

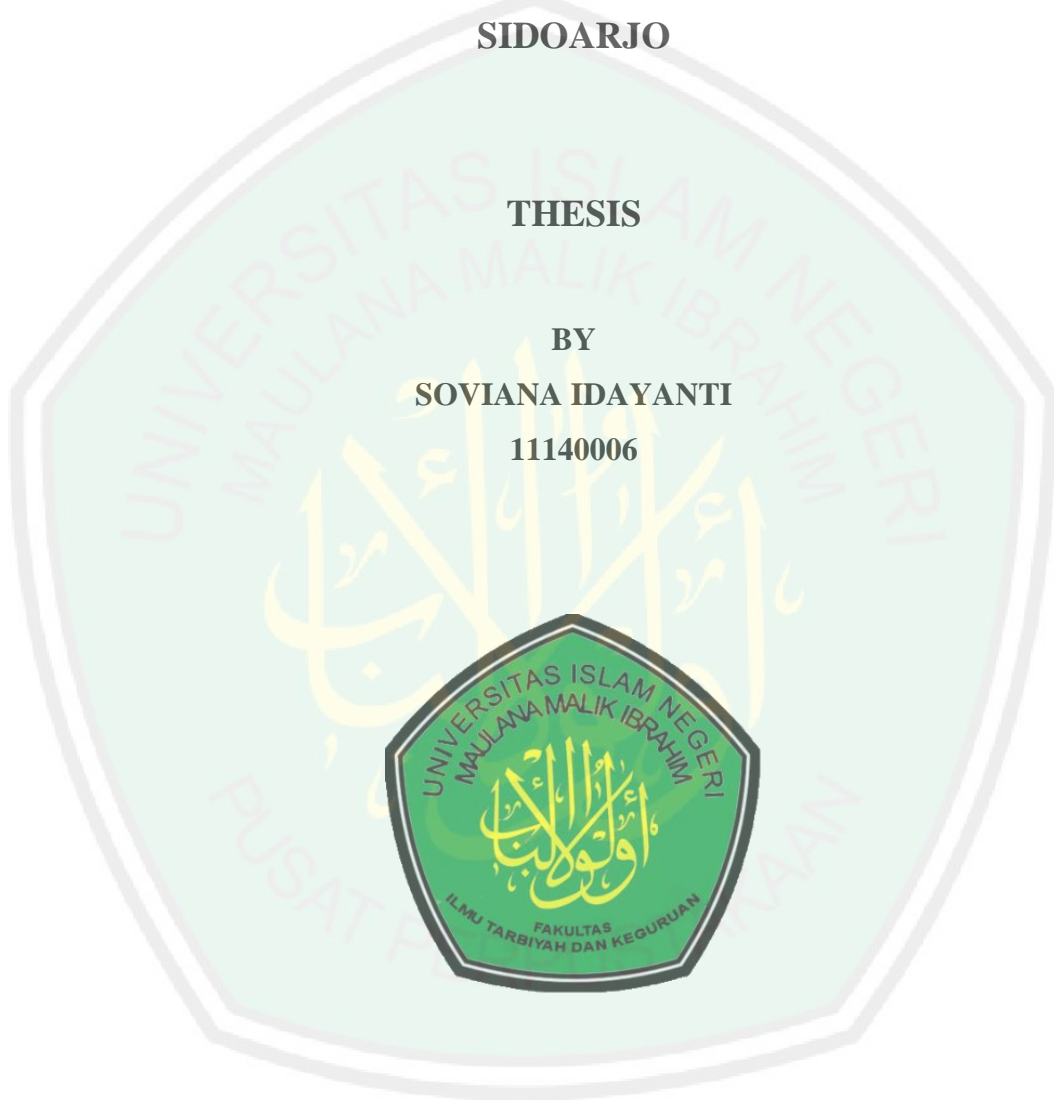
**DEVELOPING SCIENCE AND TECHNOLOGY IN SOCIETY
(SATIS) BASED- THEMATIC TEACHING MATERIAL
ON “*SELALU BERHEMAT ENERGI*” TO IMPROVE FOURTH
GRADE STUDENTS’ ACHIEVEMENT IN MIN BUDURAN
SIDOARJO**

THESIS

BY

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**DEPARTMENT OF ISLAMIC ELEMENTARY TEACHER EDUCATION
FACULTY OF TARBIYAH AND TEACHING TRAINING
MAULANA MALIK IBRAHIM STATE ISLAMIC UNIVERSITY OF
MALANG
JUNE, 2015**

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SIDOARJO**

*Presented to Faculty of Tarbiyah and Teaching Training
Maulana Malik Ibrahim State Islamic University of Malang
in partial fulfillment of the requirement
for the degree of Sarjana Pendidikan (S.Pd)*

**BY
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FACULTY OF TARBIYAH AND TEACHING TRAINING
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JUNE, 2015**

LEGITIMATION SHEET

APPROVAL SHEET





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STUDENTS’ ACHIEVEMENT IN MIN BUDURAN SIDOARJO

THESIS

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IN MIN BUDURAN SIDOARJO

THESIS

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11140006

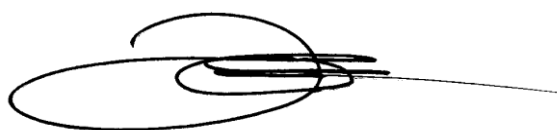
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DEDICATION

By reciting Bismillah and Alhamdulillah, I dedicate this my little work to:

Beloved father and mother who always gives me guidance, compassion, and motivation to keep going and never give up in living my days. As well as thank you for the prayers that have always devoted to me every day that I should be a good and dutiful son. Love you so much.

My younger brother and dear all my family that always delivers the most beautiful smile as my spirit through my days so that I could complete the thesis until finished.

Abah Kyai, all my teachers from kindegarten until senior high school and lecturers are always tirelessly devote their knowledge.

All my friends of PGMI especially my friends of ICP, friends of Islamic Boarding School Al Mubarak, and friends of Islamic boarding school of MSAA (Ummu Salamah's 5 and Khodijah Al Kubro's 41) who always gave me support so I can finish this thesis well. For people who are always in my heart, my life and my days, you are an important round colorful in my episode for reach a bachelor's degree, thanks. May our friendship awake until Yaumul qiyamah. Aamiin

MOTTO

وَالْعَصْرِ ۝١ إِنَّ الْإِنْسَانَ لَفِي خُسْرٍ ۝٢
 إِلَّا الَّذِينَ ءَامَنُوا وَعَمِلُوا الصَّالِحَاتِ وَتَوَاصَوْا بِالْحَقِّ وَتَوَاصَوْا
 بِالصَّبْرِ ۝٣

- (1) By time,
- (2) Indeed, mankind is in loss
- (3) Except for those who have believed and done righteous deeds and advised each other to truth and advised each other to patience.¹

(Q.S. Al Ashr 1-3)

¹ Ministry of Religious Affairs of the Republic of Indonesia, *The Qur'an and Its Translation*. (Bandung: Diponegoro, 2006), page. 250

Mokhammad Yahya, PhD
The Lecturer of Tarbiyah and Teaching Sciences Faculty
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Matter : Thesis of Soviana Idayanti Malang, June 15th, 2015
Appendixes : 4 (four) Exemplar

To,
The Dean of Faculty of Tarbiyah and Teaching Training
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At
Malang

Assalamualaikum, wr wb

Having read all the chapters carefully in terms of its contents, language and writing technique, I testify that this following thesis written by:

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NIM : 11140006
Program : Islamic Elementary Teacher Education

Title of Thesis: Developing Science and Technology in Society (SATIS) Based-
Thematic Teaching Material on “*Selalu Berhemat Energi*” to
Improve Fourth Grade Students’ Achievement in MIN Buduran
Sidoarjo

As her main supervisor, I considered that this thesis is qualified to be proposed in the examination.

Wassalamualaikum, wr wb

Supervisor,



H. Mokhammad Yahya, PhD
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CERTIFICATE OF THESIS AUTHORSHIP

I certify that the thesis I wrote to fulfill the requirement for Sarjana Pendidikan (S.Pd) entitled *Developing Science Technology Society (STS)- Based Thematic Teaching Material on “Selalu Berhemat Energi” for Improving Students’ Achievement on Fourth Grade of MIN Buduran Sidoarjo* is truly my original work. It does not incorporate any materials previously written or published by another person, except those indicated in quotations and bibliography. Due to the fact, I am the only person who responsible for the thesis if there is any objection or claim from others.

Malang, June, 2015

Soviana Idayanti

PREFACE

Alhamdulillah Praise to Allah SWT who has give mercy, taufiq and guidance, so that the writer can finish this thesis with the title *“Developing Science Technology Society (STS) Based- Thematic Teaching Material on “Selalu Berhemat Energi” to Improve Fourth Grade Students’ Achievement in MIN Buduran Sidoarjo”*.

Blessings and greetings always praised to the Prophet Muhammad, the family, friends and his followers who have brought the truth to whole human that al-Deen Islam that we expect his syafa’ah in the world and in the hereafter.

The writing and preparation of this thesis is intended to complement the overall activity of students that have been declared by the State Islamic University of Maulana Malik Ibrahim Malang as a form of accountability author became Students in Islamic University of Maulana Malik Ibrahim Malang and to meet one of the requirements to obtain a Bachelor Degree of Education of Islamic Elementary Teachers in UIN Maliki Malang.

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The writer are fully aware that the limited capacity and lack of experience, many obstacles and difficulties encountered in the preparation of this thesis. By finishing this thesis, the writer do not forget to say gratitude to all those who provide direction and guidance in the preparation of this scientific work, with all humility, the writer say thank you to:

1. Prof. Dr. H. Mudjia Rahardjo, M.Si as Rector of State Islamic University of Maulana Malik Ibrahim Malang.
2. Dr. H. Nur Ali, M.Ed, as Dean of Tarbiyah and Teaching Sciences Faculty.
3. Dr. Muhammad Walid, M.A, as Chairman of Islamic Elementary Teacher Program.
4. Mr. H. Mokhammad Yahya, PhD, as advisor who has provided direction and guidance until this thesis is completed.
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8. Mrs. Nur Cholilah, S.Pd, as a fourth grade thematic teacher at Islamic Elementary School of Buduran Sidoarjo, who assist writer in conducting the reseach from start to finish.
9. Students of grade IV of Islamic Elementary School of Buduran Sidoarjo year 2014/2015 which helped the course of this research.
10. Friends in ICP PGMI 2011 and friends in primary PGMI of 2011 who always cooperate, discuss and fight together in carrying out this study and always provide motivation and a lot of valuable experience.
11. All those who have helped in the completion of this thesis, which can not be mentioned one by one.

Hopefully all the help and motivation given to writer will be rewarded with an abundance of grace and goodness by Allah and serve of charity pious useful Fiddunnya Wal akhirot.

The writer hope what the writer report can provide benefits, especially for writers and generally for readers to improve the quality of learning. Aamiin.

Malang, June 2015

The writer

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 Religious Affairs and 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	ه	= 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

أُو = Aw

أَي = Ay

أُو = û

إِي = î

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ABSTRAK

Idayanti, Soviana. 2015. *Pengembangan Bahan Ajar Berbasis Science Technology Society (STS) untuk Meningkatkan Hasil Belajar Siswa Kelas IV A MIN Buduran Sidoarjo*. Skripsi. Jurusan Pendidikan Guru Madrasah Ibtidaiyah. Fakultas Ilmu Tarbiyah dan Keguruan. Universitas Islam Negeri Maulana Malik Ibrahim Malang. Pembimbing: Mokhammad Yahya, P.hD.

Pembelajaran tematik merupakan pembelajaran yang memadukan beberapa mata pelajaran menjadi satu kesatuan dalam bentuk tema. Adanya keterpaduan ini menjadikan kurang mendalamnya pemahaman terhadap mata pelajaran tertentu seperti sains. Di sisi lain, pembelajaran Sains juga diperlukan terkait dengan pemanfaatannya dalam masyarakat. Untuk mewujudkan pembelajaran tersebut maka dibutuhkan pengembangan bahan ajar tematik berupa bahan ajar tematik yang berbasis Sains Teknologi Masyarakat (STM) yang memberikan beberapa konsep Sains tentang energi sehingga mampu meningkatkan hasil belajar siswa khususnya pada tema Selalu Berhemat Energi.

Penelitian ini menggunakan jenis penelitian pengembangan Research and Development (R & D), dengan mengadaptasi model penelitian R&D Borg and Gall yang memiliki tujuh langkah dalam prosedur pengembangannya. Penelitian ini dilaksanakan di MIN Buduran Sidoarjo dengan mengambil kelas IV A yang berjumlah 38 siswa. Hasil telaah peneliti terhadap buku tematik kurikulum 2013, didapatkan banyak kekurangan, khususnya pada Tema Selalu Berhemat Energi. Diantaranya: 1) Terdapat kekurangan dalam hal pendalaman materi energi; 2) siswa kurang mempunyai wawasan luas mengenai energi; dan 3) materi tema 2 dirasa lebih sulit jika dibandingkan dengan tema yang telah dipelajari lainnya (tema 1, 3, dan 4).

