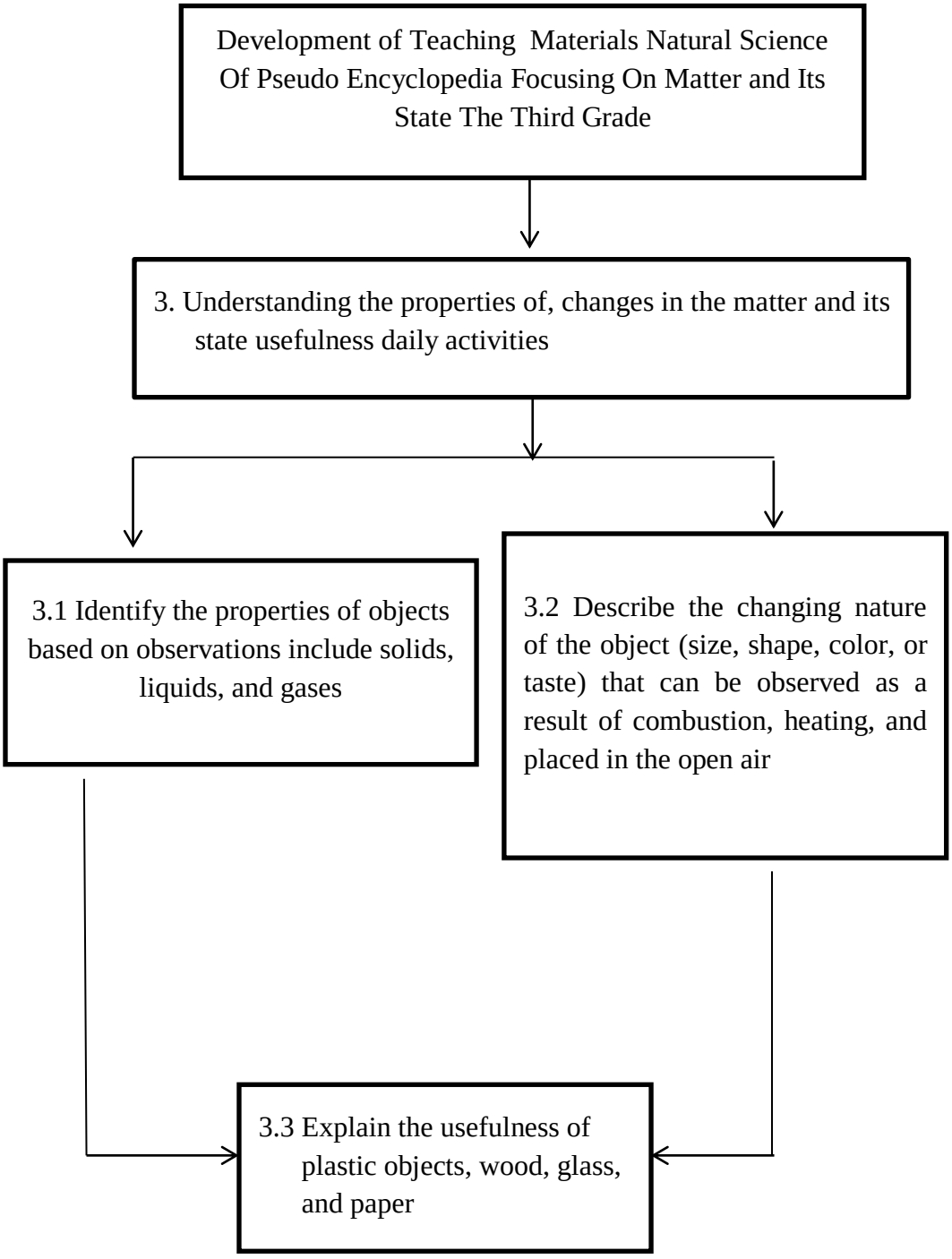
3) As a useful educational tool for achieving the goal of education, then education in schools has a specific purpose, namely :
   (a) To provide knowledge to students about the world and a place to live and how to behave
   (b) Instilling an attitude of scientific life
   (c) Providing the skills to make observations
   (d) Educate students to know, know how to work and appreciate the scientists inventors
   (e) Use and smoothing the scientific method in solving problems.

b. Identify the learning objectives of Natural Sciences the third grade of matter and its state, the obtained map competencies to be achieved by the students.

Image 3.2

Concept Maps Learning Objectives General Natural Sciences

Focusing on Matter and Its State



c. Standard analysis competence, basic competence and indicator

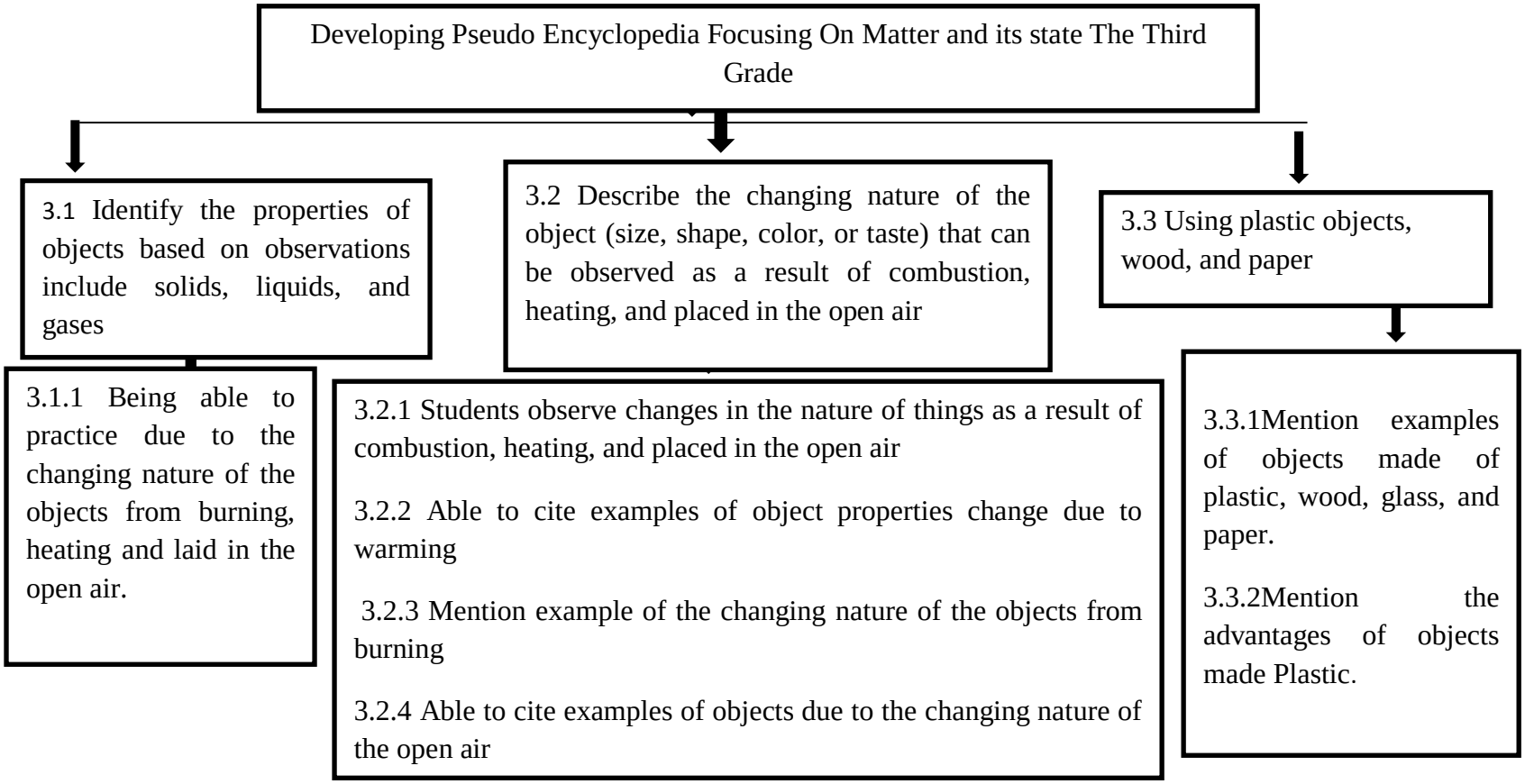
Table 3.1 Standard of Competence and Basic Competence

Standard of Competence	3. Understanding the properties of The changes properties of matter and its state role in daily activities
Basic Competence	3.1 Identifying the properties of object Based observation include solid, Liquid, and gases. 3.2 Describe the matter of the change Object (size, shape, color, or taste) that Can be observed as a result of combustion, heating, and placed in the open air. 3.3 Explain the usefulness of plastic objects, wood, glass, and paper.
Indicator	3.2.1 Observing changes in the nature of Things as a result of combustion ,Heating, and laid in the open air. 3.2.2 Mentioning examples of changes, Heating due to the nature of the objects. 3.2.3 Mention examples changes heating Combustion due to the nature of the object. 3.2.4 Able to cite examples of objects due to the changing nature of the open air. 3.3.1 Mention examples of objects made wood, glass, and paper. 3.3.2 Mention the advantages of objects made Plastic

2. *Conducting Intructional Analysis*

After identifying learning objectives, the next step is to conduct an analysis to identify skills - innate skill that must be learned by the learners in order to achieve specific learning objectives. General purpose Primary school learning science topics that have been identified are, then analyzed to identify the innate skills (subordinate skills) as mapped in the following image:

Image 3.3 analysis Identification Skills



3. Identifying Entry Behaviors, Characteristics

Identifying the contents of the material that will be included in the study, this requires identification of the specific skills that should be owned by the students to be ready to follow the learning activities and the use of textbooks, need to know the general characteristics of learners that is very important for the learning design.

As is known that users of this textbook is the third grade in Primary School. In the previous step is a preliminary analysis of the students of the third grade MI Khadijah Malang found that third grade students have had some adequate provision obtained previously (in class I and II) to receive the material in the third grade in particular Natural Sciences. To subject and certain changes its very nature there is a basic competence to practice the change in the object by its nature is to burning, heating, and in the open air, where, judging from the stock of knowledge, students have previously been able to distinguish the states of matter and nature, which in previous classes, namely the grade I and II, in which the basic competence at that time also revolve about the states of matter and the nature of that demand to study and carry out basic competence above it is considered qualified.

To know the characteristics and behavior of inputs, it needs to be known about the material previously obtained by the student. The material obtained in the math classes I, II, and III are as follows:

Table 3.2. Competence Standard and Basic Competence

Class I, Semester 1

Competence Standard	Basic Competence
Matter and Its State 3. Know the various properties of matter and its state use through observation of changes in body shape.	3.1 Identify objects in the surrounding environment based on characteristics through observation 3.2 Getting to know the objects that can be transformed 3.3 Identify the usefulness of the objects in the surrounding environment

Class II, Semester 1

Competence Standard	Basic Competence
Matter and Its State 2.Getting to know various shapes and usefulness as well as changes in form that can be experienced	2.1 Identifying characteristics of solid and liquid in the neighborhood 2.2 Shows changes in the shape and form of objects (plastic / clay / dough flour) as a result of certain conditions 2.3 Identifying objects are known and their use through observation

Class III, Semester 1

4. *Writing Performance Objectives*

Competence Standard	Basic Competence
Matter and Its State 3.Understanding the properties, changes in the nature of objects and their usefulness in daily activities.	3.1 Identifying the properties of objects based on observations include solids, liquids, and gases 3.2 Describe the changing nature of the object (size, shape, color, or taste) that can be observed as a result of combustion, heating, and placed in the open air 3.3 Explain the usefulness of plastic objects, wood, glass, and paper

Specific learning objectives are the formulation of the capability or conduct that is expected to be held by the students after participating in a particular learning program. Ability or behavior should be specific and operational so that it can be observed and measured. Thus, the level of student achievement in behaviors that exist in the specific learning objectives can be measured by tests or other gauges. Writing specific learning objectives used as a basis for developing learning strategies and devise grille learning tests.

Based on the analysis of learning towards a common goal of learning and identification of the characteristics and capabilities of the initial target (the third grade), the formula set out specific learning objectives as follows:

a. Specific Learning Objectives Of Content matter and its state after following the study on a common goal of learning on the subject matter and its state of the student is expected to:
    a) Being able to recognize the form of a solid, liquid, and gas
    b) Being able to know the properties of solids, liquids, and gases
    c) Ability to carry out practical changes to the object by means of heating
    d) Able to perform practical changes to objects by burning
    e) Ability to carry out practical changes to the object by means of the open air and being able to conclude the lab

5. *Developing Criterion-Referenced Test*

From the formulation of specific learning objectives above, will then be formulated Regarding the assessment test and measurement instrument to determine the level of achievement of the specific learning objectives. The instruments include multiple choice test test description.

6. *Developing Intructional Strategy*

This step is an attempt to choose, organize, and develop common learning components and procedures that will be used teaching to student so that learners can learn easily fit characteristics in achieving the learning objectives that have been set. The main component of the learning strategy includes:

a. pre-learning activities

This activity is an activity which will open lesson aims to condition the student's learning readiness through the following steps:

a) The characteristic of student

This activity is conducted to determine the initial character of the students associated with early ability through lessons with students before giving apersepsi and pretest.

b) Potential student motivation

Raises students' motivation is very important for students to maximize their learning activities. In addition, this event is intended to foster students' interest and motivation in learning natural science. These activities are usually carried out by describing the

subjects will be delivered through concept maps, and indicators of learning outcomes to be achieved.

c) Delivery of learning content frame

This activity is conducted to provide a general overview of the contents of the subject matter framework.

b. The presentation of information

After doing the above activities, the next step is conducting the presentation of information or transmission of the content material. Based on the analysis of the mathematical formulation stage of learning objectives, standards and basic competencies as well as indicators of educational aspects that have been adjusted. In the course of the delivery of the content of the learning material is performed as follows:

a) First: After doing the above activities, the next step is conducting the presentation of information or transmission of the content material. Based on the analysis of the mathematical formulation stage of learning objectives, standards and basic competencies as well as indicators of educational aspects that have been adjusted. In the course of the delivery of the content of the learning material is performed as follows:

b) Second: then the teacher gives a description of the subject matter that will be given to students**.**

c) Third : one of the students asked to mention the experience he had ever experienced in accordance with the topic of discussion.

d) Fourth students are invited to demonstrate / practicum activities in accordance with the topic of discussion.

e) Fifth : students are invited to discuss some of the topics of discussion that have been submitted by identifying various problems that have been caused.

c. Activities Role of Learners

In learning activities must be able to involve the active participation of students to the classroom atmosphere to life. This activity is usually performed with a variety of learning strategies that will be done in the classroom. Determination learning strategies that are tailored to the characteristics of students will determine the role of students in response to the contents of the subject matter.

d. The Closing Activities

In the course of the cover can be provided posttest and also feedback to determine the level of understanding and following the success of students in the learning process. To students who have managed to do a good job it will be given reinforcement. As for students who have not managed to do a good job given the motivation that they are actually capable of doing a good job it's just not working optimally so that the results are not optimal as well.

7) Developing and Selecting Intruction

Step staple of science learning activities design of this system is a step in the development and selection of learning materials. The results of

product development in the form of printed material such as instructional materials science teaching and learning in the third grade MI Khadijah Malang on "***Developing Pseudo Encyclopedia As A Teaching Material Focusing On Matter and Its State For The Third Grade Students At MI Khadijah Malang***" in which form this teaching material is presented with the teaching materials that include learning media in the form of book-based encyclopedia .

8) Designing and Conducting Formative Evaluation

From step selecting and developing learning materials, the next step is to design and implement the formative evaluation. Formative evaluation is done to obtain data in order to revise the learning materials produced to be more effective. This formative evaluation is usually done in two groups, namely the evaluation by experts and the evaluation of the use of textbooks for students. This evaluation includes experts test the contents of a field of study to see the truth of the contents presented meteri, design expert to obtain suitability developed design. As for the evaluation of the students there are three stages that will be given to an individual test (one-on-one evaluation), test a small group (small group evaluation), and a field test (field evaluation).

9) Designing and Conducting Summative Evaluation

At this stage conduct product validation testing to students or teaching materials of Pseudo Encyclopedia focusing on material objects

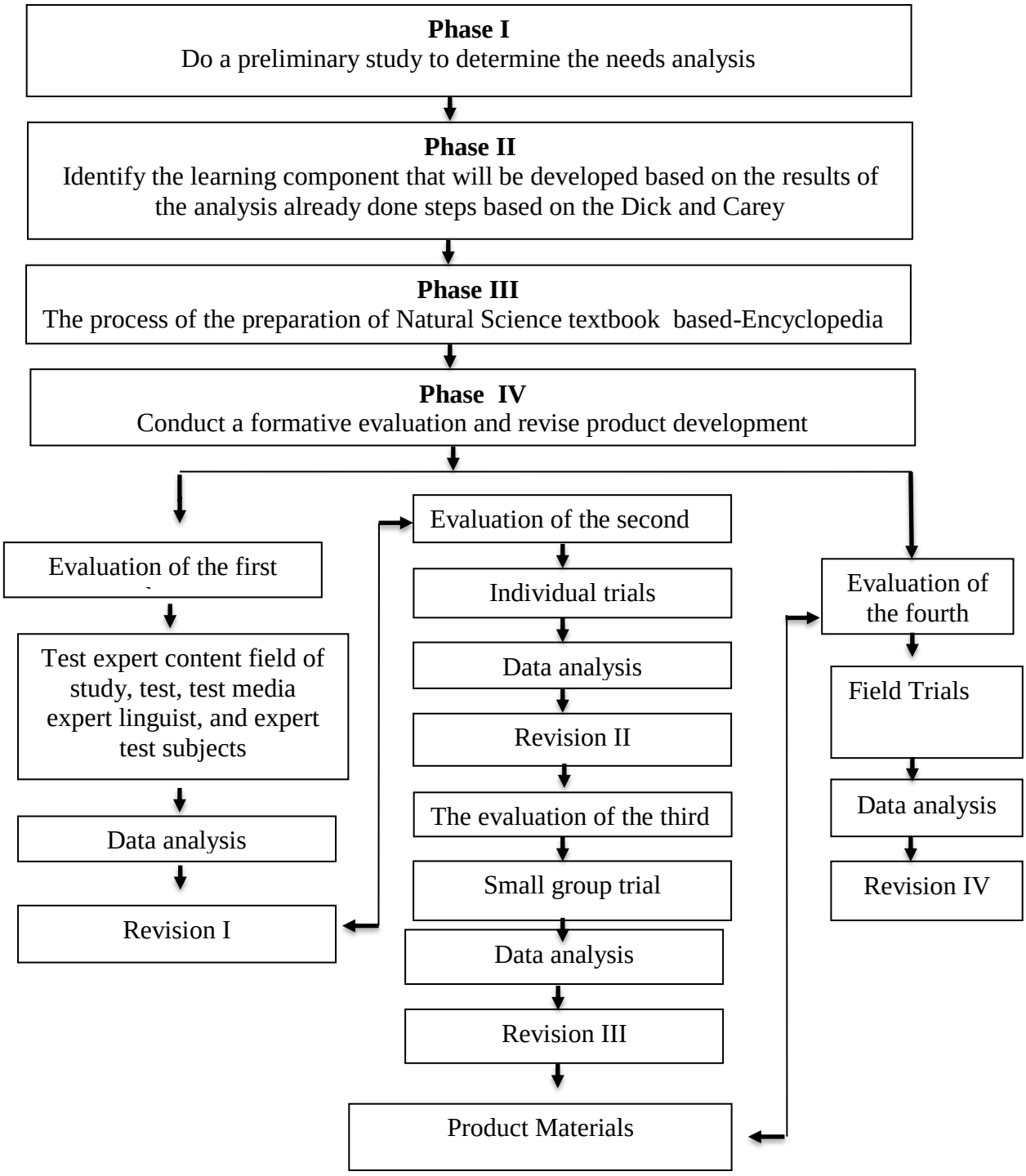
and their characteristic nature of this third grade as the development of teaching materials.

10) Revise Instructional

This step according to Dick and Carey is a step in revising the learning materials. Data obtained from the formative evaluation were collected and interpreted to solve the difficulties faced by students in achieving the learning objectives as well as to revise the learning to be more effective and to achieve the learning objectives that have been set.

The second last stage of the above will be presented in the results of the development which includes the presentation of instructional materials test data, test data analysis and revision of product development. At first, this research is done by collecting preliminary data on the condition of the textbooks used by schools intended for review, then to analyze the condition of the user that school students referred before the test and then identify the deficiencies that exist in learning that have taken place with the use of the book, including analyzing the needs of students, then produce products and evaluate them through a series of trials and the final stage is to test the attractiveness, effectiveness of the products that will be generated in this study.

Image 3.4. Procedure development and researchers



D. Validation Of Product Trials

1. Design Validation

Design validation used in the research are the development of science learning validation of lecturers and teachers as validator products. This validation includes validation of the contents and design of products. Validation is intended to obtain data in the form of assessments and advice -saran validator, so it is known whether or not valid teaching materials developed and subsequently used as a basis for revision.

2. Subjects and measures Validation

Subjects validation or validation based-*Encyclopedia* science books and nature of material objects 3 lecturers Government Elementary School Teacher Education (primary education) and a teacher of science subjects in the MI Khadijah Malang.

a. Expert Lecturer validation of teaching material Pseudo Encyclopedia focusing on Object materials and their characteristics nature to Mrs. Dewi Anggraini, M.Sc.

- Lecturer in primary competent in the field of science education Government Elementary School
- Understand and practicum materials Natural Sciences.
- Knowing the science curriculum SD / MI.
- Has written books and other Natural Science.

The Steps validation of material

- Come to the expert content of Natural Sciences

- Describes the process of development that has been done
- Gives a product that has been developed
- Through a questionnaire instrument remedy provide requested content expert opinions and comments about the content of the products that have been developed from the specification content or material present.

b. Expert Lecturer validation of design teaching material Pseudo Encyclopedia focusing on object materials and their nature to Mr. Agus Mukti, M.Pd.
   - Lecturer in primary competent in the field of science education Government Elementary School
   - Understand the science lab materials and MI.

     The steps validation of material
   - Come to the expert content of Natural Sciences
   - Describes the process of development that has been done
   - Gives a product that has been develop
   - Through a questionnaire instrument remedy provide requested content expert opinions and comments about the content of the products that have been developed from the specification content or material presented.

c. Expert Lecture Validation of Language the development of Pseudo Encyclopedia as a teaching material on focusing object and their characteristics nature to Mrs. Siti Anijat Maimunnah M.Pd

- Lecture in Lecturer in primary competent in the field of science education Government Elementary School
- Understand the language of Indonesian

  The steps validation of material
- Come to the expert correct of language of material in books Natural Science
- Gives a product that has been develop.

d. Expert Teacher of Natural Sciences in the third grade MI Khadijah to Mrs. S.Maulidiningtyas S.Pd as a teacher the third grade.

- The teacher or classroom teacher teaching science
- Availability of teachers of Natural Sciences as appraisers and users of product development for the data acquisition source development results.

D. Product Trials

Product trials are meant to gather data that can be used as a basis to set degree of effectiveness, efficiency, and the attractiveness of the product produced. Some of the activities carried out to test in the research of this development include:

1. Trial Design

Trials are conducted in order to find out the level of kemenarikan, the validity and effectiveness of the product. Products in the form of learning materials, learning materials guide teachers and students as a result of this development was tested level of validity, attractive, and their

effectiveness. The level of validity and kemenarikan learning materials via the unknown outcome of the analysis of the trial activities implemented through several stages, namely:

1) Review by the contents of the fields of study
2) Review by expert product design
3) Review by learning experts
4) Review by linguist
5) Individual trial
6) Small group trials, and
7) Field trials

In development, the developer may just pass and quit at this stage of the test, the individual, or continued and stop until the test stage a small group, or until the field test. It really depends on the urgency and the required data through a test run it.

1) The first stage is the individual trials (one-on-one evluation). Individual test is represented by 3 students with the following criteria :
    a) Including third grade still active in MI Khadijah Malang.
    b) Respondents from the evaluation of one-on-one consisting of 3 persons is determined based on the criteria that the respondents represent the characteristics of the target group.
    c) willingness of students as data acquisition in developing learning materials learning Natural Science-based *Encyclopedia.*

2) The second stage, namely small group trials (small group evaluation). Respondents in these trials is 6 students. The determination of subjects conducted at random to represent the respective criteria of the participants are included in the categories of high, medium, and low.
3) The third stage is a test field (field evaluation). Respondents to the field trials are taken from the students of one in the third grade.

a. As for the steps in a test run is as follows:

a) Determining the sample
b) Prepare the environment and infrastructure
c) Organizing test early (pre-test)
d) Carry out the learning activities
e) Organizing test late (post-test)
f) Collect data by using the instruments provided

2. Type of Data

This type of data obtained from the evaluation of teaching materials that have been developed are of two kinds. The first data in the form of quantitative data obtained from the scoring form of a percentage to determine the feasibility or validity of the instructional materials. The second data is qualitative data in the form comments or suggestions from the validator.

Quantitative data, obtained from the scoring form of a percentage through questionnaire expert assessment, teacher assessment

questionnaire natural science courses, and the students' test results were as follows:

1) Content and instructional design experts about the accuracy of the components of the textbook. Textbook accuracy components include: the content accuracy, precision coverage, the use of language, packaging, illustration and completeness of other components that can make a textbook becomes effective.
2) Subject teachers and students test of the attractiveness of the textbook.
3) The test results of student learning before and after use teaching materials development results (results of pre-test and post-test)
4) Questionnaire responses of students on teaching materials based encyclopedia

Qualitative data, it can be:

a) Information Natural Science learning obtained through interviews with teachers Natural Science MI Khadijah Malang.
b) The observation of character assessment of students before and after using the textbook development results.
c) Feedback, comments, and suggestions for improvements based on the results of expert assessment obtained through interviews or consultations with expert content, learning experts and practitioners Natural Science MI Khadijah Malang.

3. Validity Instruments

a. Validity

Validity is a degree of accuracy of instruments (gauges), ie whether the instruments used really appropriate to measure what is being measured. However, Kerlinger explained that the validity of the instrument was not sufficiently determined by the degree of precision instruments to measure what should be measured[45].

Validity consists of two kinds of internal validity and external validity. Internal validity can be measured by consulting the experts, and to external validity can be arranged based on empirical facts that have been proven, so it can be done by comparing with the test device is considered to have standar instrument in this study using experts consulted on the way Mr. Agus Mukhti M.Pd, Siti Anijat Maimunnah M.Pd and Dewi Anggraeni. M,Sc as a lecture of Islamic Elementary Teacher Education Islamic University of Maulana Malik Ibrahim Malang. Mrs S.Maulidiningtyas S.Pd as a teacher class in the third grade at MI Khadijah Malang.

b. Instrumen Data Collection

At the collection of data in this study, researchers used several data collection instruments, such as questionnaires and tests of learning outcomes. And purpose in every data collection instruments include.

[45] Zainal Arifin,"PenelitianPendidikan"(Bandung.PT.Remaja Rosdakarya.2011)hlm.223

1) Questionnaire

Data analysis techniques in this development is aimed at describing all the input, comments, and suggestions of the evaluators obtained from the questionnaire sheet. The steps are performed in collecting data using questionnaires, among others:

Provide instrument questionnaires to several experts covering materials experts, book design expert, teacher of Natural Sciences the Third Grade, and students. Results of the questionnaire instrument and then analyzed by calculating the average percentage score on every answer to every question in the berbentuk kata atau simbol.

Data from the qualitative data is noe to be quantitative use criteria Linkert five levels of scale and then analyzed via calculation of the percentage score items on each question in a question form. To determine the percentage can be used the following formula:

Table 3.3 Scoring criteria used in the Developers rated Natural Science based Encyclopedia

Score				
1	2	3	4	5
Very imprecise	Less precise	Enough precise	Precise	Very precise

After the data is now converted into the data in the form of value based on table 2.3 next step is rate rat average score students.

$$P = \frac{\Sigma x}{\Sigma x_i} \text{ x } 100\%$$

A description of P is a percentage of the feasibility

∑ x: total score answers validator (real value)

∑ xi: total score highest answers (hope)

In granting meaning and making decisions to revise the textbook used the qualification that has the following criteria:[46]

Table 3.4 Eligibility Qualifications based on a percentage of the average

Percentage (%)	The level of validity	Description
84 ≤ score ≤ 100	Very Valid	Not Revision
68 ≤ score< 84	Valid	Not Revision
52 ≤ score< 68	Enough Valid	Partially Valid
36 ≤ score< 52	Less Valid	Revision
0 ≤ score< 36	Not Valid	Total Revision

Based on the above criteria, the textbook was declared valid if it meets the criteria of score 80 from all elements contained in question form a validation assessment of media experts, expert content, learning experts, and students. In this study, the textbook made must meet the criteria. Therefore, the revision done in still not meet the criteria of a valid questionnaire.

[46] *Ibid.*

1) Observation

Observations included one data collection instruments used in the training. Observation of activities carried out on learning activities and for research activities take place. Results of observations during the study to be considered in determining the effectiveness of product development. As for the stages performed on observation, among others:

a. Observation activities conducted on learning activities. This is because researchers wanted to know how learning and teaching subjects Natural Sciences in MI Khadijah Malang.
b. Observation activities conducted to determine the availability of facilities and infrastructure that supports learning activities subjects of Natural Sciences in MI Khadijah Malang. For example, the unavailability of additional books and materials developed limitations. Results of observation and evaluation of materials used as inputs for researchers to enhance the development of products.

2) Interview

Interviews were conducted to obtain research data were not recorded either on questionnaire data and observation. Measures in interviews is as follows.

a) Creating guidelines for interview

b) Determining subject in the interview, including third grade science class teacher and some students.

Results of interviews with teachers of the third grade obtained information regarding material teaching about matter and its state, so that learners can provide maximum learning results with experiment development textbook based encyclopedia, there is content about experiment with interesting design .