Berdasarkan hasil penelitian didapatkan bahwa bahan ajar tematik berbasis STS mendapat penilaian kualifikasi yang baik, karena berdasarkan hasil validasi diperoleh nilai dari guru mata pelajaran sebesar 80% dan dari ahli isi mendapat nilai 82% yang berarti bahan ajar tematik berbasis STS dinilai valid dan tidak revisi. Dari uji coba lapangan diperoleh nilai 89% yang berarti mendapat kualifikasi sangat valid sedangkan dari ahli desain mendapat nilai 60% sehingga bahan ajar perlu dilakukan revisi sebagian. Setelah dilakukan revisi, bahan ajar mendapat nilai 98% dari ahli desain dan berarti bahan ajar berada pada kualifikasi sangat valid, sehingga bahan ajar tidak revisi. Dengan melihat rerata diketahui X_2 lebih dari X_1 ($81,31 > 69,86$) menunjukkan bahwa post tes lebih tinggi dari pada pre test serta dengan perhitungan menggunakan uji t dengan tingkat kemaknaan 0,05 diperoleh hasil $t^2_{hitung} \geq t^2_{tabel}$ yaitu $10,90 \geq 4,084$ artinya H_0 ditolak dan H_a diterima. Jadi, bahan ajar tematik berbasis STS terbukti secara signifikan dapat meningkatkan hasil belajar siswa kelas IV MIN Buduran Sidoarjo.

Kata Kunci : *Tematik, Bahan Ajar Tematik, Sains Teknologi Masyarakat (STM), Hasil Belajar Siswa.*

ABSTRACT

Idayanti, Soviana. 2015. *Developing Science Technology Society (STS) based-Thematic Teaching Material on “Selalu Berhemat Energi” for Improving Students’ Achievement on Fourth Grade of MIN Buduran Sidoarjo*. Thesis. Department of Islamic Elementary Teacher Education. Tarbiyah and Teaching Sciences Faculty. State Islamic University of Maulana Malik Ibrahim Malang. Advisor: Mokhammad Yahya, P.hD.

Thematic learning is learning that combines several subjects into a single entity in the form of theme. The integration is made less profound understanding of specific subjects such as science. Whereas learning science is also necessary related to its utilization in society. To achieve the learning required, need some development of thematic teaching material in the form of Science Technology Society (STS) based- thematic teaching materials which gives some science concepts of energy so as to improve students’ achievement, especially on the theme Selalu Berhemat Energi.

This research used Research and Development Research (R & D), by adapting the research model of Borg and Gall who has seven steps in the procedure development. This study was conducted in MIN Buduran Sidoarjo by taking a class IV A, amounting to 38 students. The results of the analysis of the thematic book, it was found some problems, especially on theme Selalu Berhemat Energi. Among them: 1) There are lack of the deepening energy materials; 2) students have less knowledgeable about energy; and 3) the material 2nd theme felt to be more difficult when compared to other themes that have been studied (theme 1, 3, and 4).

Based on the results of the research showed that the STS based- thematic teaching material got a valid qualification assessment, because based on the validation results obtained value of thematic teachers acquired 80% and acquired 82% from material expert which means that STS based- thematic teaching material assessed valid and not a revision. From field trials acquired 89% it shows highly valid qualification while from design experts received a score of 60% and it shows valid enough qualification and need to be some revised. After the revision, the STS based-thematic teaching materials acquired 98% of the design experts and means highly valid qualification, so that no revision of thematic teaching materials. By looking the average known $X_2 > X_1$ ($81.31 > 69.86$) it is showed that post-test is higher than the pre-test and by calculation using a t test with significance level of 0.05 was obtained results $t^2 \geq t^2_{table}$ ie $10.90 \geq 4.084$ means that H_0 is rejected and H_a accepted. Thus, STS-based thematic teaching materials shown to significantly improve the students’ achievement on fourth grade students of MIN Buduran Sidoarjo.

Keywords: Thematic, Thematic Teaching Materials, Science Technology Society (STS), Students’ Achievement.

مستخلص البحث

إديانتي، صافيانا. 2015. تنمية المواد التعليمية المتأسسة على علوم تكنولوجيا المجتمع لترقية نتيجة تعلم طلاب الصف الرابع "A" المدرسة الابتدائية الحكومية بودوران سيدوأرجو. البحث جامعي. قسم تعليم المدرسة الابتدائية، كلية التربية والتدريس. جامعة مولانا مالك إبراهيم مالانق. المشرف: محمد يحيى.

التعليم الموضوعي هو التعليم الذي يندمج بين عدة الدروس لتكون وحدة على الشكل الموضوعي. وهذا الاندماج تؤدي إلى ضحل الفهم على الدرس المعين مثل العلوم والتكنولوجيا. وفي ناحية أخرى، كان تعليم العلوم والتكنولوجيا مطلوب تذكيرا على استغلالها في المجتمع. ولتحقيق هذا التعليم تتطلب فيه تنمية المواد التعليمية الموضوعية أي المواد المتأسسة على علوم تكنولوجيا المجتمع التي تعطي مفاهيم اللوم عن الطاقة حتى ترقى نتيجة التعلم خاصة في موضوع الاقتصاد على الطاقة.

واستخدم هذا البحث نوع تنكية البحث والتطوير (R & D) باستخدام نظرية تطور بورغ كال (Borg & Gall) التي لها سبع خطوات في منهج تنميتها. وجرى هذا البحث في المدرسة الابتدائية الحكومية بودوران سيدوأرجو يعني من الصف الرابع "A" الذي يتكزن على 38 طالبا. ومن مطالعة الباحثة على الكتاب الموضوعي منهج 2013 وجد فيه بعض النقصان خاصة في موضوع الاقتصاد على الطاقة، منها: 1) النقصان في تعمق مادة الطاقة، 2) النقصان في وسعة المعرفة عن مادة الطاقة، 3) تعد مادة الموضوع الثاني أصعب من المواد المدروسة الأخرى (الموضوع الأول والثالث والرابع)

والنتيجة من هذا البحث تدل على المواد التعليمية الموضوعية المتأسسة على علوم تكنولوجيا المجتمع لها استحقاق جيد، ذلك لأن نتيجة التثبيت تحصل على قيمة من معلم الدرس 80% ومن متأهل المضمون 82%، وهذا تدل على المواد التعليمية الموضوعية المتأسسة على علوم تكنولوجيا المجتمع تعد صحيحة. ومن التجريب الميداني حصلت قيمة 89% التي تدل على أن له التحقيق الجيد ومن متأهل التخطيط حصلت قيمة 60% التي تدل على احتياج إلى إعادة النظر. وبعد إعادة النظر، كانت المواد التعليمية لها قيمة 98% من متأهل التخطيط وهذا يدل على أنها في تحقيق جيد جدا حتى لا تحتاج إلى إعادة النظر. وبالنظر إلى المعدل، عرف أن X_2 أكبر من X_1 (81,31 أكبر من 69,86) تدل على الاختبار البعدي أكبر من الاختبار البعدي بالحساب الذي يستخدم اختبار t بدرجة المنى 0,05 حصل على النتيجة: $(t_{hitung} \geq t_{tabel})$ وهي $10,90 \geq 4,084$. والمنى منه أن H_0 مردود وأن H_a مقبول. والخلاصة منها أن المواد التعليمية الموضوعية المتأسسة على علوم تكنولوجيا المجتمع مقررة في ترقية نتيجة تعلم طلاب الصف الرابع في المدرسة الابتدائية الحكومية بودوران سيدوأرجو.

الكلمات الأساسية: الموضوعي، المواد التعليمية الموضوعية، علوم تكنولوجيا المجتمع، نتيجة تعلم الطلاب.

CHAPTER I

INTRODUCTION

This chapter focuses on the background of this study, formulation of the problem, objectives of the study, and the significances of the study. As a research and development research this chapter also explain specifications of the product, limitations of the study and the definition of the terms.

A. Background

Teaching and learning is a process that will not be separated from our education scene. Because in fact, education is a process of change in the behavior and attitude of a person in order to develop a person's maturity through a process of training and teaching. Indonesian father of education, Ki Hajar Dewantara said that "the education is a need in children's life who intend to maximize their potentials and strength so that they are as human beings and members of the society are able to reach prosperity and happiness as high as possible".² Thus, teaching and learning is a core activity in education.

Muhammad Nuh said the educational process has two main features, namely *irreversible* and *anticipative*.³ Irreversible means that the educational process is a process that can not be repeated. That is, education is attached to the learners that primarily concerned with the character formation during the process of education. Thus, all forms of errors that occur in the educational process will continue

² Jay Liem, *Pengertian Pendidikan Menurut Para Pakar Pendidikan*, (<http://9wiki.net/pengertian-pendidikan/> accessed on Tuesday, March 25th 2015, at 1:43 pm)

³ Forum Mengunjaya VII, *Menyambut Kurikulum 2013*, (Jakarta: PT Kompas Media Nusantara). page xi.

inherently in a person until he becomes an adult, unless someone has awareness to embrace education again in order to correct errors that have been attached. While the second characteristic is anticipative, ie characteristic of education which the education is held in order to develop the potential of students and directing their potential so that students are able to answer the problems of the future.

This two characteristics of education are necessary to be considered in the elementary education level where the elementary level of education plays an important role in the development of potential and character of students. Therefore, at this time the Government have to seek the best education for the Indonesian through curriculum changes. According to Trianto, understanding the curriculum can be divided into old and new perspectives⁴ The old perspective deals with the number of subjects that the students must take to earn a diploma while the new perspective is explained by Romine as the following:

*“Curriculum is interpreted to mean all of the organized courses, activities, and experiences which pupils have under the direction of the school, whether in the classroom or not.”*⁵

From the understanding expressed by Romine, we can conclude that the educational curriculum is not just a number of lessons but also it includes a number of lessons, activities, systems, and technologies in learning. So in this case, the curriculum 2013 as the curriculum improvement in which the curriculum is

⁴ Oemar Hamalik, *Dasar-dasar Pengembangan Kurikulum*, (Bandung: Remaja Rosdakarya, 2007), page 3.

⁵ *Ibid.*, page 4.

designed to improve education especially in terms of activities and learning technologies.

The most fundamental characteristics of Curriculum 2013 lies in its emphasis on aspects of attitudes, skills, and knowledge that are simultaneously integrated. Curriculum change is therefore expected to produce productive, creative, innovative Indonesians.

“In accordance with the statement of the Minister of Education and Culture, through the Curriculum 2013 is expected to produce productive, creative, innovative, affective Indonesians through the strengthening of attitudes, skills, and knowledge are integrated. Curriculum 2013 development is expected to serve to strengthen the previous curriculum.”⁶

Integrating the value of attitudes, skills, and knowledge will be very difference with the previous curriculum in the elementary school level where learning system using thematic learning system. Thematic learning is learning that integrates a variety of subjects into one theme. with the previous curriculum in the elementary school level where learning system using thematic learning system. Thematic learning is learning that integrates a variety of subjects into one theme. In this case, seven subjects were integrated namely science, social studies, Indonesian, Mathematics, Civic Education, Arts and crafts, and PJOK (Physical Education, Sports, and Health).

Various subjects that are integrated in thematic learning system is intended for the development of potential and character of each learner. Similarly, because learning is a result of the synergy between education which is taken place in schools,

⁶ Permendikbud, *Lampiran-permendikbud-no-105-tahun-2014*, page 2.

families and communities. The process provides an opportunity for learners to develop their potential into skills that is needed for their lives and will contribute to the welfare of mankind.⁷ In its development, Curriculum 2013 has developed instructional handbook for students and teachers. The instructional student handbook contains a range of competencies expected for elementary school graduate to have the ability to think and become productive and creative students.

The ability to be clarified in the core competencies that one of them is present knowledge in clear language, logical and systematic, the aesthetic work, or in actions that reflect the behavior of the child is healthy, faithful, and noble. Competence is designed to be achieved through a process of discovery-based learning through activities in the form of task (project-based learning) which includes the processes observed, ask, try, reason, and communicate.⁸ The instructional student handbook contains thematic learning which became a students' guiding book to study independently. One academic year is allocated to 8-9 theme, with a range of 4-5 per semester theme. Each theme consists of three sub-themes which one sub-theme are broken down into 6 learning. One lesson is allocated to 1 day. While instructional teacher handbook contains a guide for teachers in teaching including learning steps that are adjusted to the student book.

As far as the eye could see, the students teaching material is very attractive in terms of design that allows students delighted in learning. However, in terms of material, material integrated is very simple. Therefore, teachers are required to be

⁷ Permendikbud, *Lampiran-permendikbud-no-103-tahun-2014*, page 2.

⁸ Preface of Minister of Education and Culture, Mohammad Nuh in Thematic Series Books 4th grade, page. preface.

more professional in teaching by developing materials that exist in the student handbook. Before teaching, teachers should learn the material that will be taught as well as the search for deepening the material. It is also anticipated if there is a question of the students who were critical of the material.

Furthermore, a review of research in Islamic Public Primary School (MIN) Buduran Sidoarjo associated with thematic books of curriculum 2013, researchers conducted interviews to the Principal of MIN Buduran. He said that curriculum 2013 is an excellent and complex curriculum. About the book, he said that the design of the book is very interesting, but the substance of the material in the book is very simple. In this case, the school also helps give the book the expansion of the material in the form of worksheet. However, the material in the worksheet was also not extensive, but more broadly to the evaluations. Then indeed there should be additional books or book with material developing per theme.⁹

In thematic teaching material 2nd theme *Selalu Berhemat Energi*, material characteristics are more inclined to science materials. Characteristics of science subjects related to the finding out about natural way systematically, can be a vehicle for students to learn about themselves and the environment, as well as prospects for further development in applying it in everyday life. The learning process emphasizes providing direct experience to develop competencies in order to explore and understand the universe around scientifically.¹⁰ Thus, the thematic teaching

⁹ Interviews with Abdul Muis, M.Pd, the Principal of MIN Buduran Sidoarjo, on November 8th, 2014.