4. Data Analysis Technique

a. Analysis Mean (Rerata)

In field trials, the data collected using the question form and achievement test or achievement test (the test achievement of learning outcomes). Data collected by field trials using the test early (pre-test) and tests (post-test) in order to find out the results of an increased understanding of the subject of the test target that is the third grade before and after using the product development of the teaching material. Analysis techniques to figure out the mean Post-Test and mean Pre-Test with formula was labelled an here;[47]

$$\text{Mean} = \frac{\sum X}{N}$$

Description:

Mean = Average

$\sum x$ = Total number of pre-test atau post-test

N = Total sample

[47] Drs. H. Zen Amiruddin, M.SI. *Statistik Pendidikan,* (Yogyakarta: Teras: 2010). Hlm.73

b. T-Test Analysis

In field trials, the data collected using the question form and achievement test or the T-test achievement award (achievement of the learning results of tests). Data collected by field trials using the test early (pre-test) and tests (post-test) in order to find out the results of a study group trials target is the third grade before and after using the product development of learning materials. The data analysis techniques using the Dependent Samples Trials Test is Criterion. T Dependent on Sample Test.

As for the formula that is used with the level of significance was 0.05%:

$$t = \frac{\bar{D}}{\sqrt{\frac{d^2}{N(N-1)}}}$$

Description:

t = Test T

D = Different (X_2-x_1)

d^2 = Variance

CHAPTER IV

THE RESULTS OF RESEARCH AND DEVELOPMENT

In this chapter, we will discussion about : 1) Description Of The Form Textbook Natural Science Based Encyclopedia, 2) Experts Review Of Natural Science Based Encyclopedia Teaching Material Product, and 3) Field Testing.

A. The Exposure Research Data

1. Description of the form of the Materials Science-based *Encyclopedia* focusing on matter and its state of the Third Grade of Elementary School.

Development of Materials Science-based encyclopedia includes textbook-based encyclopedia on the focusing matter and its state is equipped with science experiments, and the experiments step clear with pictures or examples of the practices or conduct experiments that can help students increase comprehension of concepts in experimental.

Description of the results of the development of natural science textbook-based encyclopedia for third grade elementary school. Product materials of three aspects, namely, the material aspect of the textbook, textbook design and language textbook. Aspects of the content of the material/textbook was compiled based on the results of the analysis of the learning component of natural science on the object material and their characteristic nature. The learning component of natural science on the object material and their characteristic nature is developed starting from

the formulation of standards of competence and basic competence to expository indicator.

Natural science teaching material produced in this development include three parts, namely, the introduction, part of the explanation, and complementary parts. The introduction includes a foreword, preface, table of contents, and basic standards of competency and competency base, and hints book. Part description includes meaningful story, activity of students in conducting experiments and observations, test students ' ability to complement section. include, smart dictionary and bibliography.

1) The Introduction

c. The Front Cover

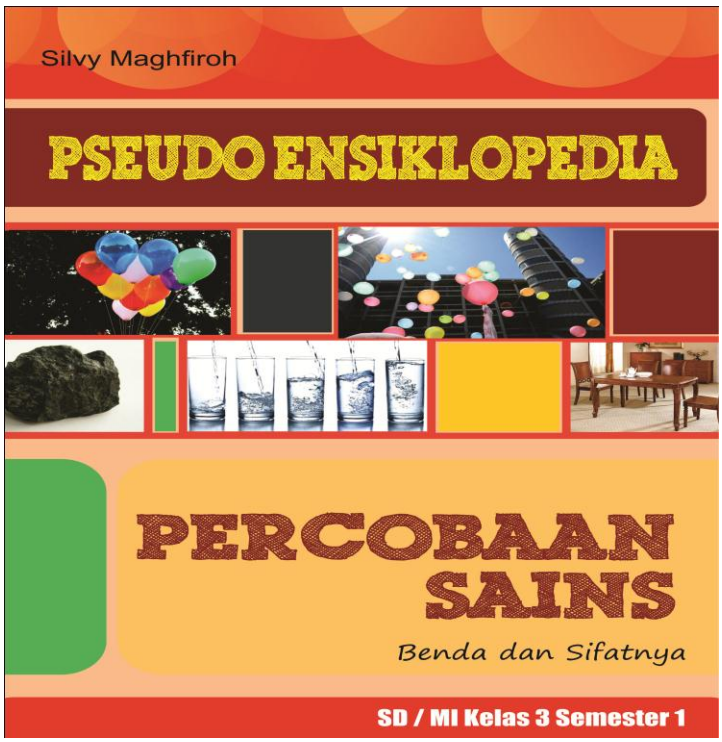


Image 4.1

The front cover was designed with color, images, and writings. The front cover consists of name development (Silvy Maghfiroh), the title of the book fit subjects with subjects who developed (matter and its state), in use for Primary School, third grade background cover fits the contents of the subjects developed matter and its state, which in the picture by one example 3 extant objects namely molten glass with an image that contains water, gas objects with images of young children to blow balloons and small children celebrate the birthday with balloons , and solid objects with images and stone seats.

b. The Rear Cover

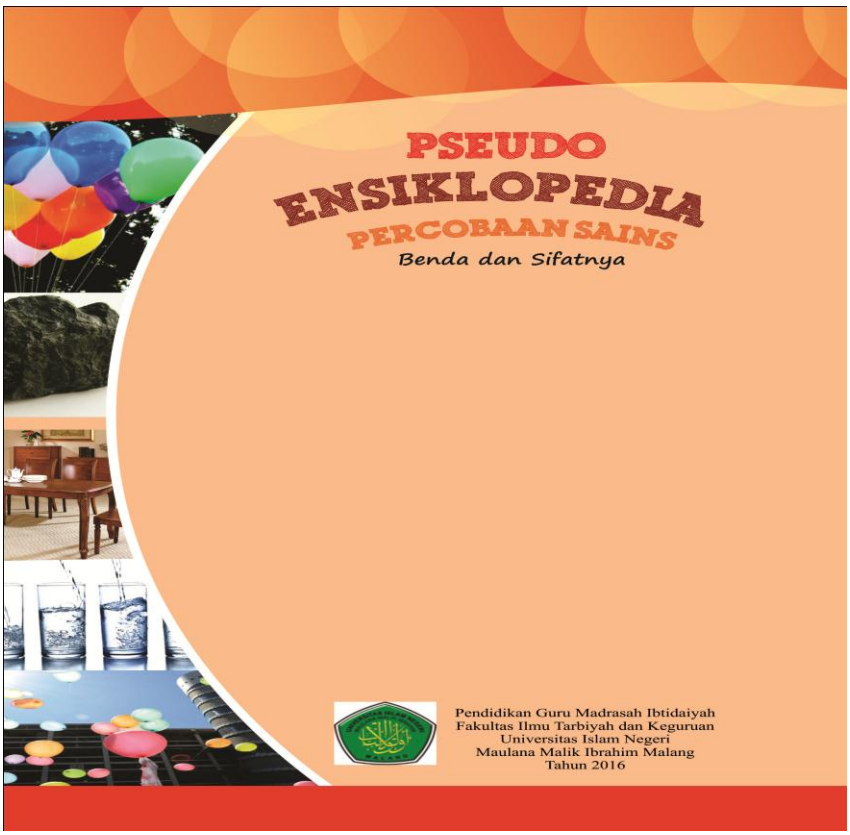


Image 4.2

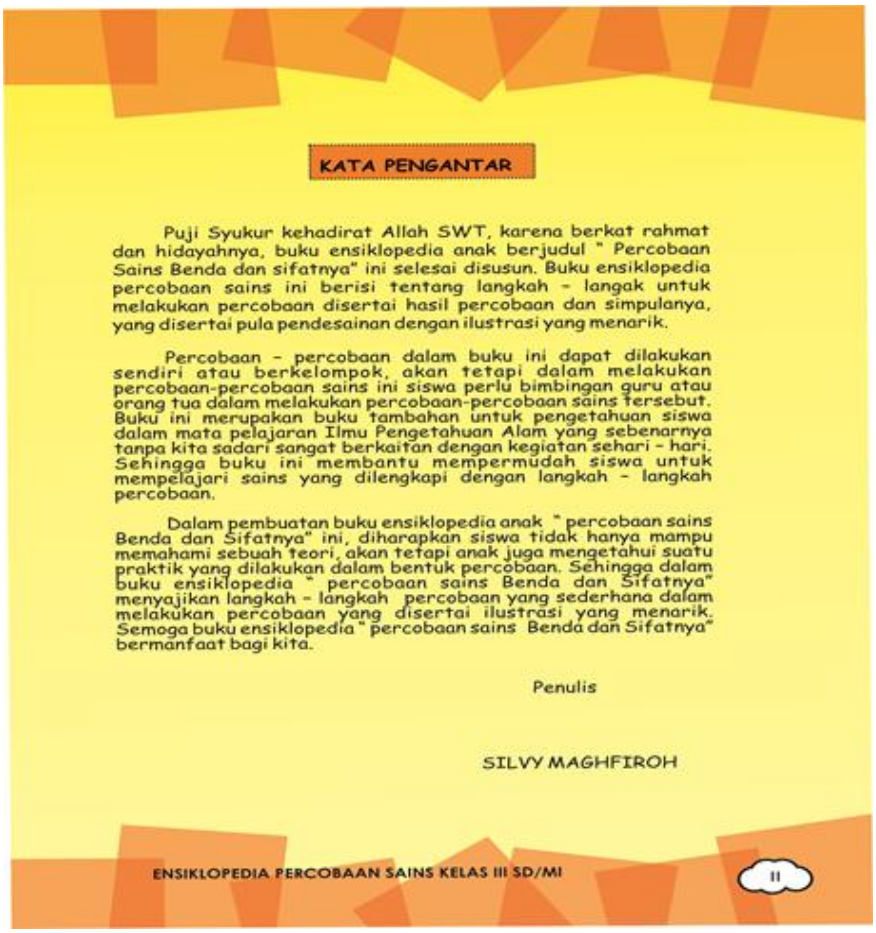
The back cover is designed with a more simple, and features images that show the existence of objects.

c. Foreword

Image 4.3

Preface this book is about the explanation of the usefulness or benefit of this book, which contains an invitation or the motivation of a child to want to read and do observations and experiments.

d. Preface



KATA PENGANTAR

Puji Syukur kehadirat Allah SWT, karena berkat rahmat dan hidayahnya, buku ensiklopedia anak berjudul " Percobaan Sains Benda dan sifatnya" ini selesai disusun. Buku ensiklopedia percobaan sains ini berisi tentang langkah - langak untuk melakukan percobaan disertai hasil percobaan dan simpulanya, yang disertai pula pendesainan dengan ilustrasi yang menarik.

Percobaan - percobaan dalam buku ini dapat dilakukan sendiri atau berkelompok, akan tetapi dalam melakukan percobaan-percobaan sains ini siswa perlu bimbingan guru atau orang tua dalam melakukan percobaan-percobaan sains tersebut. Buku ini merupakan buku tambahan untuk pengetahuan siswa dalam mata pelajaran Ilmu Pengetahuan Alam yang sebenarnya tanpa kita sadari sangat berkaitan dengan kegiatan sehari - hari. Sehingga buku ini membantu mempermudah siswa untuk mempelajari sains yang dilengkapi dengan langkah - langkah percobaan.

Dalam pembuatan buku ensiklopedia anak " percobaan sains Benda dan Sifatnya" ini, diharapkan siswa tidak hanya mampu memahami sebuah teori, akan tetapi anak juga mengetahui suatu praktik yang dilakukan dalam bentuk percobaan. Sehingga dalam buku ensiklopedia " percobaan sains Benda dan Sifatnya" menyajikan langkah - langkah percobaan yang sederhana dalam melakukan percobaan yang disertai ilustrasi yang menarik. Semoga buku ensiklopedia " percobaan sains Benda dan Sifatnya" bermanfaat bagi kita.

Penulis

SILVY MAGHFIROH

ENSIKLOPEDIA PERCOBAAN SAINS KELAS III SD/MI

II

Image 4.4

Foreword is the welcome book for people potentially experiencing unplanned, and thank you for the development of a textbook that has been developed.

e. Table of Content

Image 4.5

The table of contents contains a list of all the pages section in the book that can make it easier for students to find the contents of the book to be read and studied.

d. Concept Map

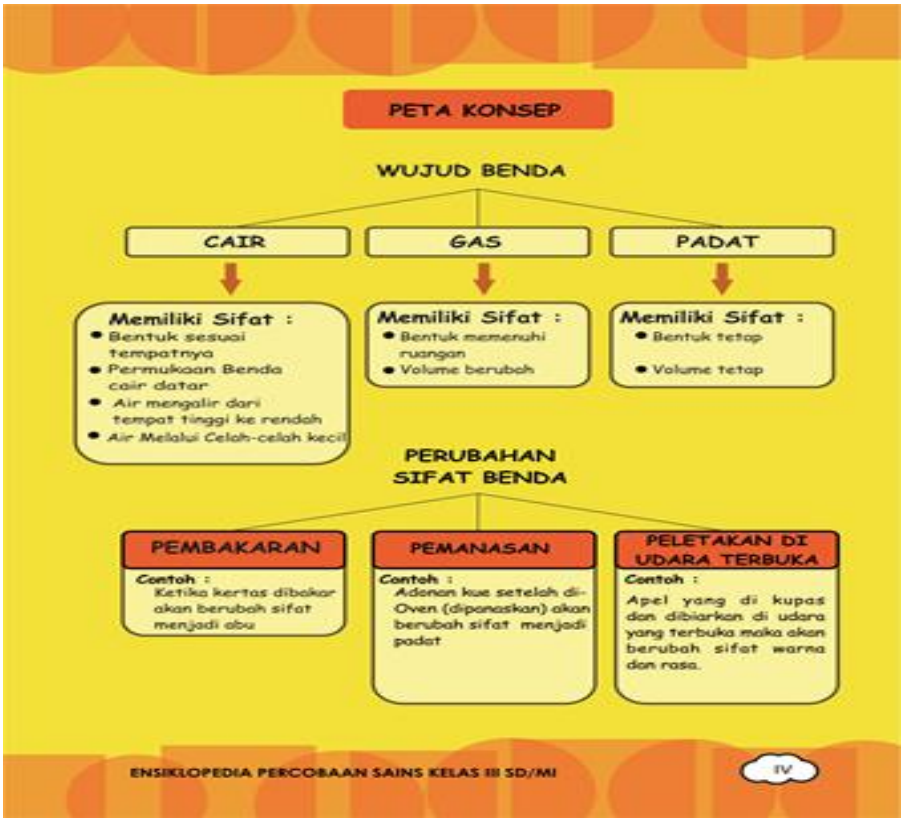


Image 4.6

Concept map contains a description of the material to be described in the contents. Concept map aims to provide knowledge in the outline of the subject matter and its nature. Concept map describes the elaboration of standard formulation competence and basic competence to indicators.

2) Part Description

a. The story and illustrations meant

Image 4.7

Stories and illustrations of meaningful stories and illustrations meant this was the picture that the subjects of natural sciences is very in touch in our daily lives, giving direction to the thought the learners through the stories and illustrations of means especially in subjects who developed "matter and its state".

b. The activity of learners in the classroom by making observations and experiments

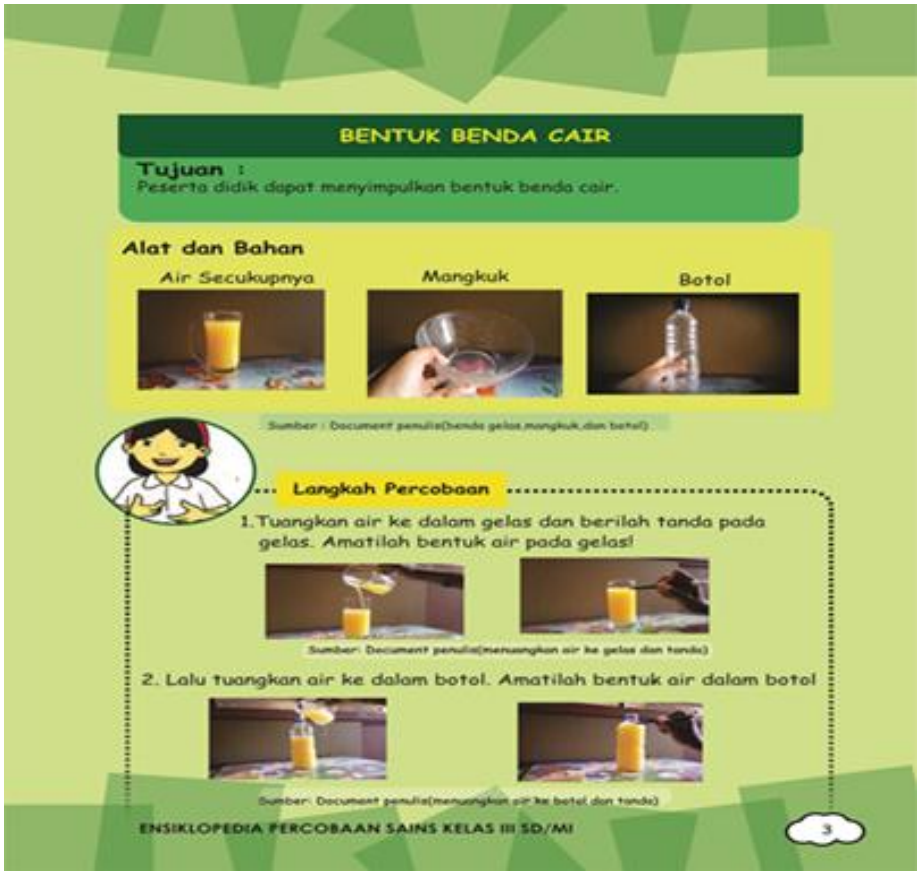


Image 4.8

In part in an experiment with complete materials and tools, step of the experiment, and experiment results.

c. Test Students ability

Image 4.9

Test students ' ability to measure the student's understanding of aiming towards the subject of integer operations. In this section students are asked to work on problems that are given to know the concept of understanding the results of science experiments that have been done.

d. Tools and Material

Image 4.10

Instructions tools and materials to be used in conducting the experiment

e. Step Experiment

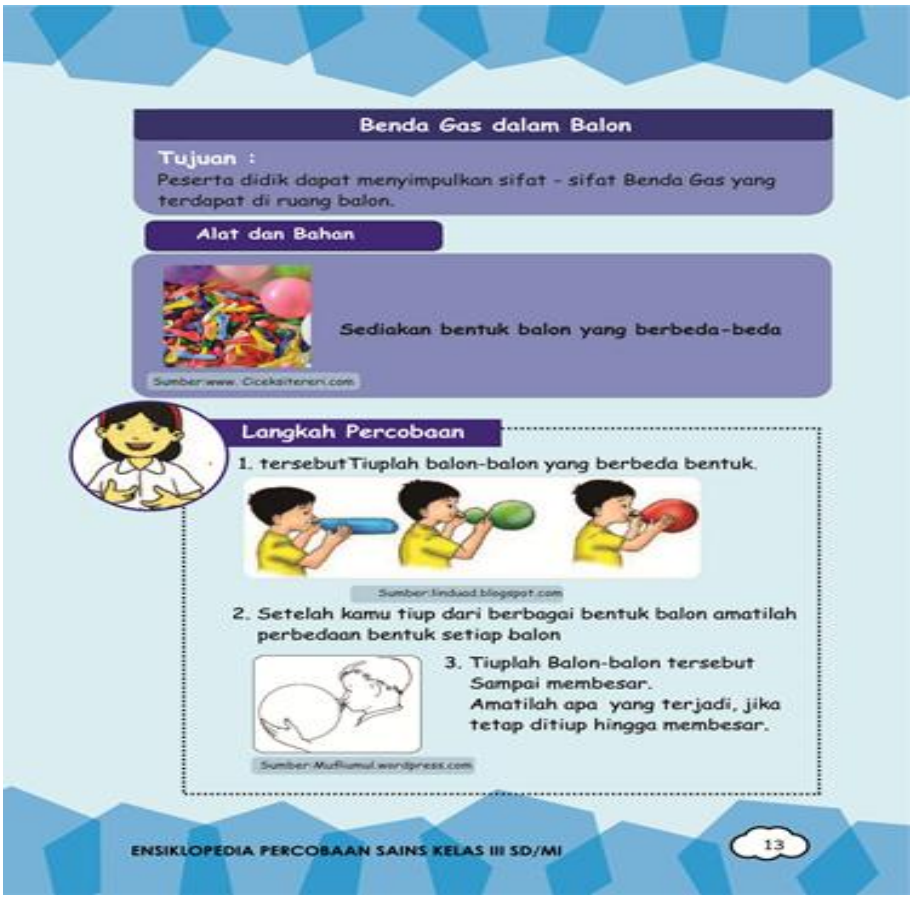


Image 4.11

Contains the instructions step-by-step experiments on any material identifying the existence of objects namely liquid, gas, solid objects, change object properties, and uses of objects.

3) Complementary Part

a. The Experiment Result

Image 4.12

Contains the results of an experiment that has been done

b. Conclusion

Image 4.13

Contains the conclusions of the results of experiments on liquid, gas, and solid objects.

c. Bibliography

Image 4.14

Bibliography is a list of books or other sources that are used by authors as a source for writing a textbook subject matter and its nature is located at the end of a textbook. Students can search for references or other literature that is listed in the bibliography.

2. Presentation Of The Results Of The Validation Data Expert Teaching Material

Validation against a Materials Science-based Encyclopedia on the subject matter and its nature is conducted by expert validator material 2 March 2016 until March 21, 2016. Data product development of learning materials is conducted in 3 stages. The first stage is obtained from the results of the assessment of the material towards the development of learning materials by a Professor of natural sciences Islamic University of Maulana Malik Ibrahim Malang Unfortunate expert material Science, the second stage of the assessment of the results obtained from the design to the development of Materials Science by Professor of natural sciences teacher education Primary School Islamic University of Maulana Malik Ibrahim Malang was unfortunate as a product design, the third stage is obtained from the results of the assessment of conformity of product material concept learning materials development conducted by a teacher the field study natural science the third grade MI Khadijah Malang as an expert study.

The data retrieved is the quantitative data and qualitative data. Quantitative data are derived from the question form the assessment scale Linkert while qualitative data in the form of additional assessment or advice from the validator. The validation test result data is analyzed with techniques scoring average assessment evaluators at each assessment item. As for the question form validation scoring value as follows.

Table 4.1 Scoring table Questioner form Validation Expert Media design, language, material, natural science subjects, and students

Percentage (%)	The Rate Of Validity	Description
84 ≤ score ≤ 100	Very Valid	Not Revision
68 ≤ score < 84	Valid	Not Revision
52 ≤ score< 68	Enough Valid	Partially Revision
36 ≤ score< 52	Less Valid	Revision
0 ≤ score< 36	Not Valid	Revision

As for the question form validation expert material, design, language, natural science subjects and students scoring criteria value is as follows:

Table 4.2 Criteria for Scoring Questioner Validation Expert Design ,language, and Teacher

Answers	Score
Verry Precise	5
Precise	4
Enough Precise	3
Les Precise	2
Not Precise	1

Table 4.3 Criteria for Scoring Questioner Validation of Content and Students In The Third Grade

Answers	Score
A	5
B	4
C	3

D	2
E	1

1. Expert Validation Materials

Product development expert materials submitted to subjects of natural science is a textbook. The descriptive results of expert validation exposure material of natural science to the development of Natural Science textbook-based encyclopedia on material objects and to it's the third grade filed through a questionnaire with the instrument can be seen in table 4.1, 4.2, 4.3.

1) Quantitative Data

Quantitative data results of validation experts more material can be seen in table 4.4. as follows :

Table 4.4 Result of Content Assessment of Expert Validation

No	**Statement**	***X***	***xi***	**P (%)**	**Rating Valid**	**Description**
1.	Formulation of the topics on the development of Natural Science textbook-based *Encyclopedia***.**	4	5	80	Valid	Not Revision
2.	The relevance of the standard of competence with indicators on the	4	5	80	Valid	Not Revision

	development of Natural Science textbook-based *Encyclopedia*.					
3.	The suitability of the material presented on the development of Natural Science textbook-based *Encyclopedia*.	4	5	80	Valid	Not Revision
4.	The learning content in the textbook in accordance with KTSP 2006	5	5	100	Valid	Not Revision
5.	Systematic descriptions of content learning in Natural Science textbook-based *Encyclopedia.*	5	5	100	Valid	Not Revision
6.	The scope of the material presented in the textbook the nature of science-based *Encyclopedia.*	4	5	80	Valid	No Revision
7.	the writing tool materials and trial measures on Natural Science textbook-based *Encyclopedia.*	5	5	100	Valid	Not Revision

8.	The material is presented through a textbook of science-based Nature of this *Encyclopedia* can provide motivation to students to be more active learning.	5	4	80	Valid	Not Revisi
9.	the language difficulty, whether in accordance with the level of understanding of students	4	5	80	Valid	Not Revision
10.	Evaluation instruments used are measuring students ' ability	4	4	100	Valid	Not Revision
The Total Number of		**44**	**48**	**92%**	**Very Valid**	**Not Revision**

Description :

x : Score the answers by validator that is Mother Dewi Anggraini, M.Sc

x_i : Score the highest answer

P : Percentage rate valid

$P = \frac{44}{48}$ x 100% = 92%

Table 4.4. and 4.5, the validation results of expert data shows the material science of product development textbook natural science material

objects and of its nature in the third grade 100% declared valid in item No. 1,2,3, 4 .5 .6 .7 .8 .9 and 10.

2) Qualitative Data

As for the qualitative data collected included expert comments, suggestions and material nature of science that is in an open statement with regard to the materials presented in table 4.6. as follows:

Table 4.5The Criticism and Suggestion of Content Expert

The Name Of The Subject Test Experts	**Criticism and suggestions**
Dewi Anggraeni, M.Sc	1. On the change form is better to use the Word objects changes the nature of objects. 2. In the application of this Natural Science textbook in the class is expected to mentoring or given by teachers against students especially in doing the experiment. 3. Add the properties of the liquid that is flowing through small gaps.

Based on the table above criticism and suggestions, there were some criticisms and suggestions should be fixed in order for researchers to add evaluation in each chapter, in order to know the achievement of

material that was submitted in doing experiments with reading tools and materials, and steps-step experiment.

3) Data Analysis

The following steps after data to attached is analyzing the data. Data analysis was done starting from the data on the validation of the results of textbook material.

Based on textbook materials expert validation of natural science-based *encyclopedia* of science experiments as noted

in table 4.4 percentage can be calculated, then the level of achievement of the textbook as follows:

$$P = \frac{\Sigma x}{\Sigma x_i} \text{ x } 100\%$$

$$P = \frac{44}{48} \text{ x } 100\% = 92\ \%$$

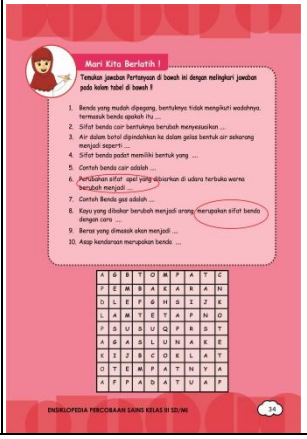
P = Percentage Rate Valid

Because each choice of weights is 1, then percentage = 92%. After converted with the conversion scale 5 , that is 92% achievement rate percentage is at a good qualifying, so the textbook does not need to be revised.

4) Product Revision

Based on the analysis carried out, then the revision of textbook as follows :

Table 4.6 Revision of Teaching Material Based Encyclopedia on Content Expert

NO	The revised point	Before Revision	After Revision
1.	Words change form objects changed "Changes the nature of the Objects" and does not need to use the example of the eucalyptus oil.		
2.	The addition on the properties of liquid that is the nature of the fluid through tiny cracks.		
3.	In writing of the change of form objects please replaced with the changing nature of the objects on the evaluation.		

2. Expert Validation Product on Design Teaching Material

Product development submitted to the expert Design is a textbook. The descriptive results of expert validation exposure study of product development textbook IPA the third grade material objects and of its nature-based encyclopedia of science experiments that are submitted through a questionnaire with instruments now can be seen in Table 4.8.

1) Quantitative Data

Quantitative data results of validation design expert more information can be seen in Table 4.8. as follows :

Table 4.7 Result Design Assessment of Expert Validation

No	Statement	$\sum x$	$\sum x_i$	Percentage (%)	The Level Of Validity	Description
1	The cover design is in accordance with the contents of the material	3	4	75	Quite Valid	Not Revision
2	The suitability of the Pictures with the material	4	5	80	Valid	Not Revision
3	The typeface is used in accordance with the SD/MI students The third grade.	3	4	75	Quite Valid	Not Revision
4	The size of the letters used in accordance with the SD/MI students the	4	5	80	Valid	Not Revision

	third grade					
5	The Use Of Color Variations	4	5	80	Valid	Not Revision
6	Clarity of Illustration image with the material presented	5	5	100	Valid	Not Revision
7	Design of layout on a textbook IPA-based *encyclopedia* of science experiments.	4	5	80	Valid	Not Revision
8	How color combinations on a textbook IPA-based *encyclopedia* of science experiments.	5	5	100	Valid	Not Revision
9	The Association of packaging on the textbook.	4	5	80	Valid	Not Revision
10	Interesting textbook "Senang Belajar Ilmu Pengetahuan Alam" with the development of natural science textbook IPA-based *encyclopedia* of science experiments.	4	4	100	Valid	Not Revision
	The Total Number Of	42	47	89	Very Valid	Not Revision

Description :

x : Score the answers by Mr. Agus Mukti M.Pd. as validator a design expert

xi : Score the highest Answer

P : Percentage of the validity

$$P = \frac{\Sigma x}{\Sigma x_i} \text{ x } 100\%$$

Table 4.7 demonstrate data expert results the design of natural science-based encyclopedia of science experiments on the subject matter and its state the third grade elementary school is 80% declared valid in item 2.4 .5 .6 .7 .8 .9, and 10. Whereas 20% indicate the level of validity of quite valid in items 1 and 3.