¹⁰ Depdiknas, *Peraturan Menteri Pendidikan Nasional*, (Jakarta: Depdiknas Dirjen Manajemen Pendidikan Dasar dan Menengah, 2006), page. 484.

material 2nd theme it should existing of a broad knowledge of the natural sciences around the students.

Learning science is indispensable in daily life to meet human needs through solving problems that can be identified. The application of science needs to be done wisely so as not to adversely affect the environment. The application of science needs to be done wisely so as not to adversely affect the environment. In the primary school expected to emphasis learning in Salingtemas (Science, environment, technology, and society) are directed at learning experience to design and create a work through the application of science concepts and competencies scientific work wisely.¹¹

Overview researchers to thematic teaching material 2nd theme Selalu Berhemat Energi, students are invited to explore about energy. The material energy is abstract and complex matter that requires a deep understanding. The problem that occurs is as disclosed in the initial discussion that the lack of depth materials on energy, such as (1) does not mention understanding the energy complexly, (2) do not understand the students the sense of energy sources, (3) lack of expansion depth materials on energy relations with surrounding environment. To that, in accordance what is expressed by Permendiknas that learning science should emphasis in learning by salingtemas (science, environment, technology, and society), the researchers sense the need for the developing of thematic curriculum 2013 book on the theme 2 Selalu Berhemat Energi based Science and Technology in Society

¹¹ *Ibid.*

(SATIS) so that students more easily understand the material taught in because the material that will be developed titled on the application of energy in environment around students.

Based on the background exposure above, researchers interested in conducting research and development of teaching materials entitled **“Developing Science and Technology in Society (SATIS) based- Thematic Teaching Material on “Selalu Berhemat Energi” to Improve Fourth Grade Students’ Achievement in MIN Buduran Sidoarjo”**.

B. Formulation of the Problem

Based on the background of the study that have been described above, the problems of the study is formulated as follows:

1. How is the form of SATIS based- thematic teaching material on “*Selalu Berhemat Energi*” which is going to be developed?
2. How is the effectiveness and attractiveness of SATIS based- thematic teaching material on “*Selalu Berhemat Energi*”?
3. What is the students’ achievement after using SATIS based- thematic teaching material on “*Selalu Berhemat Energi*”?

C. Objectives of the Research

Based on the problem formulation, the objectives of this research are:

1. To describe the design of SATIS based- thematic teaching material on “*Selalu Berhemat Energi*” which is going to be developed.

2. To explain the effectiveness and attractiveness of SATIS based- thematic teaching material on “*Selalu Berhemat Energi*” for fourth grade elementary students.
3. To know the students’ achievement after using SATIS based- thematic teaching material on “*Selalu Berhemat Energi*” for fourth grade elementary students.

D. Significances of the Study

The significances derived from the development of this research include:

1. For Researchers/ Teachers

The benefits of this developing for researchers and teachers as a means to determine the barriers and weaknesses of learning. Therefore, this developing can be used in an attempt to improve the books and teaching materials to fix the problem in learning to improve student achievement.

2. For Students

This book can foster student’s interest and enthusiasm for learning in thematic lessons, especially on theme “*Selalu Berhemat Energi*”. This book may be a supporting book of students books in curriculum 2013. So, students gain an understanding optimally so as to improve their achievement in Thematic learning. The other benefit, students can train theirselves to get used to being concerned about the environment that has to do with the science and technology in society.

3. For school organizations studied;

The presence of SATIS based- thematic teaching material on *Selalu Berhemat Energi* can provide benefits and make the basic foundation for the institution or school in developing teaching materials in Thematic learning better for the future.

4. For other researchers, this study can be used as enhancer and insight consideration, as well as a reference for the development of science education and university.

E. Form of the Product

Product development that produced is a thematic teaching material, with the following specifications:

1. Instructional materials produced is a SATIS based- thematic print media textbook
2. The SATIS based- thematic teaching material is compiled using Indonesian
3. The material presented is a matter of curriculum 2013 of fourt class on 2nd theme "*Selalu Berhemat Energi*".
4. The SATIS based- thematic teaching material emphasis on the linkages materials to a simple technology and its application in everyday society.
5. Products consist of one sub-theme namely Sub Themes "*Sumber-sumber Energi*". The Sub Themes consist of 1st, 2nd, and 3rd lessons.

6. Design of teaching materials include 4 parts:
 - a. Pre-introductory section, consisting of the home page (cover), the word introduction, instructions for use of teaching materials, and table of contents.
 - b. The introduction, consisting of the title material, core competencies, basic competencies and indicators of students' achievement.
 - c. Content section, contains thematic material associated with the technology applied of science in society.
 - d. Supplement section, contains supporting parts contained in teaching materials and bibliography.

F. Limitations of the Study

1. Developing of SATIS based- thematic teaching material which developed is only limited to thematic learning on 2nd theme "*Selalu Berhemat Energi*" on 1st, 2nd, and 3rd lessons.
2. Object development is limited to users of teaching materials in the fourth grade of MIN Buduran Sidoarjo.
3. Validity assessment on the SATIS based- thematic teaching material on 2nd theme "*Selalu Berhemat Energi*" is carried out by three expert validator, two professors of physics as a matter experts and design experts, and a thematic teacher in MIN Buduran Sidoarjo as a thematic learning expert.
4. Validity assessment on SATIS based- thematic teaching material on 2nd theme "*Selalu Berhemat Energi*" is also carried out on the fourth grade of MIN Buduran Sidoarjo specially in 4A class.

5. Validity test, practicality and effectiveness conducted is in good faith and without artificial.

G. Definition of the Terms

To avoid errors in understanding or interpreting the terms in the title, there is an emphasis and discussion of terms related to the title of the research include:

1. Development

Development has meaning treatment phrases and motifs with detail on the themes or submitted previously.¹² This study focused on the development of SATIS based- thematic teaching material on 2nd theme “*Selalu Berhemat Energi*” in fourth grade of Elementary School.

2. Science and Technology in Society (SATIS)

SATIS is one approach of contextual learning approach that can help students to make learning becomes more meaningful. This is because learning process is use connectivity between concepts learned with the benefit aspects of the concept of community.

3. Thematic Teaching Materials

Thematic teaching materials is an integrated learning involving some lessons (even across subject cluster) are tied in certain themes. This learning involves some basic competencies, learning outcomes, and indicators of a subject, or even several subjects.¹³ The thematic teaching materials developed

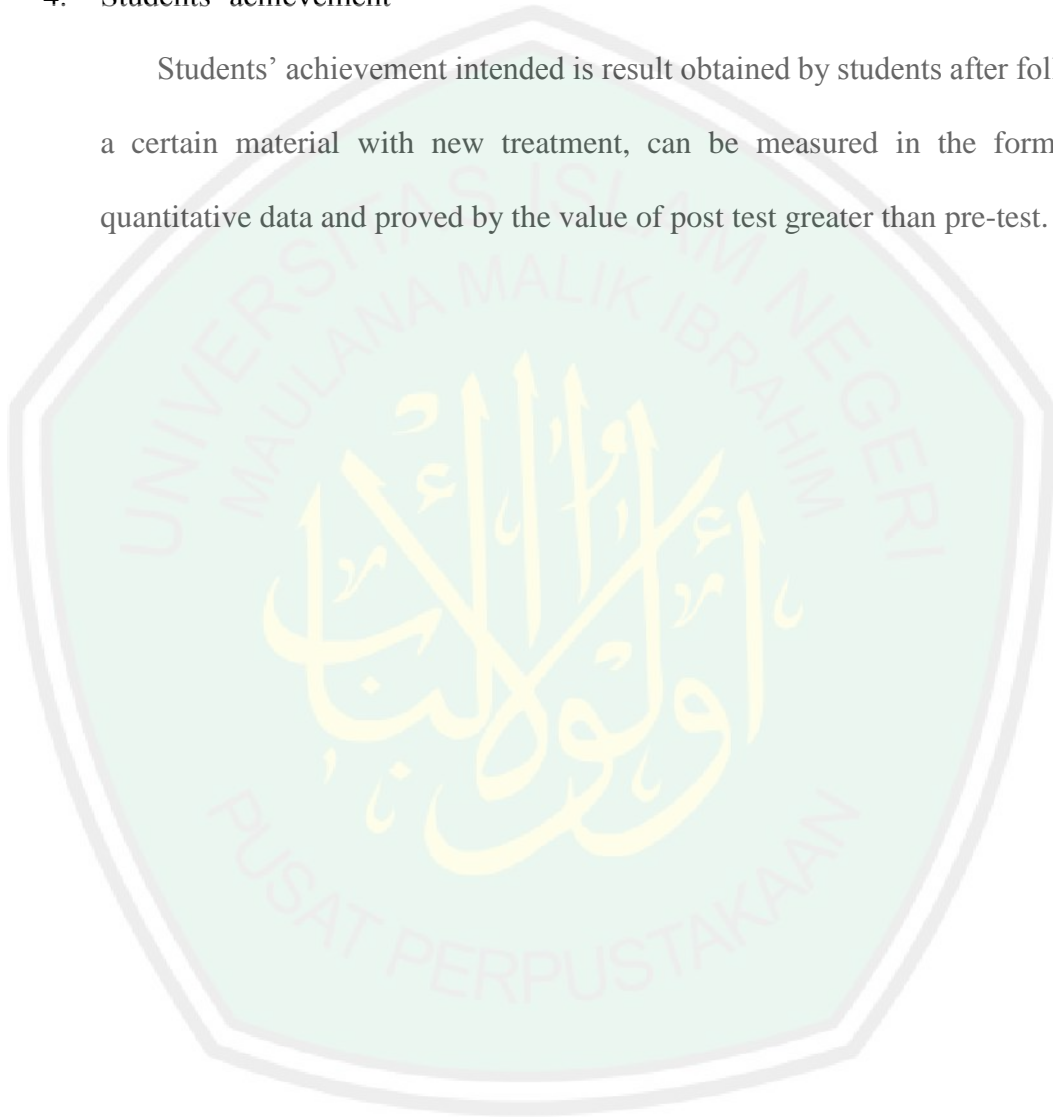
¹² Komaruddin dan Yooke Tjuparmah, *Kamus Istilah Karya Tulis Ilmiah*. (Jakarta: PT Bumi Aksara, 2000), page. 186.

¹³ Andi Prastowo, *Pengembangan Bahan Ajar Tematik*. (Jogjakarta: DIVA Press, 2013), page. 126.

is the print thematic teaching materials that can be used by students in Elementary School to learn independently.

4. Students' achievement

Students' achievement intended is result obtained by students after follow a certain material with new treatment, can be measured in the form of quantitative data and proved by the value of post test greater than pre-test.



CHAPTER II

LITERATURE REVIEW

In this chapter will be describe the literature review about: 1) Previous Studies and 2) Foundation of Analysis. The foundation of analysis include: 1) Science and Technology in Society (SATIS); 2) Thematic Teaching Material; 3) Students' Achievement.

A. Previous Studies

Related to this study, researchers conducted a study on some of the earlier paper from various sources, including the thesis written by Neny Qurrota A'yun, State Islamic University student of Maulana Malik Ibrahim Malang in 2014, entitled "*Pengembangan Bahan Ajar IPS Berbasis SAINS Teknologi Masyarakat (STM) pada Kompetensi Dasar Memelihara Lingkungan Alam dan Buatan di Sekitar Rumah untuk Meningkatkan Hasil Belajar Siswa Kelas III-A SDN Dadaprejo 1 Batu*" which reveals that the teaching materials developed very well qualified.¹⁴

¹⁴ Neny Qurrota A'yun, "Pengembangan Bahan Ajar IPS Berbasis SAINS Teknologi Masyarakat (STM) pada Kompetensi Dasar Memelihara Lingkungan Alam dan Buatan di Sekitar Rumah untuk Meningkatkan Hasil Belajar Siswa Kelas III-A SDN Dadaprejo 1 Batu", *Thesis*, Tarbiyah Faculty of UIN Malang, 2014, page. abstract.

Thesis written by Anjar Putro Utomo, Jember University students in January 2014 entitled “*Pengembangan Bahan Ajar Ipa Berbasis Pendekatan Sains Teknologi Masyarakat (STM) Pada Pokok Bahasan Limbah Dan Penanganannya Kelas XI Sekolah Menengah Kejuruan (SMK)*” which states that textbooks are have developed a very good qualification of expert validation.¹⁵

Journal written by Uswatun Hasanah, Novi Ratna Dewi, and Parmin in 2013, entitled “*Pengembangan Bahan Ajar Ipa Terpadu Berbasis Salingtemas Pada Tema Energi*”. In the journal mentioned the study of students obtained grade level classical completeness of 100%.¹⁶

Table 2.1 Research related previous study of product development

Title	Similarity	Differentiation	Originality of research
<i>Pengembangan Bahan Ajar IPS Berbasis SAINS Teknologi Masyarakat (STM) pada Kompetensi Dasar Memelihara Lingkungan Alam dan Buatan di Sekitar Rumah untuk Meningkatkan Hasil Belajar Siswa Kelas III-A SDN Dadaprejo 1 Batu</i>	<ul style="list-style-type: none"> •The textbook developed is STM based 	<ul style="list-style-type: none"> • Teaching materials developed is Social Sciences • Object studied: State Elementary School Dadaprejo 1 Batu 	<ul style="list-style-type: none"> •Teaching materials developed is Thematic •The textbook developed is SATIS based •Object studied: Fourth Grade, MIN Buduran Sidoarjo

¹⁵ Anjar Putro Utomo, “*Pengembangan Bahan Ajar Ipa Berbasis Pendekatan Sains Teknologi Masyarakat (STM) Pada Pokok Bahasan Limbah Dan Penanganannya Kelas XI Sekolah Menengah Kejuruan (SMK)*”, thesis, Biology Courses, Faculty of Science Education Teaching and Education, University of Jember, 2014, page. abstract.