2) Qualitative Data

As for the qualitative data collected from the input, suggestions and criticism/comment design experts in the natural sciences an open statement with regard to textbook described in table 4.10.

Table 4.8 Criticism and Suggestions of Design Expert

The Name Of The Subject Test Experts	**Criticism and suggestions**
Agus Mukti, M.Pd	1. Improvement Writing 2. Improvement the picture on 3. Can be done for research

Based on the table above criticism and suggestions, there is some writing that must be repaired and the agree font size in design, the images need to be improved again, and in General after the revision of the suggestion that natural science textbook-based encyclopedia of science experiments on the subject matter and their nature can be done for research.

3) Data Analysis

The following steps are performed after data to attached is working to analyze the data. Data analysis was done starting from the validation of data about natural science textbook-based encyclopedia of science experiments from the results of validation design.

Based on the expert assessment of the design of the Natural Science the Material Teaching as noted in table 4.8, then it can be quantitative percentage the level of]achievement of the textbook as follows:

$$P = \frac{\Sigma x}{\Sigma x_i} \text{ x } 100\%$$

$$P = \frac{42}{47} \text{ x } 100\% = 89\ \%$$

P = Percentage rate valid

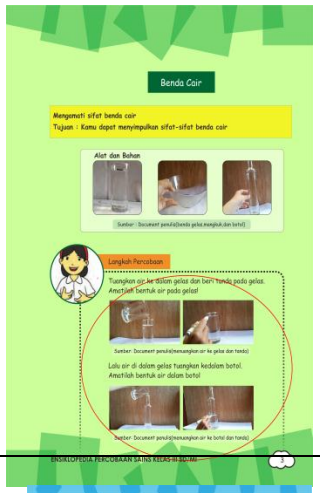
Because each choice of weights is 1, then percentage = 89%. After converted with the conversion scale 5, percentage of the level of

achievement of 89% are in qualifying either, so the textbook does not need to be revised.

Comments and suggestions from experts content subjects in open question made consideration to improve the textbook in order to improve the design of textbook and refine.

4) Product Revision

Table 4.9 Revision of Teaching Material Based Encyclopedia on Design

NO	The revised point	Before Revision	After Revision
1.	The water used was the water change water is color experiment.		
2	More enlarged font size 12 size font which was originally being a size 14.		

All data from the results of the review, assessment and discussion with experts design the Foundation of Natural Science Foundation to revise to the refinement of the design components and linkages textbook layout image subjects natural science before testing on learners user textbook products development.

3. Validation Of The Linguist Learning Natural Science .

Product development submitted to the linguist is a teaching material. The validation results of descriptive Language exposure of product development teaching material Natural Science the third grade material objects and their characteristic nature-based encyclopedia of science experiments that are submitted through a questionnaire with instruments now can be seen in Table 4.9.

1) Quantitative Data

Quantitative data validation results linguists more information can be seen in Table 4.9. as follows:

Table 4.10 Result Language Assessment of Expert Validation

No	Statement	$\sum x$	$\sum x_i$	Percentage(%)	Rate Valid	Statement
1	Suitability of language/sentence on the cover textbook IPA-based *encyclopedia* of science experiments	4	5	80%	Valid	Not Revisi

2	Suitability of language/sentence on the initial page textbook IPA-based *encyclopedia* of science experiments	4	5	80%	Valid	Not Revision
3	The ease of language to be understood in a textbook IPA-based encyclopedia of science experiments	3	5	75%	Quite Valid	Not Revision
4	The ease of language on diction the word "probation steps"	4	5	80%	Valid	Not Revision
5	Ease the overall language to be understood	4	5	80%	Valid	Not Revision
6	The precision of penepatan diction the word "do you know?".	5	5	100%	Valid	Not Revision
7	Placement accuracy of diction the word "Experiment Results".	4	5	80%	Valid	Not Revision
8	The ease of language used on diction the word "Conclusion".	4	5	80%	Valid	Not Revision
9	The Association of packaging on the textbook	4	5	80%	Valid	Not Revision
10	interesting textbook enjoy learning with the development of natural science textbook IPA-based encyclopedia of science experiments.	4	5	80%	Valid	Not Revision
	The Total Number of	40	50	80%	Valid	Not Revisi

Description :

x : Score the answers by validator is Mrs Siti Anijat Maimunnah, M. Pd as a linguist.

xi : Score the highest Answer

P : Percentage rate valid

$$P = \frac{\Sigma x}{\Sigma x_i} \text{ x } 100\%$$

Table shows data and results of expert language natural science-based encyclopedia of science experiments on the subject matter and its state of the third grade elementary school is 90% of declared valid in items 1,2, 4 .5 .6 .7 .8 .9, and 10. While 10% showed a level of validity of quite valid in item 3.

2) Qualitative Data

As for the qualitative data collected from the input, suggestions and criticism/comment linguist in the natural sciences an open statement with regard to textbook described in table 4.10.

Table 4.11Criticism and Suggestions of Language Expert

The Name Of The Subject Test Experts	Criticism and suggestions
Siti Annijat Maimunnah, M.Pd	1. Improve the language in his sentence 2. Pay Attention To Spelling

Based on the table above criticism and suggestions, there is some writing that must be corrected in the languages of every sentence, and more of note to mention spelling in writing sentences.

3) Analysis Data

The following steps are done after the data available is the work of analyzing the data. Data analysis was done starting from the validation of data about natural science textbook-based encyclopedia of science experiments from the results of a validation language.

Based on the assessment of linguists IPA against the textbook as noted in table 4.10, then it can be calculation percentage the level of achievement of the textbook as follows:

$$P = \frac{\Sigma x}{\Sigma x_i} \text{ x } 100\%$$

$$P = \frac{40}{50} \text{ x } 100\% = 80\ \%$$

P = Percentage of Validity

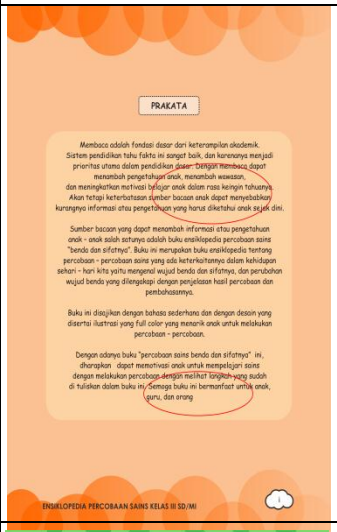
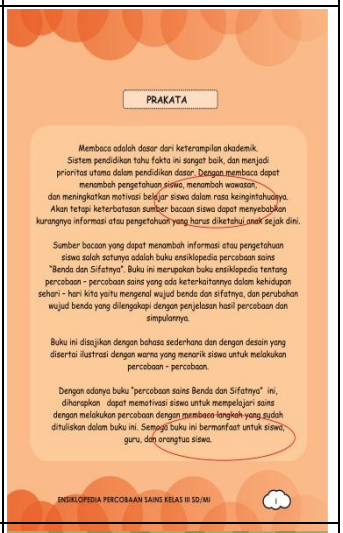
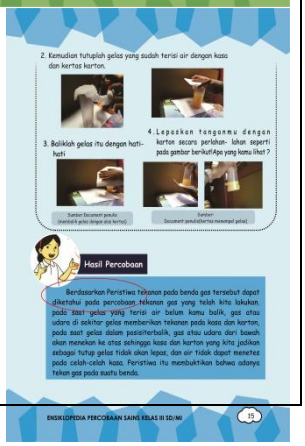
Because each choice of weights is 1, then percentage = 80%. After converted with the conversion scale 5, percentage of the level of achievement of 80% are on good qualification, so the textbook does not need to be revised.

Comments and suggestions from the experts the language subjects in the open question was made into consideration to improve the textbook in order to improve the design of textbook and refine.

4) Product Revision

Based on the analysis carried out, then the revision of textbook is as follows:

Table 4.12. The Revision of Teaching Material Based Encyclopedia on Language Expert

NO	The Revised Point	Before Revision	After Revision
1.	In the preface, there is the writing good children is replaced with "students/learners"		
2.	Preparation of a sentence which is less good at sub liquid material.		
	The addition of the word "based" on each experiment results.		

All data from the results of the review, assessment and discussion with expert language natural science was made to revise the Foundation to perfecting the language textbook about spelling and writing of sentences subjects natural science before tested on learner users of textbook development products.

4. Expert Validation of learning (Teacher in the third grade)

Product development submitted to the expert learning is a textbook. The descriptive results of expert validation exposure study of product development textbook Natural Science the third grade matter and its state based encyclopedia put forward through the questionnaire method with instruments now can be seen in Table 4.16.

Table 4.13 Result of content expert from teacher in the third grade

No	Statement	X	x_i	P (%)	Rate valid	Ket.
1	Natural science textbook-based Encyclopedia facilitate the comprehension of students	4	4	100	Valid	Not Revision
2	The accuracy of material objects and the nature of learning in natural science	4	5	80	Valid	Not Revision
3	The clarity of the material and exposure measures experiment	3	3	100	Valid	Not Revision

4	Scope are presented in accordance with the purpose of learning	4	4	100	Valid	Not Revision
5	Natural science book based Encyclopedia was able to increase the understanding of the concept of students	3	3	100	Valid	Not Revision
6	The use of letters and punctuation marks of natural science textbook-based Encyclopedia	4	4	100	Valid	Not Revision
7	The use of language in natural science-based encyclopedia	4	4	100	Valid	Not Revision
8	Natural science textbook-based Encyclopedia can motivate students	4	5	80	Valid	Not Revision
9	Problems exercises include the children's materials "objects and nature"	4	4	100	Valid	Not Revision
10	The evaluation instrument used can be gauge capability students.	4	5	80	Valid	Not Revision
The Total Number of		**38**	**41**	**92,7**	**Valid**	**Not Revision**

Description:

x : score the answers by validator Mrs Sri Mulidiningtyas, S. Pd as a learning.

xi : Score the highest answer.

P : Percentage of rate valid

$$P = \frac{\Sigma x}{\Sigma x_i} \text{ x } 100\%$$

1) Quantitative Data

Quantitative data results of validation experts more material can be seen in Table 4.13. as follows :

Table shows the results of the validation data expert study of product development of textbook material objects and their nature based encyclopedia of the third grade is 90% of declared valid, i.e. on items 1, 2, 3, 5, 6, 7, 8, 9 and 10.

2) Qualitative Data

As for the qualitative data collected from the input, advice and expert commentary of material science in an open statement with regard to the materials presented in table 4.14. as follows:

Table 4.14 Criticism and Suggestion of Content from teacher in the third grade

The Name Of The Subject Test Experts	Criticism And Suggestions
Sri Maulidiningtyas.S.Pd	1. Image + description of the kapilaritas Less quick 2. Please look for images that match the proof about kapilaritas 3. Is in compliance with the expected

Based on the table above criticism and suggestions, it seems that there is some material that has been presented in the textbook are still less precise, so need to be replaced by appropriate material i.e. proof about the event "kapilaritas". In addition give the right picture to the nature of the liquid "through the cracks".

3) Data Analysis

The following steps are performed after data available is working to analyze the data. Data analysis was done starting from the data about the validity of the results of textbook learning experts.

Based on the results of the expert assessment learning Natural Science against the textbook as noted in table 4.13, then the percentage can be calculated the level of achievement of the textbook as follows:

$$P = \frac{\Sigma x}{\Sigma x_i} \text{ x } 100\%$$

$$P = \frac{38}{41} \text{ x } 100\% = 92{,}7\ \%$$

P = Percentage of rate valid

Because of the weight of each choice is 1, then percentage = 92,7%. After converted with the conversion scale table 5, a percentage of the level of achievement of the qualification is at 92.7% good, so the textbook does not need to be revised.

Comments and suggestions from experts content subjects in open question made consideration to improve the textbook in order to enrich the content of the textbook material and exposure include.

4) Product Revision

Based on the analysis carried out, then the revision of textbook is as follow :

Table 4.15 Revision Of Teaching Material Based Encyclopedia on Content Expert From Teacher In The Third Grade

NO	Point of Revision	Before Revision	After Revision
1.	On the material properties of the molten liquid through small gaps are expected to be replaced by proof and the right image.		

All data from the results of the review, assessment and discussion with expert learning Natural Science was made to revise the Foundation to perfecting textbook component and material science subjects before trial tested on learner user textbook products development.

B. Field Trials Results

Results obtained from the results of field trials on teaching materials Pseudo Encyclopedi Focusing on matter and its state MI Khadijah Malang. Assessment of the results of trials using scale conversion level of achievement, as required in the assessment standards of achievement (score)

and adjusted to predefined categories. The following table qualification assessment.

Table 4.16

The level of attractiveness of the Classification Based on Percentage

Percentage (%)	**The Level Of Attractiveness**
84 ≤ score ≤ 100	Very Interesting
68 ≤ score< 84	Interesting
52 ≤ score< 68	Enough Interesting
36 ≤ score< 52	Less Interesting
0 ≤ score< 36	Not Interesting

Data validation is obtained from the results of testing against the textbook on third grade Elementary School in MI Khadijah Malang we start performed 12 - 14 April 2016. Product development that are submitted for field trials of learning science is a textbook. Product development was left to field trials which include.

a. Individuals Trial *(one on one)*

1) The Presentation of the Data

Individual trial is represented with three correspondents with the criteria of the correspondent is the top correspondent, correspondent for the central part and the lower part of the correspondent. As for exposure quantitative data from the results of the field test are as described in the following table:

Table 4.17 Result of individual Trials (One On One) the Teaching Material Natural Science on Material Objects and their Characteristic Nature based Pseudo Encyclopedia

No	Statement	x_1	x_2	x_3	$\sum x$	$\sum x_i$	P (%)	The Level Of Attractiveness
1	Textbook Natural Science can facilitate students in learning.	5	5	5	15	15	100	Very Interesting
2	The use of Natural Science textbook can give morale in learning students.	5	4	5	14	15	93,3	Very Interesting
3	Textbook Natural Science make it easy for students to understand the material lesson	5	5	4	14	15	93,3	Very Interesting
4	test on textbook	5	5	4	14	15	93,3	Very Interesting

	Natural Science is easy.							
5	Typeface and size of letter in the textbook Natural Science facilitate students in reading.	5	5	5	15	15	100	Very Interesting
6	Words that are used in accordance with the the State of the students.	4	5	5	14	15	93,3	Very Interesting
7	The instructions contained in the textbook Natural Science easily understood	5	5	4	14	15	93,,3	Very Interesting
8	The language used in the textbook easy to understand	5	5	5	15	15	100	Very Interesting

9	test exercises of easily understood	5	4	5	14	15	93,3	Very Interesting
10	his textbook helps students to team up with friends and environment.	5	5	4	14	15	93,3	Very Interesting
The Total Number		**49**	**46**	**45**	**143**	**150**	**95,3**	**Very Interesting**

Description:

x_1 **:** respondent 1 students is third grade elementary school MI Khadijah Malang, his name Fakhrul Alif Ardhiansyah

x_2 **:** respondent 2 student is third grade elementary school MI Khadijah Malang, his name nasyaband hodza putra dzikrullah

x_3 **:** respondent 3 student is third grade elementary school MI Khadijah Malang, his name muhammad ersyah farendsyah

$\sum x$: total score answers evaluators (real value)

$\sum x_i$: score the highest answer

P : percentage of rate valid

$$P = \frac{143}{150} \times 100\%$$

$$= 95,3\ \%$$

As for the qualitative data collected from the input, suggestions and comments of individual trials in the open questions with regard to products that have been tested textbook is as follows:

1. physical Appearance of learning media is already interesting.
2. The size and typeface is already good.
3. The material in the textbook is quite obvious

2) Data Analysis

After getting quantitative data from the results of individual trials available on table 4.20 the next step to do is to analyze the data. A percentage of the level of achievement of the learning media on individual trials are as follows:

$$P = \frac{\Sigma}{\Sigma x_i} \text{ x } 100\%$$

$$P = \frac{143}{1500} \text{ x } 100\% = 95\text{ ,}3\%$$

P = Percentage the level of Interest

Because of the weight of each choice is 1, then percentage = 95.3% and once converted to the table conversion scale percentage level achievement qualification is at 95.3% very interest so learning media do not need revision.

Comments and suggestions from respondents on the trials of individuals in open question will be used as consideration for perfecting textbook.

b. Small group trial.

1) The presentation of the data

This small group trials represented 6 correspondents to the criteria of the correspondent was a correspondent for the top, 2 Central and part 2 correspondent bottom.

As for exposure quantitative data from the results of the field test are as described in the following table:

Table 4.18 The results of the Assessment Tests in small groups the Teaching Material Natural Science Focusing on Matter and Its State Based-Pseudo Encyclopedia

No	Statement	x_1	x_2	x_3	x_4	x_5	x_6	$\sum x$	$\sum x_i$	P (%)	The Level Of Attractiveness
1	Textbook Natural Science can facilitate students in learning.	5	5	5	4	5	4	28	30	93,3	Very Interesting
2	The use of Natural Science textbook can give morale in learning students.	5	4	5	5	5	5	29	30	96,6	Very Interesting
3	Textbook Natural Science make it easy for students to understand the material lesson.	5	5	4	4	5	5	28	30	93,3	Very Interesting
4	Test exercises in the textbook Natural Science is easy.	5	5	4	5	5	4	28	30	93,3	Very Interesting
5	Typeface and size of letter in the textbook Natural Science facilitate students in reading.	5	5	5	5	5	5	30	30	100	Very Interesting

6	Words that are used in accordance with the State of the students.	4	5	5	4	4	4	26	30	86,6	Very Interesting
7	The instructions contained in the textbook Natural Science is easy to understand.	5	5	5	5	4	5	29	30	96,6	Very Interesting
8	The language used in the textbook easy to understand.	5	5	5	4	5	4	28	30	93,3	Very Interesting
9	Practice questions are easy to understand.	5	4	5	4	4	5	27	30	90	Very Interesting
10	This textbook helps students to team up with friends and the environment.	5	5	4	4	5	5	28	30	93,3	Very Interesting
The Total Number		**49**	**48**	**47**	**44**	**47**	**46**	**281**	**300**	**93,6**	**Very Interesting**

Description:

x_1 **:** respondent 1 is student third grade MI Khodijah Malang his name Fakhrul alif ardhiansyah

x_2 **:** respondent 2 is student third grade MI Khodijah Malang her name Nasyaband hodza putra dzikrullah

x_3 **:** respondent 3 is student third grade MI Khodijah Malang his name Muhammad ersyah farendsyah

x_4 **:** respondent 4 is student third grade MI Khadijah Malang her name Azzahra nadia sandra

x_5 **:** respondent 5 is student third grade MI Khadijah Malang his name Muhammad ibnu farizka

x_6 : respondents 6 is student third grade MI Khadijah Malang his name Moch. Rafly akbar

$\sum x$: total score answers evaluators (real value)

$\sum x_i$: score the highest answer.

P : percentage the rate attractiveness

$$P = \frac{\Sigma x}{\Sigma x_i} \text{ x } 100\%$$

As for the qualitative data collected from the input, suggestions and comments small group trials in the open questions with regard to products that have been tested textbook is as follows:

1. physical Appearance textbook is already interesting, but rather examined again in the writing of his sentence.
2. This textbook is very helpful to learning grade 3 students in Natural Science subjects.

2) Data Analysis

After getting quantitative data from the results of the assessment of small group trials on table 4.18, the next step to do is to analyze the data. A percentage of the level of achievement of the textbook on small group trials are as follows:

$$P = \frac{\Sigma x}{\Sigma x_i} \text{ x } 100\%$$

$$P = \frac{281}{300} \text{ x } 100\% = 93{,}6\ \%$$

P = Percentage rate the level of interest

Because of the weight of each choice is 1, then percentage = 93.6% and after conversion scales with the tables converted percentage level achievement qualification is at 93.6% very interest so learning media do not need revision.

Comments and suggestions of the respondents at trial of a small group in the open questions will be made into consideration to improve textbook.

3) Revision Of Product Development.

Based on the results of the assessment tests in small groups with an average achievement levels 93.6% the textbook product development need not get revisions or improvements. However, the comments and suggestions of the respondents at trial of a small group in the open questions will be made into consideration to improve the textbook so that the resulting product development will be the better.

c. Field Trials

1) The Presentation of The Data

Field trials is represented by an entire the third grade MI Khadijah Malang. As for exposure quantitative data from the results of the field test are as described in the following table:

Table 4.19 The results of the Assessment field trials Teaching Material Natural Science Focusing on Matter and its state Based Pseudo Encyclopedia

No	Criteria	The scores given by respondents 1, 2, 3, 4, 5, 6, 7, 8, 9,10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31,32,33,34,35,36,37.	∑x	$\sum x_1$	P (%)	The Level of Attractiveness
1	Textbook Natural Science can facilitate students in learning	4,4,5,5,5,4,5,4,5,5,5,5,5,5,5,5,5,5,4,5, 4,5,5,5,5,5,5,5,4,5,5,5,5,5,5,5.	178	185	96 %	Very Interesting
2	The use of Natural Science textbook can give morale in learning students.	4,4,4,4,5,5,5,4,5,5,5,4,5,4,5,5,4,4,4,5,5, 5,5,4,5,4,4,4,5,4,4,5,4,4,5,4.	166	185	90%	Very Interesting
3	Textbook Natural Science make it easy for students to understand the material lesson.	5,4,4,5,4,4,4,4,5,5,4,5,4,5,5,5,5,4,5,4,5, 5,4,4,5,5,5,5,5,5,4,5,4,4,5,5,5.	159	185	86 %	Very Interesting
4	Test exercises in the textbook Natural Science is easy	4,5,5,4,4,4,4,5,4,5,4,5,4,4,4,4,5,5,5,4,5, 4,4,4,5,4,4,4,5,5,5,5,5,5,5,4,4.	168	185	91 %	Very Interesting

5	Typeface and size of letter in the textbook Natural Science facilitate students in reading	5,4,4,4,5,4,5,5,5,5,5,5,4,5,5,4,5,5,5,4,5, 5,5,5,5,5,5,5,5,5,5,4,5,5,5,5,5.	177	185	96%	Very Interesting
6	Words that are used in accordance with the the State of the students	5,4,4,4,4,4,4,4,4,5,4,4,4,5,5,4,5,4,5,4,5, 4,4,5,4,4,5,5,5,5,4,4,4,4,4,4,4.	152	185	82 %	Very Interesting
7	The instructions contained in the textbook Natural Science is easy to understand	4,4,4,5,4,4,4,5,5,5,5,5,5,5,4,4,5,5,5,5,5, 5,4,4,4,5,5,5,5,5,5,5,5,5,4,5,5.	169	185	91 %	Very Interesting
8	The language used in the textbook easy to understand	5,5,4,4,5,5,4,4,4,5,5,4,5,4,5,4,4,5,4,4,5, 4,4,5,5,5,5,4,5,5,4,5,4,5,5,4,4,4.	167	185	90 %	Very Interesting
9	Practice questions are easy to understand	4,4,4,4,4,3,4,4,4,5,4,5,4,5,4,4,4,5,5,4,5, 5,5,4,5,4,5,4,5,5,5,5,5,5,5,4,4.	158	185	85%	Very Interesting

10	This textbook helps students to team up with friends and the environment.	5,5,5,5,5,5,5,4,5,5,5,5,4,5,5,4,5,5,5,4,4, 5,4,4,5,4,5,5,5,4,5,5,5,5,5,4,5.	175	185	94%	Very Interesting
The Total Number			**1669**	**1850**	**90%**	**Very Interesting**

Table 4.20
Field trials of the respondents against the Teaching Material Natural Science Focusing on matter and its state based Pseudo Encyclopedia

Respondent	Name Respondent
1	Ahmad amin azva
2	Aldwin rifqi farazie
3	Almeira revia aurelia
4	Alzamira hafuza s
5	Aqila najia puterykitta
6	Arsya al hanif arif
7	Azzahra nadia sandra
8	Cahyaning ayu adzania
9	Chelsea auryn w.r
10	Dwi wahyu aprisagema maulida
11	Fakhrul alif ardhiansyah
12	Filaradi adiwidya
13	Hadi setyo
14	Hafez talib
15	Khaila valendyta azzahra
16	M. alief richies A.Y. maulidan
17	M. ibrahim al ansory
18	M. rayhan islami rasya
19	Mahvin zahira hilvana
20	Moch zidan alfiansyah
21	Moch. Rafly akbar
22	Muhammad addia prasetyo akbar
23	Muhammad ersyah farendsyah
24	Muhammad ibnu farizka
25	M. razzan canawaro islamy
26	Nabilla almaas syaharani faizzah
27	Nailah eka marsya
28	Nasyaband hodza putra dzikrullah
29	Nawira
30	Raisha dewa
31	Sabian aleshia ramadhani
32	Tiar achmad fauzan firdaus
33	Vania raadina exelsa
34	Zahidah abdul chalik bavana
35	Zainina zahwa
36	Zhafir rauf sheva wibowo
37	Inez

Description :

$\sum x$: total score answers evaluators (real value)

$\sum x_i$: score the highest answer.

P : Percentage rate valid

$$P = \frac{\Sigma x}{\Sigma x_i} \text{ x } 100\%$$

The qualitative data collected from the input, advice and comment field trials in the open questions with regard to the product materials that have been tested for cobakan are as follows:

1. Look Book is already nice and interesting.
2. This book is very complete, note writing.

2) Analisis Data

After getting quantitative data from the results of the assessment field trials available on table 4.24, the next step to do is to analyze the data. A percentage of the level of achievement of the textbook in the field trials are as follows:

$$P = \frac{\Sigma}{\Sigma x_i} \text{ x } 100\%$$

$$P = \frac{1669}{1850} \text{ x } 100\% = 90\ \%$$

P = Percentage the rate attractiveness

Because of the weight of each choice is 1, then percentage = 90% and after conversion scales with the tables converted percentage level of achievement of 90% are on qualification very interest so no need to textbook revisions.

d. Presentation data pre-test and post-test

Table value of pre-and post test-test the third grade students at the time of field test is as follows:

Table 4.21 The results of the assessment of field trials on pre-test and Post-test

Respondent	Name Respondent	Pre-test	Post-test
1	Ahmad amin azva	89	97
2	Aldwin rifqi farazie	61	79
3	Almeira revia aurelia	80	89
4	Alzamira hafuza s	74	86
5	Aqila najia puterykitta	78	92
6	Arsya al hanif arif	85	95
7	Azzahra nadia sandra	83	89
8	Cahyaning ayu adzania	77	79
9	Chelsea auryn w.r	89	97
10	Dwi wahyu aprisagema maulida	83	100
11	Fakhrul alif ardhiansyah	91	92
12	Filaradi adiwidya	72	83
13	Hadi setyo	75	78
14	Hafez talib	85	94
15	Khaila valendyta azzahra	28	67
16	M. alief richies A.Y. maulidan	85	95
17	M. ibrahim al ansory	73	92
18	M. rayhan islami rasya	83	92
19	Mahvin zahira hilvana	39	76
20	Moch zidan alfiansyah	91	97
21	Moch. Rafly akbar	66	84
22	Muhammad addia prasetyo akbar	73	87
23	Muhammad ersyah farendsyah	70	87
24	Muhammad ibnu farizka	94	100
25	M. razzan canawaro islamy	91	92
26	Nabilla almaas syaharani faizzah	78	95
27	Nailah eka marsya	81	92
28	Nasyaband hodza putra	81	90

	dzikrullah		
29	Nawira	84	100
30	Raisha dewa	94	95
31	Sabian aleshia ramadhani	91	91
32	Tiar achmad fauzan firdaus	80	92
33	Vania raadina exelsa	73	95
34	Zahidah abdul chalik bavana	79	94
35	Zainina zahwa	75	89
36	Zhafir rauf sheva wibowo	94	100
37	Inez	86	92

From the table above, it can be seen by looking average which shows that the average value of pre-test is a 78 and an average value of post-test is 90. By looking at the average post-greater test i.e. (90%) than the average pre-test (12%) indicating that there is an increase in student learning gains of 12% after learning using textbook development results. Then it can be said that the textbook learning IPA-based encyclopedia material objects and their very nature proved to be significantly effective for increasing the understanding of students towards Natural Science subject to the third grade MI Khadijah Malang.

e. The T-test Analysis

The value data pre-test and post test further analyzed through two sample t-test (Paired Samples T-Test). This analysis technique is used to find out whether or not there is an influence of the treatment imposed on group objects. The thing that is an indicator of whether or not the influence is there, if there is a difference between a cognitive understanding of learners between before and after using the media that was developed.