¹⁶ Uswatun Hasanah, Novi Ratna Dewi, dan Parmin, *Pengembangan Bahan Ajar Ipa Terpadu Berbasis Salingtemas Pada Tema Energi*. Unnes Science Education Journal, State University of Semarang. USEJ 2 (2) November 2013.

<p><i>Pengembangan Bahan Ajar Ipa Berbasis Pendekatan Sains Teknologi Masyarakat (STM) Pada Pokok Bahasan Limbah Dan Penanganannya Kelas XI Sekolah Menengah Kejuruan (SMK)</i></p>	<ul style="list-style-type: none"> • The textbook developed is STM based 	<ul style="list-style-type: none"> • Teaching materials developed is Natural Sciences • Object studied: Second Grade of Vocational School 	
<p><i>Pengembangan Bahan Ajar Ipa Terpadu Berbasis Salingtemas Pada Tema Energi</i></p>	<ul style="list-style-type: none"> • The material were developing is on Topic Energy • The textbook developed is Science Technology Society Environment (STSE) based (another term of SATIS) 	<ul style="list-style-type: none"> • Subjects were developed is Integrated Science • Object studied: Second Class of State Islamic Junior High School of Manba'ul Ilmin Nafi' 	

Based on previous studies that have been tracked by researchers, it can be concluded that the studies were written by three researchers alike over the portion to the developing SATIS based- thematic teaching material were examined at each study site researcher.

In addition to having the equation, the above three studies that have been tracked by researcher also have differences with the research to be conducted. The difference of the three studies lies in the teaching materials and the basis of the developing of teaching materials, and the object of research. Particularly in the

physical form is the most visible form is researchers developing SATIS based-thematic teaching materials in order to improve students' achievement.

B. Foundation of Analysis

1. Science and Technology in Society (SATIS)

a. Understanding Science and Technology in Society (SATIS) Approach

SATIS approach initially is one approach that is aimed at the education of natural sciences (*natural science education*). Was first developed in United States, then in the UK with the name SATIS (*Science and Technology in Society*), in Europe developed EU-SATIS. While in Israel with the term (*Science Technology Environment Society*) and in African with the name of Science Policy. While the term Science - technology - society (STS) was first proposed by John Ziman in his book *Teaching and Learning About Science and Society*. While in Indonesia, STS approach was introduced in the 1990s.

SATIS is an attempt to present science through the use of problem in daily life. SATIS approach involving students in determining learning objectives, procedures for implementing learning, information learning materials retrieval and even in the evaluation of learning. The main objective of SATIS approach to produce students who have the provision of science and knowledge that will be able to take decisions related to problems in the community. This approach is based on three things: (1) The close relationship between science, technology and society; (2) Teaching-learning process based on the theory of constructivism, where students construct their own knowledge while interacting with the environment; and (3) There are 5 domains of learning,

namely: realm of cognitive, realm of affective, realm of science process, realm of creativity, and realm of relationships and applications.¹⁷

Philosophical foundation in SATIS learning is constructivism and pragmatism. Constructivism is a philosophy that emphasizes that our knowledge are construction (formation) of our self through the structure of conception when interacting with the environment. In addition to constructivism, SATIS is also based on the philosophy of pragmatism which pioneered by Peirce, James and Dewey. They agreed that the mind should be directed to work, instead of just analyzing. Knowledge as a tool to do something productive and more geared to the results and goal oriented.

The National Science Teachers Association (NSTA) in USA looked SATIS as “the teaching and learning of science in the context of human experience”. Basically, SATIS approach is implemented by the teacher through the topics covered by the connecting road between the science and technology associated with its use in the community.

SATIS learning at the basic level according Weisenmayer and Rubba aims to equip students with sufficient background knowledge, namely: “the concept of science and social studies, as well as on the nature of science, technology

¹⁷ Muhammad Faiq, *Penerapan Pendekatan STM – Sains Teknologi Masyarakat dalam Pembelajaran* (<http://penelitianindakankelas.blogspot.com/2013/03/pendekatan-STM-sains-teknologi-masyarakat.html>), accessed on November, 4th 2014 at 09.00 am.

and society to enable them to make decisions on issues of science technological society”¹⁸.

b. Learning Objectives through SATIS Approach

The purpose of the SATIS approach in order to produce students who mastered the science and technology as well as understand the relation with the public interest.¹⁹ Another object of the SATIS approach according to Yager are as follows:²⁰

- 1) provide opportunities for students to compare and contrast science and technology and appreciate how science and technology contribute to the knowledge and new influences
- 2) giving examples from the past and present of the changes that are very large in the field of science and technology that brought the community, increase economic, and political processes
- 3) make students capable of social reality to the topic of learning in the classroom
- 4) learners are able to use various roads or view to addressing various issues and situation in the community based on the scientific view
- 5) make students able to make himself as citizens who have a social responsibility.

¹⁸ Hipkin, *Pengembangan Model Pembelajaran Sains Teknologi Masyarakat dalam Pembelajaran Kimia* (<http://hipkin.or.id/pengembangan-model-pembelajaran-sains-teknologi-masyarakat-dalam-pembelajaran-kimia/>), accessed on November, 4th 2014 at 10.00 am.

¹⁹ Anna poejiadi. *Sains Teknologi Masyarakat: Model Pembelajaran Kontekstual Bermuatan Nilai* (Bandung: Remaja Rosda Karya, 2005), page 100.

²⁰ Bunga Nilam, *Pendekatan STM*, (<http://nilamazzahra.blogspot.com/2013/03/makalah-pendekatan-stm-sains-teknologi.html>), accessed on November, 4th 2014 at 10.30 am.

c. Characteristics of SATIS Approach

SATIS approach has 11 characters, namely:²¹ (1) identify the issues that going on the society which have an interest and impact; (2) the use of resources in society around students (include people and objects) to seek information that can be used in solving the problem; (3) active participation of students in finding information that can be applied to solve problems in everyday life; (4) addition/ extension of learning beyond the classroom and school; (5) focus on the impact of science and technology to students; (6) a view that the content of science is not only the concepts that must be mastered students in the test; (7) emphasis on process skill which students can use in solving problems; (8) emphasis on career awareness related to science and technology; (9) opportunities for students to act as citizens or members of the community in which he tries to solve the issues that have been identified; (10) identify the impact of science and technology in the future; (11) freedom or autonomy in the learning process.

d. Stages of Learning with SATIS Approach

SATIS learning approach consist of five steps, namely:

- 1) Preliminary stages (initiation, invitational, apperception, and exploration)

At this stage, put forward issues or actual problems that exist in the community and can be observed by the learners.

²¹ Gita Nurul Puspita. *Pendekatan Sains Teknologi Masyarakat (Makalah)*. (<http://gitabiology.blogspot.com/2010/12/pendekatan-sains-teknologi-masyarakat-s.html>), accessed on November, 5th 2014 at 09.00 am.

2) Phase formation and development of the concept

That stage learners build or construct their own knowledge through observation, experimentation, and others.

3) Stage application of concepts in life

Is to analyze the issues or problems that have been raised in the early learning based on the concept that has been previously understood.

4) Stage stabilization concept

That teacher gives stabilization concept in order to avoid any misunderstanding on the concept of self-learners.

5) Evaluation stage

At this stage, the teacher gives the task and assessment of students' achievement. The use of portfolio or other variations of evaluation model is strongly recommended.

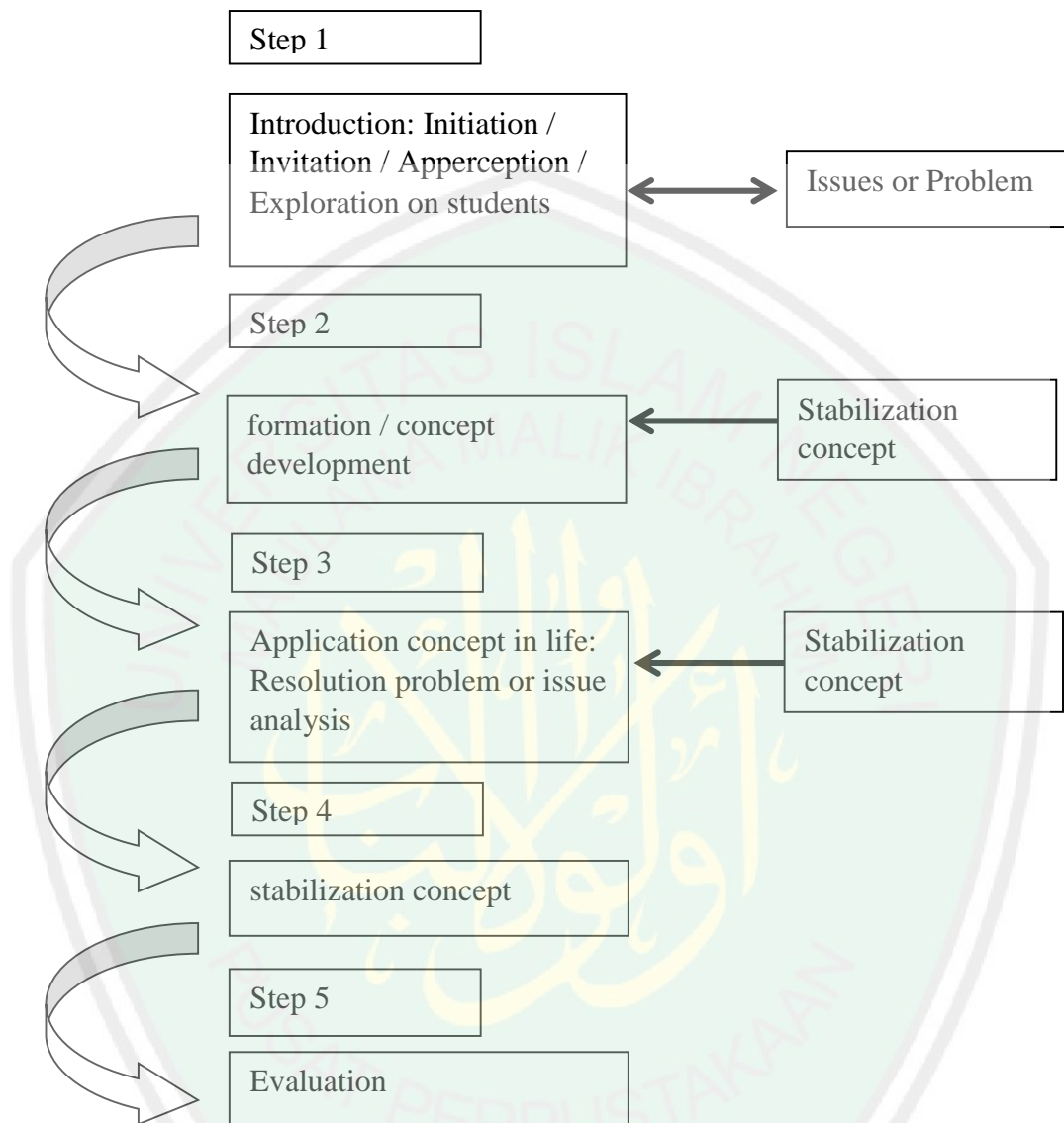


Figure 2.1. Model of the SATIS based on Yager.²²

Thus, SATIS learning can be implied into 4 stages of learning, namely:

- 1) Invitation, including observation of the interesting things in the environment

²² Anna Poedjiadi, *op.cit.*, page 126.

- 2) Exploration, including brainstorming alternatives suitable of information to be searched, a special phenomenon observations, collect data, solve problems, and data analysis.
- 3) Explanations and solutions, including the submission of ideas, create new explanations, making conclusions and solutions, combining all three aspects of the solution, theory, and experience.
- 4) Evaluation and feedback, includes giving problems or further questions regarding the material, as well as feedback packaged in making suggestions of positive activities for individual learners and society.

e. Characteristics of SATIS Approach Viewable in Learning

The characteristics of science technology and society approach when applied into a lesson, then we will be able to see the following:²³

- 1) Issues raised as a learning material is local, real life situation, important (significant) and the impact on student
- 2) Learning activities used local resources (can be a resource (people), objects, physical environment (biotic and abiotic) or the social environment (community/ society) in an attempt to obtain information that can be used to solve problems that have been raised as learning materials

²³ Muhammad Faiq, *op.cit.*,

- 3) SATIS approach requires all students to participate actively involved to obtain information to solve the issues raised in the learning activities are derived from real situations in everyday life.
- 4) In general, the application of SATIS approach requires the allocation of more than traditional approaches. For it often takes extra time student learning at school and outside of school (at home)
- 5) In order the issues raised in the study has a deep meaning for the students, the problem is focused on the impacts of science and technology for the students themselves
- 6) Learning materials that learned to students when implementing the SATIS approach (science technology and society) includes products (natural phenomena, concepts, principles, facts, theories and laws in science) and processes of science (scientific method to solving problem)
- 7) Learning which also emphasizes learning material in the form of the process of science (not just products) will eventually give students a solid science skills that they can later use to solve problems in everyday life related to science and technology in conjunction with the community
- 8) The application of the SATIS approach provides the opportunity for students to begin to have the self-awareness of the possibility of a career that they will have in the future are of course related to science, technology and society

- 9) When teachers use the application of SATIS in a learning and raise issues or problems in their real everyday life, the students get an opportunity to play as a citizen where they will learn to solve an issue-problem mentioned
- 10) In a study with the application of SATIS, currently studying teaching and learning activities take place, students close attention to what and how the impact of science and technology in the future.
- 11) Is another hallmark of SATIS, namely the freedom or autonomy in the learning process, so that they actually build their own knowledge and understanding of science, technology, and society.

f. Excess of SATIS Approach

Some of the advantages of the SATIS approach, among others:²⁴ (1) students can see the relationship (values) about anything they learn in school to real everyday life (*real life situation*); (2) students can see the relevance of the technology used today by the concepts and principles of science they are studying; (3) students become more creative, it will be seen from the number of questions they ask for the amount of their curiosity. They also become more easily and skillfully identify the cause or result of the use of a technology; (4) students can see that science is a tool that can be used/ were able to solving a problem; (5) students will realize that the processes of science is important to study because they are a very important skill to master the destination of

²⁴ *Ibid.*,

solving a problem; (6) students will have a strong retention of the learning that took place as shall be based on constructivism learning and contextual.