Based on table 4.21. look for whether the textbook developed can improve the understanding of the students or not. As for the T test steps as follows:

a. The first step make Ha and Ho in the form of a sentence

   H_a = there are differences in the understanding of the students which can be seen from the difference between the values obtained before and after using the textbook Natural Science-based encyclopedia

   H_0 = there is no understanding of the difference in the understanding of the students which can be seen from the difference between the values obtained before and after using the textbook IPA-based encyclopedia.

b. The second step looking for t_{hitung} with the formula :

$$t = \frac{\overline{D}}{\sqrt{\frac{d^2}{N(N-1)}}} \qquad \text{Dan db} = \text{N} - 1 = 37 - 1 = 36 \text{ Siswa}$$

c. The third step to determine of criteria

   Ha accepted in $t_{hitung}^2 < t_{tabel}^2$

   Ho accepted in $t_{hitung}^2 > t_{tabel}^2$

d. The fourth the calculation

Tabel 4.2. Table the calculation t-Test

Respondent	Name Respondent	Pre-test (X_1)	Post-test (X_2)	(X_1 - X_2)	D	d^2
1	Ahmad amin azva	89	97	-8	8	64
2	Aldwin rifqi farazie	61	79	-18	18	324
3	Aalmeira revia aurelia	80	89	-9	9	81
4	Alzamira hafuza s	74	86	-12	12	144
5	Aqila najia puterykitta	78	92	-14	14	196
6	Arsya al hanif arif	85	95	-10	10	100
7	Azzahra nadia sandra	83	89	-6	6	36
8	Cahyaning ayu adzania	77	79	-2	2	4
9	Chelsea auryn w.r	89	97	-8	8	16
10	Dwi wahyu aprisagema maulida	83	100	-17	17	289
11	Fakhrul alif ardhiansyah	91	92	-1	1	1
12	Filaradi adiwidya	72	83	-11	11	121
13	Hadi setyo	75	78	-3	3	9
14	Hafez talib	85	94	-9	9	81
15	Khaila valendyta azzahra	28	67	-39	39	1521
16	M. alief richies A.Y. maulidan	85	95	-10	10	100
17	M. ibrahim al ansory	73	92	-19	19	361
18	M. rayhan islami rasya	83	92	-9	9	81
19	Mahvin zahira hilvana	39	76	-32	32	1024
20	Moch zidan alfiansyah	91	97	-6	6	36
21	Moch. Rafly akbar	66	84	-18	18	324
22	Muhammad addia prasetyo akbar	73	87	-14	14	196
23	Muhammad ersyah farendsyah	70	87	-17	17	289
24	Muhammad ibnu farizka	94	100	-6	6	36
25	M. razzan canawaro islamy	91	92	-1	1	1
26	Nabilla almaas syaharani faizzah	78	95	-17	17	289
27	Nailah eka marsya	81	92	-11	11	121
28	Nasyaband hodza putra dzikrullah	81	90	-9	9	81
29	Nawira	84	100	-16	16	256
30	Raisha dewa	94	95	-1	1	1
31	Sabian aleshia ramadhani	88	91	-3	3	9
32	Tiar achmad fauzan firdaus	80	92	-12	12	144
33	Vania raadina exelsa	73	95	-16	16	256

34	Zahidah abdul chalik bavana	79	94	-15	15	225
35	Zainina zahwa	75	89	-14	14	196
36	Zhafir rauf sheva wibowo	94	100	-6	6	36
37	Inez	86	92	-6	6	36
The Total Number		2911	3344	**∑d = 455**		**$\sum d^2$ = 7084**

$$\bar{D} = \frac{\sum d}{n}$$

$$= \frac{455}{36}$$

$$\bar{D} = 13$$

$$t = \frac{\bar{D}}{\sqrt{\frac{d^2}{N(N-1)}}}$$

$$= \frac{13}{\sqrt{\frac{7084}{37\,(37-1)}}}$$

$$= \frac{13}{\sqrt{\frac{7084}{37(36)}}}$$

$$= \frac{13}{\sqrt{\frac{7084}{1332}}}$$

$$= \frac{13}{\sqrt{5,3}}$$

$$= \frac{13}{2,3}$$

$$= 5,65$$

e. The Fifth step is compare t_{hitung} dan t_{tabel}

t_{hitung} = 5,65

t_{tabel} = 1,687

f. The sixth step conclusion

The results of the above calculation shows that T count is greater than T table (t count > t table, is 5,65 > 1,687), so Ho and Ha rejected accepted. So there is a significant difference between the value of students before and after using the textbook Natural Science based

encyclopedia in the third grade. Next than average known that X_2 is greater than X_1 (3344 > 2911), thus indicating that the post test better than on the pre test. It shows that teaching material Natural Science-based Pseudo Encyclopedia through the third grade was able to increase the understanding of the concept of the students in learning.

CHAPTER V

DISCUSSION

This chapter describes the study of product development. Exposure assessment of data product development is divided into three subject, we will discussion 1) Analysis of Product Development; 2) Analysis of Results Validation Expert; 3) Analysis of Effectiveness, The efficiency and attractiveness of the Product Development,

A. Analysis of Textbook Development

The development of Natural Science textbook-based encyclopedia of in the third grade is based by the fact that it is there, yet the existence of the development of the textbook used in the learning process is processed. Precisely here to development textbook researcher package "Senang Belajar Ilmu Pengetahuan Alam" into a book "Encyclopedia of science experiment", which only the specific material "Matter and Its State". Thus these results have aim to increase understanding in the learning process in the classroom with curriculum provision in schools.

Product development procedure textbook teaching natural science through how many stages, which include:

the preliminary study Phase

1) by doing a needs analysis of the curriculum evaluation
2) stage of development of Natural Science textbook based-encyclopedia using model Dick & Carrey stage trials and trial products.

The development of Natural Science textbook-based Encyclopedia has been done gradually to the consummation of the Mr / Mrs of expert lecturers in the field, so that it becomes the validator in the development of natural science textbook-based Encyclopedia. The development of this textbook there are four aspects of the validation of the very books emphasized that this aspect of the matter, the language aspect, the aspect of design/media, and aspects to the teacher of Natural Science subjects in the classroom. The desired aspect by doing validation and revision, so that the natural science textbook-based encyclopedia in accordance with the elements of the feasibility of, and the provision of material component on the textbook development, before field trials to the third grade.

The results of the development of these materials is as additional textbook for students and teachers in the learning process in the classroom on the subjects of natural science. The development of natural science textbook-based encyclopedia has its own characteristics, namely the development of a textbook, there are many collection of science experiments that are particularly on the material "Matter and Its State", there are steps a very easily

understood experiment students, with Training of researchers way equipped itself, and there are meaningful illustrations related to everyday life with students can observe or doing experiments directly with reading the instructions step-by-step experiments will be conducted.

The development of science-based book "*encyclopedia*" is a number of writings which contain explanations that hold comprehensive information understandable and comprehensible and quick about the whole branch of science or specialized in a particular branch of science which is composed of parts of articles on one topic.

Based on the exposure to the notion of "*Encyclopedia*" over the meaning of the development of science-based book encyclopedia, researchers developed a book package " Senang Belajar Ilmu Pengetahuan Alam" developed into the book as book encyclopedia, researchers by developing on activities to do experiments with gives an illustration of a meaningful story that relate to everyday life, and steps experiment with pictures that match the experiment. On the development of this textbook, researchers using special encyclopedia books on natural science for grade 3 on the topic/subject "matter and its state".

With regard to the issues facing that is not yet the existence of the development of natural science textbook based-encyclopedia. The results of

the development of the alternative learning materials can be used, besides the textbook which is already used in the process of teaching and learning in progress.

The development of natural science textbook-based encyclopedia is only develop on the subject on the material "matter and its state", certainly has a lot of revision to be a textbook that can be used in the process of teaching and learning. Before the trial in this book has been revised/in the validation material, linguist, expert design/media, learning experts, test the individual, small group, test and field trials.

The results of validation to the validator with a valid percentage scale as well as the decision making to the revision of textbook used the following assessment qualification criteria:

Table 5.1 Eligibility Levels Qualifying based on Percentage

Percentage (%)	The Level of Validity	Description
84 ≤ score≤ 100	Very Valid	Not Revision
68 ≤ score< 84	Valid	Not Revision
52 ≤ score< 68	Enough Valid	Partially Valid
36 ≤ score< 52	Less Valid	Revision
0 ≤ score< 36	Not Valid	Total Revision

1. Data Analysis Expert Validation Of Content/Material Natural Science.

Based on a conversion scale set out in the appraisal question form questionnaire items, is as follows :

a. Score 1 for is not clear, it is not appropriate, not relevant, not systematic, not motivating, does not measure the ability.
b. Score 2 for less obvious, less suitable, less relevant, less systematic, less motivated, less measuring capability.
c. Score 3 for enough obvious, enough appropriate, relevant enough, enough systematic, enough motivating, and measuring capabilities.
d. Score 4 for the class, appropriate, relevant, systematic, motivate, measure the ability.
e. Score 5 for very clear, very appropriate, very relevant, very methodically, very motivating, measuring ability.

Exposure data validation results of expert material natural science data validation results from exposure to material science experts against textbook Natural Science the third grade elementary school based-Encyclopedia on Table 4.5, are as follows:

a. The formulation of the topic on the development of natural science textbook based encyclopedia is very clear, specific, and operational.
b. Relevance standard of competence to the indicators on the development of natural science textbook based encyclopedia is very relevant.

c. Suitability of the material presented in the textbook of natural science-based encyclopedia is very appropriate.
d. The contents of the textbook of natural science-based encyclopedia is in accordance with KTSP 2006.
e. Systematics describing the content of learning in natural science textbook based very systematic encyclopedia.
f. The scope of the material presented in the textbook of natural science-based encyclopedia is in accordance with the theme.
g. Writing tools and materials and measures existing experiments in natural science based-encyclopedia book is very good.
h. The material is presented through a textbook of natural science based-encyclopedia in order to motivate the students to study harder.
i. The level of difficulty of the language used is in accordance with the level of student understanding.
j. Evaluation instrument can measure the ability of students.

From the questionnaire responses were filled out by professors of Natural Science as a subject matter expert, calculated the percentage level of validity textbook as follows:

$$P = \frac{\sum X}{\sum Xi} \times 100\%$$

$$P = \frac{44}{48} \times 100\%$$

$$= 92\%$$

Based on the above results, the obtained results the percentage of 92%. In accordance with a conversion table scale, the percentage level of achievement of 92% are in the valid qualifications so that the textbook does not need to be revised. This suggests that the textbook Natural Science elementary school matter and its state is good and fit for use according to subject matter expert.

2. Validation Data Analysis Expert Learning Natural Science the third grade Elementary School.

Based on the conversion scale set out in the questionnaire product assessment questionnaire, are as follows:

a. Score 1 for not clear, inappropriate, irrelevant, not systematic, not motivated, do not measure the ability.
b. Score 2 for less obvious, less suitable, less relevant, less systematic, less motivated, less measuring capability.
c. Score 3 for enough obvious, enough appropriate, relevant enough, enough systematic, enough motivating, and measuring capabilities.
d. Score 4 for the class, appropriate, relevant, systematic, motivate, measure the ability.
e. Score 5 for very clear, very appropriate, very relevant, very methodically, very motivating, measuring ability.

Exposure data from expert validation of subjects of natural science against science textbook the third grade elementary school based object matter and its state with based-encyclopedia on Table 4:16, is as follows:

a. Textbook of Natural Science based-Encyclopedia help facilitate students' understanding.
b. Textbook of Natural Science based-Encyclopedia help facilitate students' understanding.
c. Clarity exposure to the materials and steps clear enough trial.
d. The scope is presented in accordance with the purpose of learning
e. Textbooks based-encyclopedia enough able to improve students' understanding of the concept.
f. Capitalization and punctuation textbook science based-encyclopedia is appropriate.
g. The use of the language in the book is appropriate science based-encyclopedia.
h. Natural science-based textbook Encyclopedia very motivating students.
i. Exercises have been suitably includes material "matter and its state".
j. Textbooks Natural Science was instrumental in the encyclopedia based science learning on the topic "Matter and Its State ".

From the questionnaire responses were filled by teachers in science the third grade MI Khadijah as expert learning natural science fields of study, the percentage of the level of validity can be calculated as follows textbook:

$$P = \frac{\sum X}{\sum Xi} \times 100\%$$

$$P = \frac{38}{41} \times 100\%$$

$$= 92,7\ \%$$

Based on the calculation above, the obtained results a percentage of 92.7%. In accordance with a conversion table scale, the percentage of 92.7% achievement rate is valid on qualifying so that the textbook does not need to be revised. This suggests that the textbook Natural Science the third grade in primary school language objects matter and its state based-encyclopedia has been good and deserve to be used according to expert studies teachers teaching natural science.

3. Validation Data Analysis Expert Product Design Textbook.

Based on the conversion scale set out in the questionnaire product assessment questionnaire, are as follows:

a. Score 1 for very good
b. Score 2 for less well
c. Score 3 for Good Enough
d. Score 4 for good
e. Score 5 for very good

Exposure data from media expert validation of product design textbook to textbook Natural Science third grade on matter and its state based-encyclopedia based on Table 4.8., Are as follows:

a. Design cover both the content of the material.
b. Suitability pictures very well with the material in to development.
c. The use of a typeface is good for science textbooks based encyclopedia.
d. The size of the font used well with third grade students in elementary school.
e. Suitability lay out the design color variations both in the textbook of Natural Science based Encyclopedia.
f. Clarity is excellent illustration in the textbook of Natural Sciences based Encyclopedia.
g. Interest in design lay out both in the textbook of Natural Sciences based-Encyclopedia.
h. The combination of excellent color design in the textbook of Natural Sciences based-Encyclopedia.
i. Linkage packaging both in developing a science textbook.
j. The effectiveness of good science textbooks based encyclopedia.

Based on feedback questionnaires filled out by lecturers Government Elementary School Teacher Education (primary education) as a media expert product design textbook, can be calculated percentage of the level of validity of teaching materials as follows:

$$P = \frac{\sum X}{\sum Xi} \times 100\%$$

$$P = \frac{42}{47} \times 100\%$$

$$= 89\%$$

Based on the above results, the obtained results a percentage of 89%. In accordance with a conversion table scale, the percentage level of achievement of 89% are in the valid qualifications so that the textbook does not need to be revised back. This suggests that the textbook in the third grade elementary school matter and its state based encyclopedia is already good and feasible for use by expert instructional media.

4. Analysis Data Validation Linguists

Based on the conversion scale set out in the questionnaire product assessment questionnaire, are as follows:

a. Score 1 for strongly disagree
b. Score 2 for less agree
c. Score 3 for enough agree
d. Scores 4 to agree
e. Score 5 for strongly agree

Exposure data from media expert validation product language textbook to textbook Natural Science the third grade on matter and its state based-encyclopedia on Table 4.8., Are as follows:

a. Conformity language / phrase on the cover of textbook-based Natural Science based- Encyclopedia Science Experiment very appropriate.
b. Conformity language / sentence on the home page textbook Natural Science based-Encyclopedia Science Experiment very appropriate.
c. Ease language to be understood in the science textbooks based-Encyclopedia Science Experiment very appropriate.
d. Ease language in diction word "steps trial" is very appropriate
e. Ease of language as a whole to be understood very appropriate.
f. You keep the precision of diction words "Do You?" Is very appropriate.
g. You keep the precision of diction of the word "Experimental results" is very appropriate.
h. Ease the language used in the diction of the word "conclusion" is very appropriate.
i. Linkage packaging in the textbook is very appropriate.
j. The attractiveness of the textbooks “Senang Belajar Ilmu Pengetahuan Alam” at the development of “Natural Science Of Pseudo encyclopedia” .

Based on feedback questionnaires filled out by lecturers Government Elementary School Teacher Education (elementary education) as a media expert product design textbook, can be calculated percentage of the level of validity of teaching materials as follows:

$$P = \frac{\sum X}{\sum Xi} \times 100\%$$

$$P = \frac{40}{50} \times 100\%$$

$$= 89\%$$

Based on the above results, the obtained results the percentage of 80%. In accordance with a conversion table scale, the percentage of the level of achievement of 80% are in the valid qualifications so that the textbook does not need to be revised back. This suggests that the textbook Natural Science in the third grade on material objects and their characteristic nature-based encyclopedia is already good and feasible for use by expert instructional textbooks.