2. Thematic Teaching Materials

a. Understanding Thematic Learning

According to Indonesian dictionary latest edition,²⁵ “thematic defined as “relating to the theme”; dan “theme” itself means “main idea; basic story (which be spoken, is used as a basis for making up, change the rhyme, and so on”. Based on the dictionary, it can be a simple understanding of thematic that a plot or story or group of activities related to the theme.

According Muryati et al, Thematic Curriculum can be interpreted as a curriculum that includes an integrated learning concept that uses a theme to tie some subjects that can provide meaningful experiences to the students.²⁶ The concept of thematic curriculum means using thematic learning as a special feature in the thematic curriculum. Andi Prastowo revealed that in the context of the implementation of the curriculum, it is understood that thematic is one of the integrated learning model (*integrated learning*) at the level of kindergarten or elementary schools for the initial class (1st, 2nd, and 3rd grade) which are based on certain themes are contextual to the world of children.²⁷

Meanwhile, according to the Ministry of Education and Culture in 2013, the

²⁵ Tim Penyusun Pusat Bahasa Depdiknas, *Kamus Besar Bahasa Indonesia*, (Jakarta: Gramedia Pustaka Utama, 2008). page.1.429.

²⁶ Muryati et al. *Buku Tematik; Kebersihan dan Kesehatan untuk SD/MI Kelas I Semester I*. (Jakarta: Grasindo, 2010). page vi.

²⁷ Andi Prastowo, *Pengembangan Bahan Ajar Tematik*, (Jogjakarta: DIVA Press, 2013), page 122.

notion of thematic itself is a learning approach that integrates the various competencies of various subjects into various themes.²⁸ Then base on this sense, the Ministry of Education and Culture commonly call this learning with thematic integrative learning where learning is used in this curriculum is a themed learning that collect or gather various competencies of the various subjects in the theme and the theme used is the actual theme or near with the world of children.

b. Thematic Teaching Material

Teaching materials have a fundamental role in learning, including in thematic learning. Because thematic learning is basically a blend of various types of knowledge, then this learning requires teaching material that more complete and comprehensive as well as compared to monolithic learning. In one lesson topic, it takes a number of learning resources in accordance with the amount of standard competences (or in Curriculum 2013 called core competencies) which is the number of fields of study are included.²⁹

Specifically, the definition of thematic teaching materials need to be extracted essentially understanding. The concept of “teaching materials” in scientific studies have a lot of sense. For example, according to the National Centre for Vocational Education Research Ltd., teaching materials are all kinds of materials that are used to help teachers or instructors in implementing the

²⁸ Kemendikbud, *Kompetensi Dasar SD/MI*. (Jakarta, 2013), page 9.

²⁹ Trianto, *Desain Pengembangan Pembelajaran Tematik bagi Anak Usia Dini TK/RA dan Anak Usia Awal SD/MI*, (Jakarta: Kencana Prenada Media Group, 2013), page 179.

learning process in the classroom. The material what is meant can be either written or not.³⁰ Teaching materials is a set of material arranged in a systematically, whether written or not, so as to create the environment or atmosphere that allows students to learn. Some of the opinion said that the teaching material are information, tools, and text needed by teachers for planning and review of implementation of learning. This view is complemented by Pannen that teaching materials are substances or materials arranged systematically, which is used by teachers and students in the learning process.³¹

In Secondary Vocational Education Ministers' (ind: Dikmenjur) website stated that the teaching material is a set of material or substances of learning that systematically arranged and showing the whole figure of competencies which students will learn in learning activities. By teaching materials students enable to learn competencies in a coherent and systematic, so that cumulatively able to master all of competency as a whole and integrated.³²

From the description, it can be concluded that the teaching material basically understanding as any material (whether information, tools and texts) are arranged systematically, which displays the whole figure of competencies which students will learn and use in the learning process with the purpose of planning and review of learning implementation. For example, textbooks,

³⁰ Tim Penyusun Direktorat Pembinaan Sekolah Menengah Atas Dirjen Manajemen Pendidikan Dasar dan Menengah Depdiknas, *Panduan Pengembangan Bahan Ajar*. (Jakarta: Depdiknas, 2008), page 6.

³¹ Tian Belawati dkk, *Pengembangan Bahan Ajar*, (Jakarta: Universitas Terbuka, 2003), page 11.

³² *Opcit*,.

modules, handouts, worksheets, models or mockups, audio teaching materials, interactive teaching materials, and so on.

Of the understanding above and intent of thematic learning itself, then we can pull a sense that thematic teaching material is any material (whether information, tools and texts) are arranged systematically, which displays whole figure of competencies which students will learn through a learning process that encourages student involvement actively and fun, which is not solely to encourage students to learn (learning to know), but also do (learning to live together), and holistic and authentic, with the aim of, planning and review of implementation of learning.

c. The Characteristics of Thematic Teaching Material

Characters on thematic teaching materials are relatively same as teaching materials in general. It's just a thematic teaching materials should be designed to be more attractive to support the thematic learning process.

Some of the basic character of thematic learning which should appear in the preparation of teaching materials there are four types, namely:

1) Active

Teaching materials contain material that emphasizes the learning experience, encouraging students actively in learning either physically, mentally, intellectually, and emotionally, in order to achieve optimal results study by considering the desires, interests, and abilities of students, so that they are motivated to learn continuously.

2) Interesting or fun

That is, teaching materials have fascinating properties, stimulating, comfortable viewing, and a lot of usefulness, so that students are always encouraged to continue to learn from themselves. In fact, students get involved and engrossed with the teaching materials to lose track of time, because of the rush challenging students' adrenaline.

3) Holistic

That is, teaching materials containing study a phenomenon of multiple fields of study at the same time, not from the standpoint of fragmented. Thus, the presence of the teaching materials enable students to understand a phenomenon from all sides, become more wise and prudent.

4) Authentic

Characteristics of thematic teaching materials that emphasize on authentic side or direct experience provided by a teaching material. In other words, teaching materials provide an experience and knowledge that can be acquired by the students themselves. In addition, the teaching materials provide contextual information with empirical reality or socio-cultural phenomenon around the students. This has an impact on the significance of the material being studied.

d. Functions of Thematic Instructional Materials in Learning

The existence of thematic teaching materials have several functions in the learning process. There are two main classifications of the distribution function

of teaching materials, which according to those who take advantage of teaching materials and learning strategies used.³³

Parties who use teaching materials are of two kinds, namely the educators and learners. The function of teaching materials for educators are:

- 1) Saving time in learning because teachers do not need to write the material on the board for later copied by the students to write their books. Teacher enough to explain the material in teaching materials, then the students listen to what is described by the teacher.
- 2) Change the role of a teacher becomes a facilitator. This is because in reality, students will better understand the lessons after they observe things they want to know by themselves. Through the book, students are able to build their own patterns of thought, if they feel less able or do not understand it in this case the teacher acts as a facilitator in the learning process.
- 3) Improving the learning process becomes more effective and interactive. Textbook allows students to learn independently because there is also a step-by-step learning fun. Book is structured with the intention that children interested in reading and study.
- 4) Guidelines for teachers who will direct all activities in the learning process and the substance of competencies that should be taught to students.
- 5) Evaluation tool or mastery of learning outcomes.

³³ Andi Prastowo, *Panduan Kreatif Membuat Bahan Ajar Inovatif*. (Yogyakarta: DIVA Press, 2012), page 24-26.

While the function of teaching materials for the learners are:

- 1) Students can learn independently through books.
- 2) Through the book, students can learn anytime and anywhere they want.
- 3) Students can learn according to what they want to learn or choose their preferred material to be studied first.
- 4) Students can learn with their capabilities of learning speed without any competition with his friends.
- 5) Guidance to students which will direct all activities in the learning process and the substance of the competencies that should be learned or mastered.

According to the learning strategies used, the function of teaching materials can be divided into three kinds, namely the classical learning, individual, and group.

- 1) function in classical learning that as the only source of information and supervisors, as well as controlling the learning process as well as supporting the learning process organized.
- 2) functions teaching materials in individual learning as the main media in the learning process, the tools used to develop and oversee the students gain information, and supporting other individual learning media.
- 3) function of teaching materials in the learning groups:
 - a) is a material that is integrated with the group learning process, by providing information about background of material, information about the role of the people involved in the study group, as well as instructions on the learning process of their own group, and

- b) as a supporter of major teaching materials that if it designed in such a way can increase students' motivation.

3. Scientific Approach

a. Understanding Scientific Approach

The approach is the basic concept that embodies, inspire, strengthen, and underlie thinking about how learning methods are applied based on a particular theory. Therefore a lot of the view that the approach is tantamount to the method

Scientific approach is part of a pedagogical approach that is used in learning to underpin the use of scientific methods in teaching and learning.³⁴

The learning process that implements scientific approach will touch three areas, namely:

- 1) The realm of attitudes (*affective*) is transformation of substances or teaching materials that the students “know why”.
- 2) The realm of skills (*psychomotor*) is transformation of substances or teaching materials so that students “know how”.
- 3) The realm of knowledge (*cognitive*) is transformation of substances or teaching materials so that students “know what it is”.

³⁴ Kurniasih, Imas and Berlin Sani. (*Sukses Mengimplementasikan Kurikulum 2013*), Jakarta: Kata Pena. 2014. Page 12

With the learning process so it is expected that the learning outcomes of students who gave birth to a productive, creative, innovative, and affective through the strengthening of attitudes, skills and knowledge are integrated.

b. The Objectives and Principles of Scientific Approach to Learning

Several *scientific* approach to learning objectives are 1) to improve the ability of the intellect, especially high-level thinking skills of students, 2) to form a student's ability to solve a problem systematically, 3) the creation of conditions of learning where students feel that learning is a necessity, 4) obtaining results of high learning, 5) to train students in communicating ideas, especially in writing a scientific article, and 6) to develop students' character.

The principles in the learning saintific are: 1) students are facilitated to figure out, 2) students learn from a variety of learning resources, 3) learning to use a scientific approach, 4) competency-based learning, 5) integrated learning, 6) learning that emphasizes the divergent answers that have multi-dimensional truth, 7) applicative skills-based learning, 8) an increase in the balance, continuity, and the relationship between *the hard-skills* and *soft skills*, 9) learning that promotes cultivation and empowerment of learners as lifelong learners, 10) learning to apply the values by giving exemplary (*Ing Ngarso Sung Tulodo*), build willingness (*Ing Madyo Mangun Karso*), and developing the creativity of learners in the learning process (*Tut Wuri Hand*), 11) the learning that takes place at home, at school , and in the community, 12) the utilization of information and communication technology to improve the efficiency and effectiveness of learning, 13) recognition of individual differences and cultural background of students, and 14) fun and challenging learning environment.

c. The Criteria of Scientific Approach

Here are seven (7) criteria for a learning approach can be regarded as a scientific study, namely:³⁵

- 1) Substance or learning material based on the facts or phenomena that can be explained by logic or specific reasoning; not limited to roughly, fantasy, legend, or a mere fairy tale.
- 2) Teacher's explanation, the response of learners, and educational interaction teacher-learners free of prejudice, subjective thinking or reasoning that deviate from the groove to think logically.
- 3) Encourage and inspire students to think critically, analytically, and precise in identifying, understanding, solve problems, and apply the substance or learning materials.
- 4) Encourage and inspire learners are able to think hypothetically in view of the differences, similarities, and link one to the other of the substance or instructional materials.
- 5) Encourage and inspire learners are able to understand, implement, and develop patterns of rational thought and objective in responding to the substance or learning materials.
- 6) Based on the concepts, theories and empirical facts that can be accounted for.
- 7) Learning objectives formulated in a simple, clear, and attractive presentation systems.

³⁵ *Ibid.*, Page 15

d. Steps in Learning to Scientific Approach

Scientific Learning consist of five steps, namely Observing, Questioning, Associating, Experimenting, Networking.³⁶

1) Observing

Method of prioritizing observe meaningfulness learning process (*meaningfull learning*). This method has certain advantages, such as the media presents a real object, happy and challenged learners, and easy implementation. Of course, the activity observed in the context of this study usually requires a long preparation time and mature, relatively much cost and effort, and if uncontrolled will obscure the meaning and purpose of learning.

Observation activities in the learning process necessitates the involvement of learners directly. In this regard, teachers must understand the form of involvement of learners in these observations.

Principles - principles that must be observed by teachers and learners during the learning observations presented below.