Based on the evaluation of the whole, both of validation experts, teachers of science in the third grade and the results of field trials against textbook Natural Science in the third grade on material objects and their characteristic nature-based Encyclopaedia showed good results or valid. Then generally the product development textbooks have met the eligibility and does not need to be revised or repairs. However, feedback, suggestions and comments made by the validator in the questionnaire of closed questions, trying to be realized as well as possible so that the resulting product development is getting better.

5. Analysis Data Validation Testing Products Textbook.

According to the table 4:20., 4:22, and 4:24 questionnaire responses were filled by target subjects that all students in third grade at MI Khadijah

Malang is divided into 3 phases: 1) Trial individual 2) Trial small group 3) The field trials. The field trial assessment on each component as analyzed quantitatively for field trials can be interpreted as follows:

1) Number 1 indicates that the third-grade students, textbook Natural Science can facilitate learning with percent validity of 96%.
2) Number 2 shows that by third grade students, the use of this science textbook can give enthusiasm in learning with percent validity of 90% .
3) Number 3 shows that by third grade students, the textbook that is in the textbook Natural Science is easily understood percent validity of 86%.
4) Number 4 shows that by third grade students, the questions in the textbook Natural Science is easy with percent validity of 91%.
5) Number 5 indicates that the third-grade students, font and size of letters contained in this science textbook readable percent validity of 96%.
6) Number 6 indicates that the third-grade students, during the study of this book could not find words hard with percent validity of 82%.
7) Number 7 indicates that the third-grade students, the instructions contained in the textbook Natural Science is easily understood percent validity of 91%.
8) Number 8 indicates that the third-grade students, the language used in textbooks easily understood percent validity of 90%.
9) Number 9 demonstrate that by third grade students, practice questions easily understood with a percent validity of 85%.

10) Number 10 indicates that the third-grade students, this textbook helps to work with friends and environment with a percent validity of 94%.

According to the table 4.24., Feedback questionnaires filled out by all students in the third grade totaling 37 students MI Khadijah Malang, can be calculated with the percentage level of validity textbook as follows:

$$P = \frac{\sum X}{\sum Xi} \times 100\%$$

$$P = \frac{1669}{1850} \times 100\% = 90\%$$

Based on the calculation above, the obtained results the percentage of 90%. In accordance with a conversion table scale, the percentage of the achievement level of 90% are in the valid qualifications so that the textbook does not need to be revised. This suggests that the textbook Natural Science in the third grade on material objects and their characteristic nature-based encyclopedia has been good and feasible for use in the learning process.

Based on the evaluation of the whole, both of validation experts, teachers of the fourth grade science and the results of field trials against textbook Natural Science in the third grade on material objects and their characteristic nature-based Encyclopaedia showed good results or valid. Then generally the product development textbooks have met the eligibility and does not need to be revised or correct. However, feedback, suggestions and comments made by the validator in the questionnaire an open question, trying

realized as well as possible so that the resulting product development is getting better.

B. Revised Product Development

1. Revision of the development of the subject contents experts based on comments and suggestions on the table 4.6 as follows:

   a. Change the changing nature of the object on the oil timber with the changing nature of the object on the changing nature of the apple fruit.

Before Revision

After Revision

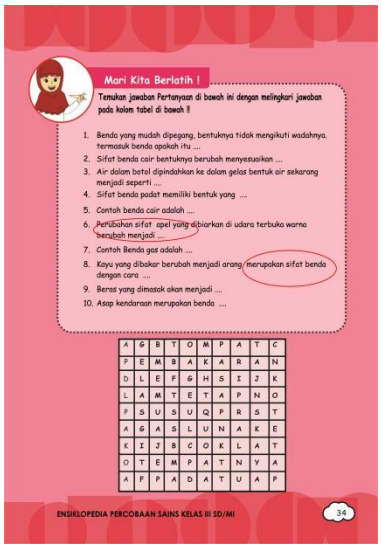
   b. Add the properties of objects through the small cracks.

(The nature of the object through the small cracks)

c. Note the inscription on changing states of matter replace with the word changes the nature of the object.

Before Revision

After Revision



2. Revised Development of Natural Sciences learning experts in the third grade Primary School.

a. The nature of objects through small cracks, should not use tissues, better replaced with cloth.

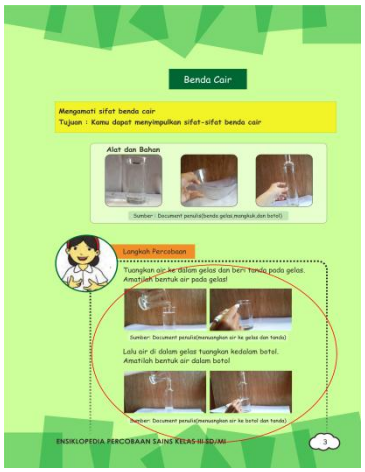
Before Revision

After Revision

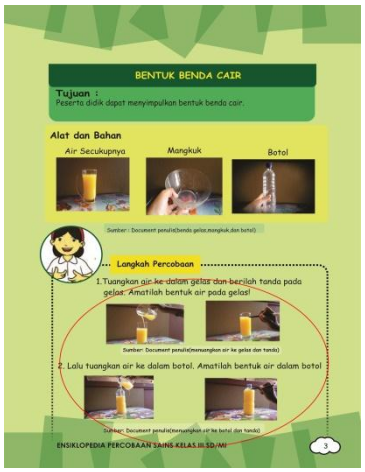
3. Revised Development expert Design / Media Natural Sciences in Primary School.

   a. Water made experimental use colored water, so that students can see the water from clear glass.

Before revision



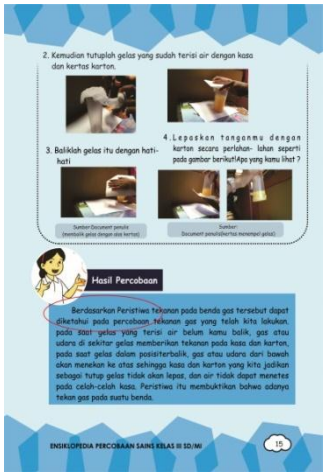
After revision



   b. Change the font size 12 font to 14 fonts, so you can easily read at the third grade students of Primary School.

Before Revision

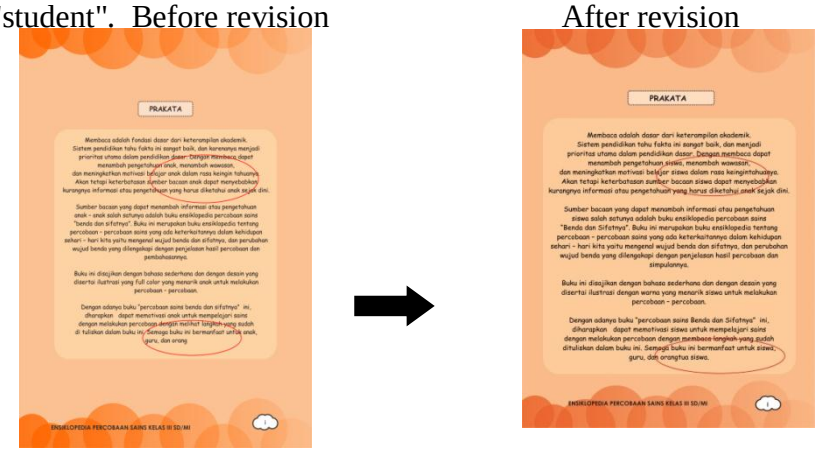
After revision



4. Revised Development linguists.

Based on the feedback received from linguists on developing textbook-based Natural Sciences Encyclopedia in the third grade in Primary School.

a. Supposedly children says in the preface be replaced with the word "student". Before revision After revision



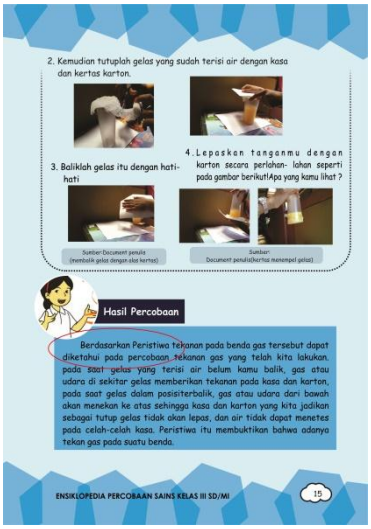
b. Preparation of a sentence less well on material from liquid.

Before Revision After Revision

c. The addition of the word "Based" at the beginning of the sentence of the experimental results.

Before revision

After revision



C. Analysis of the effectiveness and attractiveness of the Textbook of Natural Sciences in the third grade Primary School.

The learning process in the classroom urgently need a strategy and media were very supportive for learning in the classroom, so that with the strategy and media interest will be able to produce interesting learning and students easily understand the lessons that have been described by teachers. Active learning now, learning that can turn on the creativity of students, and get a meaningful learning experience that is easily remembered by students.

Application of textbook development based Encyclopedia of Natural Science, researchers here is to develop the material objects and nature in experiments evidence of the properties of objects and properties of objects associated changes in everyday life. In the learning process now takes patience,

perseverance in guiding students in conducting learning activities in the classroom, to be precise when doing experiments per group, with enthusiastic students who are active so many questions alternately from the students, seeing they are very eager to learn to use the textbook of natural science-based encyclopedia , However, with the new terms may present guidance and direction in the learning process very instrumental.

The learning process can proceed smoothly not forget a target teacher preparation time and need before teaching is compiling a Lesson Plan (RPP), which includes[48] :

Activities Introduction This activity is sometimes also called the start-up activity or footing. Each start learning activity or any activity, the teacher should perform several strategic steps aimed at students' mental condition in order to be ready to learn.

Introduction activities are phase shifted the focus of attention of students of various activities before school, let alone potentially disrupt the learning activities. For example, teachers should anticipate when the child is just playing, joking, or even still eat snacks, so as not to interfere with concentration and attention of students in learning activities.

Core Activities This is the main activities in the learning process, is the effort to make the students master the subject matter. Once students are

[48] http://kampuspendidikan.blogspot.co.id/2013/09/3-tahap-dasar-pembelajaran-efektif-dan_2.html (Diakses : pada hari kamis,21 April 12:51).

really ready to learn, teachers can begin the process of internalization of the subject matter in accordance with the approaches, strategies, methods, media and various instruments that have been prepared. The management of the core activity must be adapted to the material, the coverage area and availability of facilities and infrastructure. During the core activity, and the effectiveness of student attention should be conditioned in order to fully focus on the learning process, both in terms of choosing the right method or medium as well as giving an interlude (ice breaking) refreshers.

Closing Activities this activity is called also foothold end or end activities. In this activity, the teacher should ensure that all students successfully master the subject matter, either through quizzes, question-answer, reflection or evaluation. Based on the results of the final activities teachers can find out if the learning process when it successfully hit the target or not. That way, the teacher can take the necessary steps to fix it, or provide additional treatment especially for students who have not succeeded. Students themselves strived to understand what they had just learned, and realized the extent of their understanding, as well as their flaws in the material master.

CHAPTER VI

CONCLUSION

This chapter will focus on two issues namely that 1) conclusion of the product development, and 2) the suggestion that include product utilization, product dissemination, and further development of the product.

A. Product Development

Based on the development process and the assessment results of this Pseudo Encyclopedia focusing on matter and its state for third grade Elementary Students several conclusion can be down :

1. Textbook in the form of based-Encyclopedia focusing on matter and its state for third grade Elementary Students. a) The physical appearance that include front cover, back cover, foreword, preface, table of contents and concept maps; b) The introduction consists of the title material meaning, illustrations about matter and its state c) The contents that consist of 7 materials matter and its state is to identify state of matter which is of liquid, gas, and solid by conducting experiments using this of Natural Science-based encyclopedia. For the liquid contained an experimentation about the form of liquid, liquid surface, the flow of liquid, and the liquid through the small cracks. While in the gas there are experimental objects that contained gas, and the pressure of gas objects. Furthermore there are sub material changes in the nature of the object that is the nature of the heated object in this case I used an example of

cooking / heating changing in solid matter to becomes soft. The changing in matter by burning, in this study done by burning the paper that turned into ashes, and the changing in state of matters in the open air, by leaving an apple out in the open air that will change the nature of green apple into shrunken and withered/apple. In this sub topics matter and its state the students will explain matter and its function from the objects that are made from glass, wood, plastic and paper.

2. The textbook of based-encyclopedia that has been developed graded good qualification, because it gets the results of the validation from the subject matter expert of science by 92% which means the book of natural science based-encyclopedia is valid and needs no revision, the validation from the experts in design media is 89% that stated in the qualification is valid / need revision. While the validation from the expert in the language resulted with 80% which chows a valid qualification. The validation from in the experts namely the teacher in the third grade received 92.7% and it means that is a good of the qualification, while the percentage from field trials conducted toward or third grade students is 90%, that also expressed a valid qualification. However the book will still need revision by the researcher, in order to be much better book.
3. Natural science textbook based-encyclopedia is proven as a significantly effective textbook to improve students' understanding on the concept of the learning material matter and its state for third grade students MI Khadijah

Malang. This is proven by the t test with significance calculation obtained 0,05 through calculation $t_{hitung}^2 \geq t^2_{tabel}$ is 5,65≥ 1,687 that means Ho is rejected and Ha is accepted. Furthermore, from a mean X_2 is more than X_1 (3344> 2911which also shows that the post-test better than the pre-test. In conclusion there are significant differences in learning achievement using the previous book Senang Belajar Ilmu Pengetahuan Alam with having used this book of science-based natural encyclopedia.

B. Suggestion

Suggestions put focused on the use of the product namely textbook Pseudo Encyclopedia as a teaching material focusing on matter and its state, the dissemination of products, and the purpose of further development. In detail, these suggestions can be explained as follows:

1. Suggestions for the use of the product

Natural science textbook-based encyclopedia of matter and its state for third grade student were developed for additional textbooks or supporting textbook in teaching and learning in class, as the cultivation of students' concept and to make them easy in students understanding when students conduct their own experiments in learning.

2. Suggestions For Product Dissemination

For the dissemination of the product on the broad objectives, it is recommended the following :

a. The textbook of based-encyclopedia focusing matter and its state for the third grade elementary school, the first textbook of natural science-based encyclopedia can be done individually, then as a whole.
b. The textbook based-encyclopedia focusing matter and its state for the third grade elementary school can be duplicated more widely if it turns out effective and efficient its use is

3. Suggestions for Further Development

For the purpose of further development it is suggested the following. Issue because the textbook based-encyclopedia focusing matter and its state for third grade students of Elementary School it still has some weakness as mentioned in the product development results. Therefore, it is suggested to interested development to overcome this weakness.

a. The development of natural science textbook based encyclopedia should, be given the time allocation to complete each activity to carry out activities experiments.
b. Product development should be developed further with other materials related to natural science and coupled with an consistent approach with the characteristics of the material.
c. It is Suggested for Elementary School teachers, especially science teacher to try to develop textbooks in accordance with the conditions of the existing school.