- a) Thorough, objective, and honest and focused on the object that is observed for the sake of learning.
- b) More or less as well as homogeneity or heterogeneity of the subject, object, or situation observed. The more numerous and heterogeneous subject, object, or situation that is observed, the more difficult it is carried out observation activities. Before the observation implemented, teachers and

³⁶ Yunus Abidin. (*Desain Sistem Pembelajaran dalam Konteks Kurikulum 2013*). Bandung: PT Refika Aditama. 2014. Pages 49-54.

learners should determine and agree on the manner and procedure of observation.

- c) Teachers and learners need to understand what is about to be recorded, recorded, and the like, as well as how to take notes on the acquisition of observation

Competencies developed in this step is to train the seriousness, thoroughness, looking for information.

2) Questioning

Teachers inspire students to improve and develop the attitudes, skills and knowledge. By the time the teacher asked, at that moment he was guiding or guiding learners to learn well. When the teacher answered questions learners, when it was also he pushed her care was to be penyimak and a good learner.

Developed competence is to develop creativity, curiosity, the ability to formulate questions to form a critical mind necessary for intelligent life and lifelong learning.

3) Associating

Associating is the process of thinking logically and systematically over the word empirical facts that can be observed to obtain a conclusion in the form of knowledge. Associating is a scientific reasoning.

In the learning process with a scientific approach in the curriculum in 2013 illustrates that educators and learners are active participants. The point certainly in many respects and the situation should be more active learners rather than teachers. Activities make sense in the context of the learning

process with many scientific approach refers to the association of learning theory refers to the ability to classify a variety of ideas and events - events fragment then make brain memory.

Developed competence is to develop an attitude of honest, conscientious, disciplined, law-abiding, hard work, the ability to apply the procedures and the ability to think in summing.

4) Experimenting

To obtain a real learning, the learner should try or experiment, especially for suitable materials or substances. Learners should have the skills to develop knowledge about the nature around and be able to use the scientific method and scientific attitude to solve the problems faced everyday.

Application methods of experimentation or attempt intended to develop various domains of learning objectives, namely attitude, skills and knowledge.

Developed competence is to develop an attitude of conscientious, honest, polite, respect the opinions of others, the ability to communicate, implement the ability to collect information through a variety of ways to learn, develop the habit of learning and lifelong learning.

5) Networking

Learning Network also called Collaborative Learning, which is a personal philosophy, is more than just learning techniques in the classroom - school class. Vygotsky research results prove that when learners are given the task to himself sediri, they will work as well as possible when cooperate or collaborate with friends.

In this step, educators are expected to provide an opportunity for students to share what they have learned. The findings were presented in class and was rated by teachers as a result of learners or groups of learners such. As stated in Permendikbud, Number 81A in 2013, is to convey the observations, conclusions based on the results of the analysis of oral, written, or other media.

Developed competence is to develop an attitude of honest, conscientious, tolerance, the ability to think systematically, to express an opinion with clear and concise, and to develop good language skills and correct.

4. Students' Achievement

a. Definition of Students' Achievement

The students' achievement is the result obtained after the student learning experience and learning process. This can be achieved if students already understand learn with the change of behavior better anymore.³⁷ Bloom in Sudjana dividing the three domains of students' achievement are:

1. Cognitive domain relating to intellectual result study which consist of six aspects, namely knowledge and memory, comprehension, application, analysis, synthesis and evaluation.
2. Affective domain respect to the attitude which consist of five aspects such as reception, response, or reaction assessment, organization and internalization.

³⁷ Nana Sudjana, *Penilaian Hasil Proses Belajar Mengajar*, (Bandung: Remaja Rosdakarya, 1989), page. 22.

3. Psychomotor domain respect to the skills result study and the willingness to act, there are six aspects that reflex movements, basic movement skills, skills distinguish visually, physically field skills, complex skills and communication.

The third domain are being of the research object of students' achievement. Cognitive achievement were measured at the beginning and end of the studys, while for the affective and psychomotor measured in the learning process to determine the attitudes and skills of students. In order to achieve optimal learning outcomes, a teacher must be able to choose a learning model that is effective and efficient, as well as methods that can foster student learning activities so that the situation of teaching and learning could progressing well, with an atmosphere that is not boring for students.

b. Students' achievement teSATIS

Achievement teSATIS is a test item that is used to determine student learning outcomes after following the teaching and learning activities. Achievement teSATIS covering products, test results of learning processes and learning outcomes psychomotor teSATIS. Test results in the form of learning psychomotor be the form of skills to carry out the experiment.³⁸ Achievement test is a test used to measure a student's ability. This test developed tailored to the level of cognitive ability, for scoring the

³⁸ *Ibid.*,page.144

results of the test, using the evaluation guide contains key and scoring guidelines for each item.³⁹

Measuring instruments the level of student success need to be carefully designed and developed before the media used, or prior learning activities undertaken. This tool can be a test, assignment, or a check list of behaviors. Measuring instruments the level of student success must be developed in accordance with the objectives to be achieved and basic learning materials that will be presented to students. It is measured or evaluated is the ability, skills or attitudes of students as a result of the learning activities.

Should any abilities and skills that support the achievement of specific learning objectives be used as a test, or a check list of behavior (*performance check list*). Common learning objectives should have a specific purpose. Learning materials should be sufficient, that all the abilities and skills embodied in specific learning objectives and learning materials existing in the measurement tool.

To measure and evaluate the success rate can be done through learning achievement test. Based on the purpose and scope, learning achievement teSATIS can be classified in some kind of assessment, namely:

- 1) Formative teSATIS

Formative teSATIS used to measure one or several specific subjects aimed to gain an overview of the absorption of students in the subject. Test results

³⁹ Ibid..

can be used to improve the learning process in a particular material and in a specific time.

2) Sub-Summative Test

Sub-Summative teSATIS covering certain amount of teaching materials that have been taught in a certain time. The goal is to obtain the absorption of students in order to improve students' achievement. Sub-summative test results can be used to improve the learning process and taken into account in the form of the value of report.

3) Summative Test

Summative teSATIS conducted to measure the absorption of students to the subject matter that has been taught for a semester, a year or two. The goal is to determine the level or degree of success of students in the learning period. Result of summative test was used for the increase in class, rank or as a measure of school quality.

c. Evaluation of Achievement

The achievement is change of behavior aimed at students after learning activities. To determine student learning outcomes of course we have to do an evaluation. Davies argues evaluation is a simple process give or assign a value to a number (objectives, activities, decisions, performance, prroses, people, objects, and others) based on certain criteria through assessment.⁴⁰

⁴⁰ Dimiyati dan Mujiono, *Belajar dan Pembelajaran* (Jakarta : Depdikbud dan Rineka Cipta, 1999), page. 250.

The results of the activities of learning outcomes evaluation at the end functionalized and intended for the following purposes:

- 1) Diagnostics and development. That is the use of the results of the activity of achievement evaluation as a basis diagnosis of weakness and excellence of students and its causes.
- 2) For the selection of the results of the evaluation activities are often used as the basis for determining which students are best suited for this type of position or type of education.
- 3) Determine whether a student can be raised to a higher class or not, need information that can support the decision made by teachers.
- 4) For placement for students to develop in accordance with the level of ability and potential that they have, it is necessary to think about the accuracy of the placement of students in appropriate groups.⁴¹

⁴¹ *Ibid.*, pages.200-201

CHAPTER III

RESEARCH METHOD

At chapter III will be studied about development method, include: (a) Type of the Research, (b) Development Model, (c) Development Procedure, (d) Product Review, and (e) Field Testing.

A. Type of the Research

The method used in this study is a research and development method (R & D). Research development oriented to product development in the field of education. Nana Syaodih Suryadinata revealed in his book “Metode Penelitian Pendidikan” that Development Research or *research and Development (R & D)* is a strategy or method of research quite powerful in/ to improve practice.⁴² Meanwhile, according to Borg and Gall (1983) development research is the process used to develop and validate educational products.⁴³

The main objective of development research as assessment of changes that occur within a certain time. The changes are expected to lead to changes in learning improvement. Thus the development research related to improving the quality of education, in terms of process and result study of education.⁴⁴ This is in line with research that aim to develop a product that done by researcher about teaching

⁴² Nana Syaodih Sukmadinata. *Metode Penelitian Pendidikan* (Bandung: Remaja Rosdakarya, 2007), page. 164.

⁴³ Punaji Setyosari. *Metode Penelitian Pendidikan dan Pengembangan* (Jakarta: Kencana Prenada Media Group, 2012), page. 194.

⁴⁴ Nurwiga, Adhin Maulidya, “Pengembangan Buku Panduan Praktikum IPA untuk meningkatkan prestasi belajar siswa kelas V pada materi Sifat Cahaya dan Alat Optik di MI Negeri Gedog Kota Blitar”, *Thesis*, Tarbiyah Faculty of UIN Malang, 2012, page. 57.

material devoted to thematic learning to students on fourth grade of Elementary School.

This product is expected to be a path that seeks to bridge the information gap between compliance and the provision of learning materials as needed of student in thematic learning. Therefore, one way that researchers have developed to facilitate the understanding of the students is through the “product-oriented development” is the developing SATIS based- thematic teaching material on “*Selalu Berhemat Energi*” to improve fourth grade students’ achievement in MIN Buduran Sidoarjo.

B. Development Model

The model used in this developing theacing material is adapted from the model of development according to Borg and Gall.⁴⁵ In the model development, Borg and Gall contains systematic steps guide undertaken by researchers in order to have a product that designed had eligibility standards.⁴⁶ The steps of the development covered in this research through ten stages,

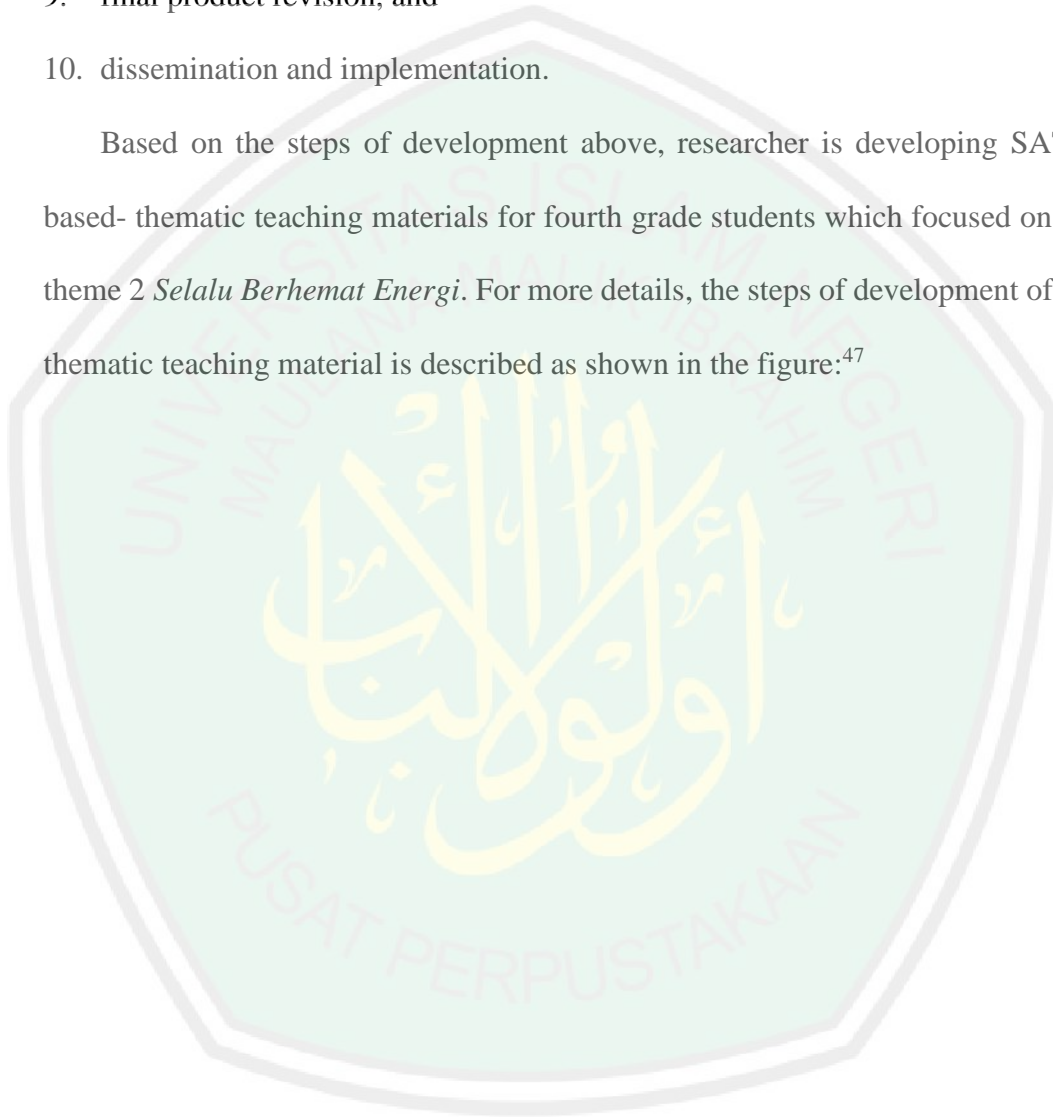
1. research and information collecting,
2. planning,
3. develop preliminary form of product,
4. preliminary field testing,
5. main product revision,
6. main field testing,

⁴⁵ Punaji Setyosari, *op.cit.*, page. 228.

⁴⁶ Hadie Piyoe, *Model Penelitian Pengembangan Borg and Gall (1983)* (<http://hadiepiyoe2710.blogspot.com/2012/11/model-penelitian-pengembangan-borg-and.html>), Accessed on May 24th, 2015 at 10.19 pm.

7. operational product revision,
8. operational field testing,
9. final product revision, and
10. dissemination and implementation.

Based on the steps of development above, researcher is developing SATIS based- thematic teaching materials for fourth grade students which focused on the theme 2 *Selalu Berhemat Energi*. For more details, the steps of development of the thematic teaching material is described as shown in the figure:⁴⁷



⁴⁷ Punaji Setyosari, *op.cit.*, page. 52.

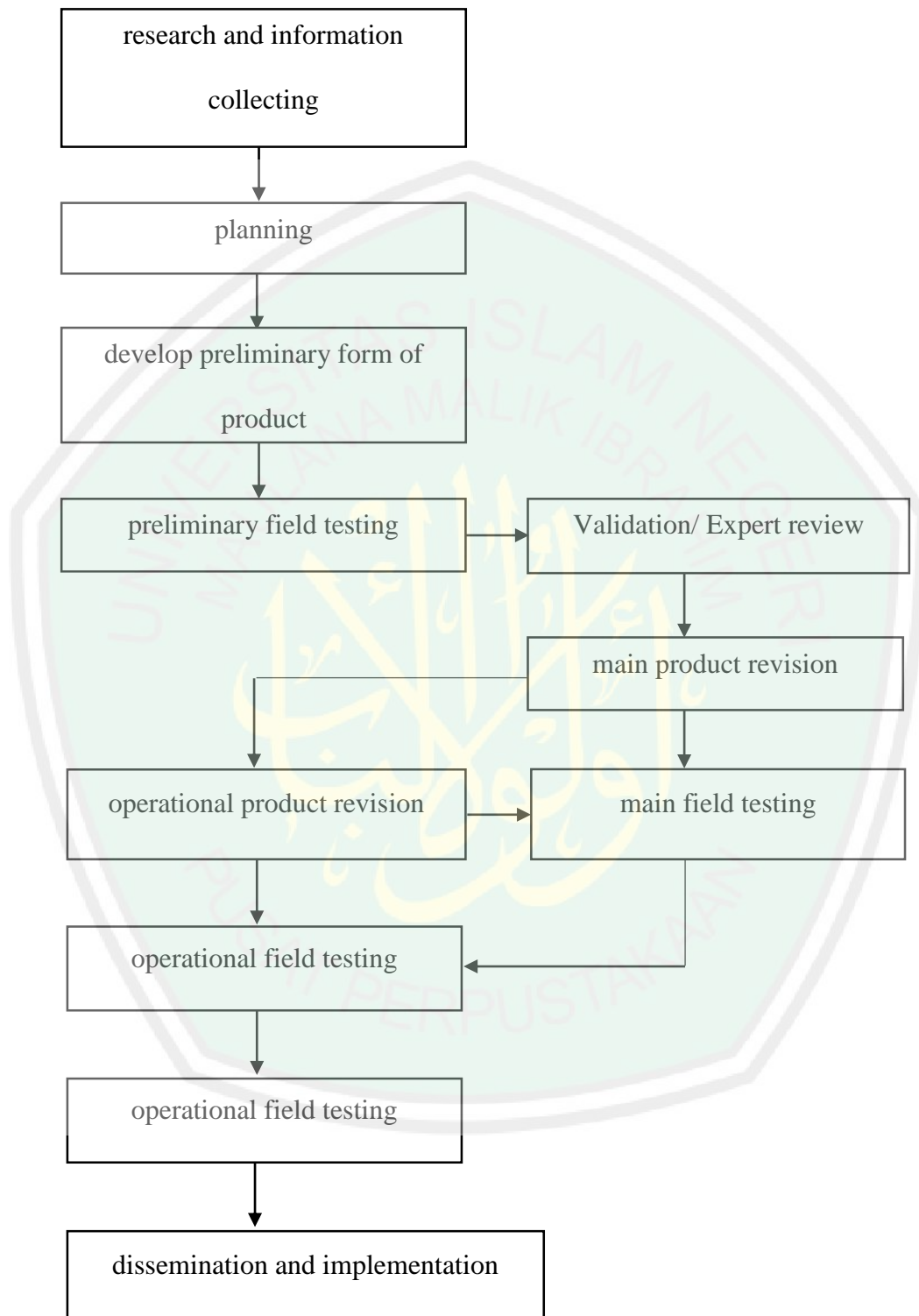


Figure 3.1. Steps of Developing Teaching Material According to Borg and Gall

From step development according to the Borg and Gall, researchers adapted to simplify into seven main steps, namely:⁴⁸

- a. research analysis, needs assessment and proof of concept;
- b. product planning and design;
- c. preliminary product development;
- d. preliminary field testing;
- e. product revision;
- f. main field testing;
- g. and the final product revision and dissemination.

The Borg, Gall, and Gall model included added steps together with operational product revision and operational field testing. These steps were omitted due to the time and budget restraints of this research. Below, Figure 2 provides a graphic representation of the R & D steps which were used. This illustrates the product development progression that was followed in this investigation.

⁴⁸ Deanna L Gooch, "Research, Development, and Validation of a School Leader's Resource Guide for the Facilitation of Social Media Use by School Staff", *Dissertation*, Kansas State University, 2012, pages. 85-86.

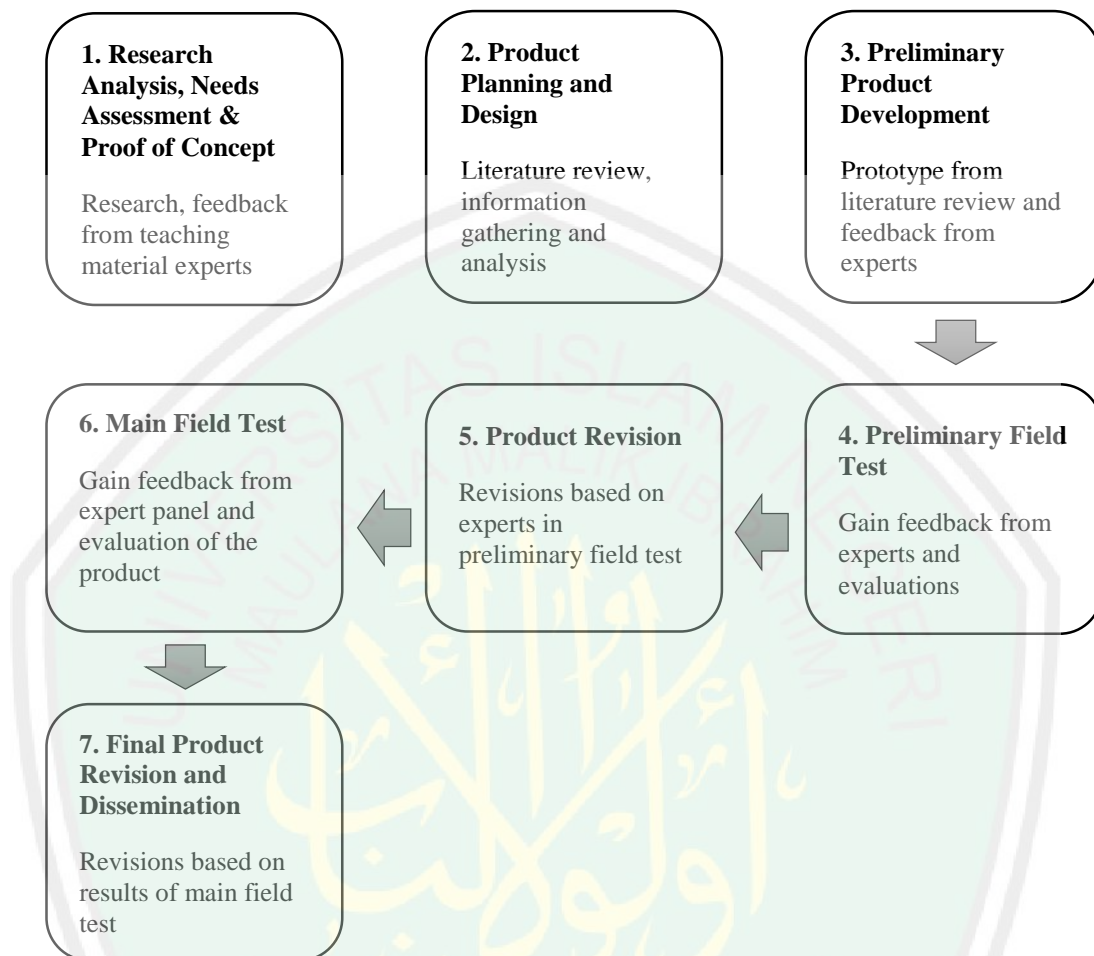


Figure 3.2. Gall, and Borg Research and Development (R&D) Process

C. Development Procedures

This thematic teaching materials develop using several development stages as mentioned above. The development stages are described as follows:

1. Stage of research analysis, needs assessment and proof of concept

The steps taken at this stage include:

a. Curriculum Studies

This activity is carried out in an effort to determine the material to be presented, recognizing the thematic material of 2nd theme *Selalu Berhemat Energi*. So that the

developer can define a few basic competence at a minimum that must be mastered by students. The other goal is the developer can make the interlacing between topics or inter subject.

b. Studies about SATIS based- thematic teaching material

This studies was undertaken as an effort to study about SATIS especially material studies on 2nd theme *Selalu Berhemat Energi* which will be presented on thematic teaching material which correspond to the basic competence to be achieved so that developers can compile learning activities that include material draft and exercises based on SATIS.

c. Study of 2nd theme *Selalu Berhemat Energi* of fourth grade of Elementary School

This study was conducted in an effort to determine the material to be developed in accordance with the core competency, basic competencies and indicators of achievement. So the developer can compile the material systematically in order to make it easy for students to understand the material.

2. Stage of product planning and design

This step taken for formulating the teaching material well be developed. In this step, the researcher have preparing the resources and information needs relating to SATIS as additional material on thematic teaching material that will be developed.

3. Stage of Preliminary Product Development

The steps taken at this stage include:

a. Developing the learning content

The learning content is structured in accordance with the basic competencies to be achieved by students. The thematic learning material developed from the thematic book (2013 curriculum) theme 2 *Selalu Berhemat Energi* 1st sub theme *Sumber-sumber Energi*. Learning begins by presenting a story related to the activities in the surrounding community.

b. Developing the learning activities

Learning activities intended to activities or the basic competencies target that have been developed can be achieved. Learning activities that will be presented include the design of materials and questions practice. Learning activities follow the steps described in each chapter.

c. Material Writing

The material presented in this teaching material is the instant material that can be used directly by students without a teacher guide. But it would be better if the teacher acts as a mediator conveys the material to students more easily understand the material.

d. Writing Exercises Evaluation

Writing exercises evaluation are intended as an application of the concepts that have been constructed and studied by students. Questions are presented in accordance with the indicators of students' achievement, so practice questions can be used to measure the extent to which students achieve expected indicator.

4. Stage of Preliminary Field Test

Teaching material written then reviewed by several material experts (lecturer or subject teachers). Stage of review is intended to determine whether the teaching materials that have been developed are feasible or not for use in learning activities at school. The results of the review carried out by the experts will be used as guidelines for revising the teaching material.

5. Stage of Product Revision

After the teaching material reviewed by experts, then the teaching material is revised based on questionnaire data obtained through the expert review in order to obtain a product actual results of development.

6. Stage of Main Field Test

Stage of main field testing conducted on a class. The field testing was conducted at students of IV A MIN Buduran Sidoarjo to test the effectiveness and attractiveness of SATIS based- thematic teaching material. Then, 6 students selected for fulfill a questionnaires relating to teaching materials. Selection of 6 students represent a group that has the capability of low, medium, and high views of daily test scores and their skills in thematic learning. The results of questionnaires given as guideline for revising teaching materials

7. Stage of Final Product Revision and Dissemination

The final product revision and dissemination carried out after field testing had done in full class of IV A MIN Buduran Sidoarjo. However, the dissemination had not conducted because the limitation of the study drap over final product.

D. Product Review

Product review aiming to obtain accurate data that is used to perform revision, establish the feasibility of the product contents. Before tested, the product must be consulted with several experts first covering material experts and design media experts. In this product review will be described on the design of review, subject of review, type of data review, collection and instruments of data review, and analysis techniques of data review.

1. Design of Review

Design of review used in this development is the review by materials expert, media design expert, teacher as thematic teaching experts and students as users of the product. This validation includes validation of the content/ materials, product design and the language used. This review is intended to obtain data in the form of assessment and suggestions of validator, so it is known the validity of the product developed and then used as a basis for revision.

2. Subject of Review

Subject of review in this development is the review by materials expert, media design expert, teacher as thematic teaching experts and students as users of the product. The election of MIN Buduran Sidoarjo as trial testing subject is based on several reasons, namely (1) This school is one of the favorites school in Sidoarjo and have been using thematic learning in 2013 curriculum, (2) students have less extensive insight regarding energy materials and material on theme 2 feels more difficult when compared to other themes that have been studied (theme 1, 3, and 4), (3) after doing analysis, there are many flaws in the thematic book's of 2013

curriculum primarily on the enrichment of materials related to energy, (4) does not have any SATIS based- thematic teaching materials, and (5) diverse of students ability.

a. Material experts

Acting as an material expert in the developing SATIS based- thematic teaching materials on 2nd theme *Selalu Berhemat Energi* is Mr. Ahmad Abtokhi, M.Ed. He got his doctoral degree in Physics Education from Surabaya State University and he is a lecturer of Physics in the Physics Department of the State Islamic University of Maulana Malik Ibrahim Malang. The election of expert based on the consideration that the person concerned has the competence in the field of material science and the material in this developing is SATIS based which the learning tend to science learning.

Material expert give comment and generally advice about existing learning material in the developing SATIS based- thematic teaching materials on 2nd theme *Selalu Berhemat Energi*.

b. Design Media Expert

Acting as an expert in the developing SATIS based- thematic teaching materials on 2nd theme *Selalu Berhemat Energi* is Mrs. Wiwis Sasmitaninghidayah. She got her masteral degree for Physics from *Sepuluh November* Institute of Technology of Surabaya and she is a lecturer in the Department of Physics, State Islamic University of Maulana Malik Ibrahim Malang. The election of design media experts is based on the consideration that the

person concerned has the competence in the field of learning media especially in worksheet book. She have been made many worksheet book of elementary.

Design media experts provide general comments and suggestions to the attractiveness of the thematic teaching materials developed.

c. The thematic learning expert

Acting as thematic learning expert in the developing SATIS based- thematic teaching materials on 2nd theme *Selalu Berhemat Energi* is Mrs. Nur Cholilah, M.Ed. She got her scholar degree for Elementary Teacher Education from Surabaya State University and she is a thematic teacher in IV A of MIN Buduran Sidoarjo. The election of design media experts is based on the consideration that the person concerned has the competence in the field of thematic learning that she already has much experience in teaching.

The thematic learning expert give feedback and assessment of the developing SATIS based- thematic teaching materials on 2nd theme *Selalu Berhemat Energi*.

d. Student of IV A of MIN Buduran Sidoarjo

Subjects of main field testing were taken from six students from class IV A MIN Buduran Sidoarjo and represent a group that has the capability of low, medium, and high. This is viewed of daily test scores and the ability of the students in the study of thematic before. Selection of that students is also based on a consideration of thematic teacher's that is concerned it is easy to be interviewed.

In detail, the subjects of main field testing can be seen in the following table:

Table 3.2. Subjects of Main Field Testing

Subjects	Group
A and B	High
C and D	Medium
E and F	Low

3. Type of the Data Review

Data is defined as information or materials tangible which can be relied upon for research (analysis or conclusion).⁴⁹ Type of the data review in the developing SATIS based- thematic teaching material are qualitative and quantitative data. The first data in the form of quantitative data that obtained from the scoring (form of a percentage) to determine the feasibility or validity of the product. The second data is qualitative data in the form of responses or suggestions from the validator.

4. Collection and Instruments of Data Review

Instruments used in the collection of data on the development of this form of questionnaires. The questionnaire used to gather data on the accuracy of material components, the attractiveness and ease of use of teaching materials. The nature of the questions in the questionnaire includes two kinds of questions that are open questions and closed questions. Open questions are used to obtain qualitative data. While the closed questions directed to obtain quantitative data.⁵⁰

⁴⁹ Wahidmurni, *Cara Mudah Menulis Proposal dan Laporan Pengembangan Lapangan; Pendekatan Kualitatif dan Kuantitatif*, (Malang: UM Press, 2008), page. 41.

⁵⁰ Novi Aryu Ning Tyas, "Pengembangan Bahan Ajar Berbasis Karakter Poko Bahasan Alat Indra Manusia Kelas IV MI Raudlatul Ulum Ngijo karangploso Malang", *Skripsi*, Fakultas Ilmu Tarbiyah dan Keguruan UIN Malang, 2013, pages. 65-66.

Open questions are used as an instrument of qualitative data collection form of sheet replenishment suggestions and comments from the validator. While the closed questions used as a quantitative data collection of questionnaire instrument in the form of a Likert scale with five alternative answers, as follows:⁵¹

- b. Score 1 for very not right, very mismatched, not unclear, very unattractive.
- c. Score 2 for not right, mismatched, unclear, unattractive.
- d. Score 3 for quite right, quite matches, quite clear, is quite attractive.
- e. Score 4 for right, matches, clear, attractive.
- f. Score 5 for very right, very matches, very clear, very attractive.

5. Analysis Techniques of Data Review

Data analysis is a process and interpret the data with the function to have a clear meaning and significance according to the research objectives.⁵² The collected data can be grouped according to the type of data and grouped into two kinds, namely quantitative data in the form of a numeric and qualitative data in the form of data or symbols.

There are three kinds of data analysis techniques are used to process data review results that are analysis of quantitative data and analysis of qualitative descriptive.

⁵¹ Subali, B. dkk, *Jurnal: Pengembangan CD Pembelajaran Lagu Anak untuk Menumbuhkan Pemahaman SAINS Siswa Sekolah Dasar*, Surabaya: Surabaya State University, page. 27.

⁵² Wina Sanjaya, *Penelitian Tindakan Kelas* (Jakarta: Kencana Prenada Media Group, 2009), page. 106.

a. Analysis of quantitative data

Data in the form of words or symbols will be analyzed in a logical and meaningful. While the data will be analyzed in the form of percentage descriptions, with the following formula.⁵³

$$P = \frac{\Sigma X}{\Sigma X_i} \times 100 \%$$

Description:

P : Percentage level of validity

ΣX : Total number of evaluators answer scores (real value)

ΣX_i : Total number of higher responses scores (expected value)

100 : a constant

Having obtained the results of the data that has been processed using the formula above, the result is matched with the validity criteria for the use of teaching materials as follows:⁵⁴

Table 3.4. Qualification Level of Validity Based on Average Percentage

Percentage (%)	The level of validity	Information
84 – 100	Highly Valid	Not Revision
68 – 84	Valid	Not Revision
52 – 68	Valid enough	Some revisions
36 – 52	Less valid	Revision
20-36	Highly less valid	Revision

⁵³ Arikunto, *Dasar-dasar Evaluasi Pendidikan* (Jakarta: Bumi Aksara, 2013), page. 313.

⁵⁴ *Ibid.*

Based on the above criteria, the teaching material were declared valid if it meets the criteria of score 68 of all elements contained in questionnaire a validation assessment of media experts, expert content, thematic teacher and fourth grades student of Islamic Elementary school. In this developing, thematic teaching material should be met the valid criteria. Therefore, done a revision if still not met valid criteria.

b. Analysis of qualitative descriptive

In the stage of field testing, the data collected using closed-assessment questionnaire and open-assessment questionnaire to provide feedback, suggestions, and improvements feedback. The result of descriptive analysis are used to determine the feasibility of product development results in the form of thematic teaching materials based SATIS theme 2 *Selalu Berhemat Energi*.

E. Field Testing

1. Design of Field Testing

In education, the design of products such as teaching material can be directly tested, after being validated and revision. The test is done by simulating the use of teaching material after doing pre-test. Testing was conducted to obtain information on whether the new teaching material is more effective and efficient than the old teaching material or another.⁵⁵

MIN Buduran stated that the learning process is quite good and successful if the score of tests or the average score reaches 72, and the percentage of students

⁵⁵ Sugiyono, *Metode Penelitian Pendidikan* (Bandung: CV. Alfabeta, 2009), page. 414

who passed the criteria have reach 80% of class, if it has not reached an average value, it is need to remedial.

In this case the researchers made the average value of the class is 72, if the pre-test has not shown a value of 72, and if the pcentage of students who passed the criteria have not reach 80%, it will be tested the SATIS based-thematic teaching material. After the test, post-test performed to test the effectiveness of the book. The teaching material test done by comparing the situation before and after using the new system (before-after design).⁵⁶

Picture 3.2. Design of Experiments (Before-After).



Keterangan:

X = learning using teaching material

O₁ = initial test / pretest

O₂ = final test / post-test

2. Subject of Field Testing

Subject of field testing in this development research done on students of class IV A MIN Buduran Sidoarjo totaling 38 students. Thing that is researched is the comparing the student's learning achievement before and after using the SATIS based- thematic teaching materials.

⁵⁶ *Ibid.*, page. 303

3. Type of the Data

The data obtained in this study is in the form of quantitative data collected using achievement test in thematic learning, which includes pre-test and post-test.

4. Data Collection and Instrument

The instrument used in the form of field testing are pre-test and post-test. The test is used to collect data on results that show changes in the understanding before and after the learning process by using a thematic teaching materials based SATIS.

5. Analysis Data Techniques

In the field trial, the data collected using the achievement test (achievement test of learning outcomes). The data collected by using experimental one group pretest-posttest design that samples given initial tests and final tests in addition a treatment to determine the learning achievement of the group target that is class IV A before and after using the product development.

The first data analysis techniques performed by reviewing student learning achievement associated with improved of learning achievement as evidenced by the increase in the grade of the post-test of the pre-test.

The data analysis techniques is using test criteria. The test criteria is t test for repeated observations. T test is used to determine whether there is a treatment effect that is imposed on a group of objects. The formula used with significance level of 0,05 is:⁵⁷

⁵⁷ Turmudi, *Metode Statistika* (Malang: UIN Press, 2008), page. 214.

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

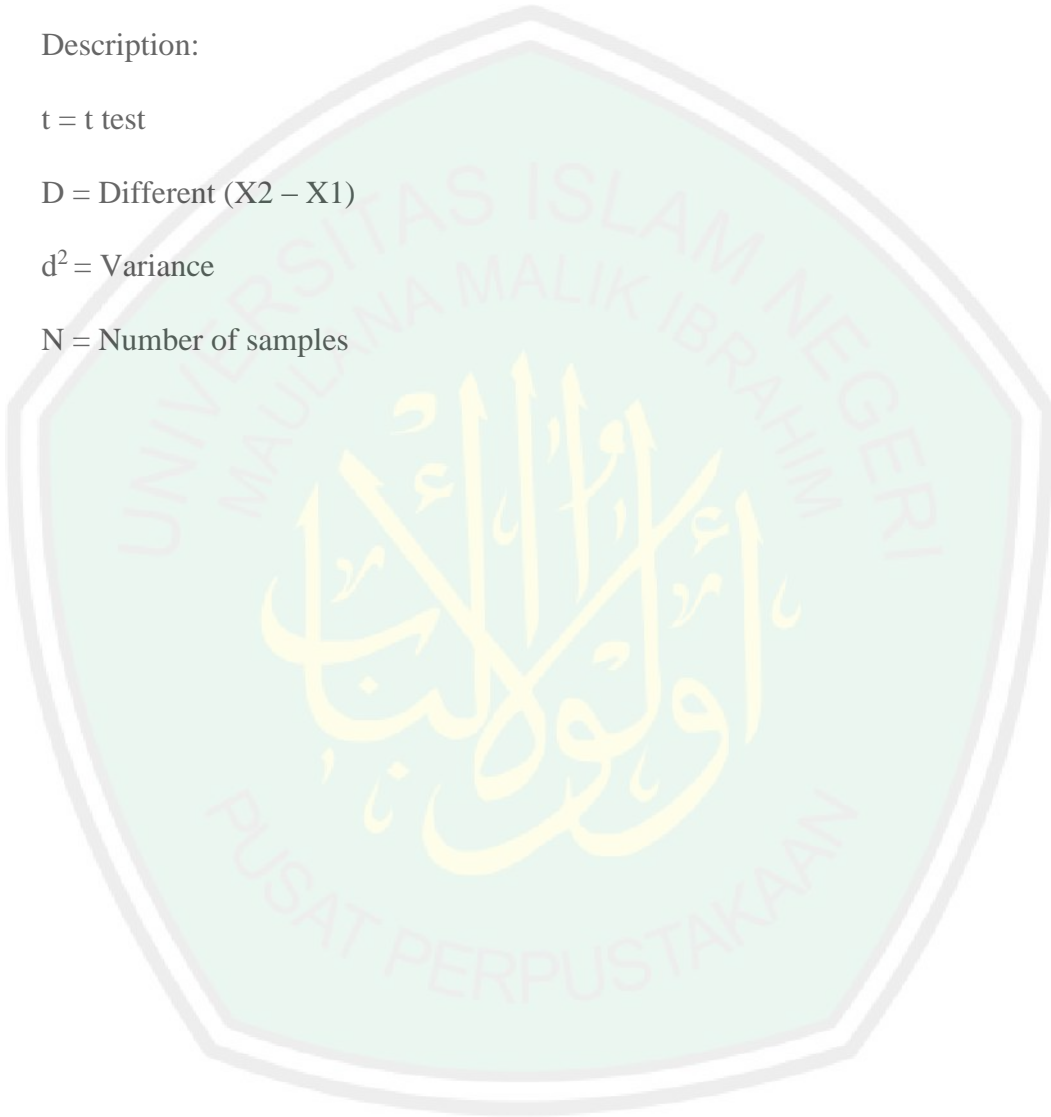
Description:

t = t test

D = Different (X2 – X1)

d² = Variance

N = Number of samples



CHAPTER IV

RESEARCH FINDINGS AND DATA ANALYSIS

In chapter IV, presented three issues related to the research findings. The three things are: 1) Description of the form of thematic teaching materials, 2) Experts Reviews of SATIS based- thematic teaching material product, dan 3) Field testing result.

A. Description of the Form of Thematic Teaching Materials

The thematic teaching material that have been developed by the developer is the student book of 2013 Curriculum on 2nd theme “*Selalu Berhemat Energi*” Sub theme “*Sumber-sumber Energi*” learning 1, 2, and 3 by using the approach of SATIS for fourth grade elementary students.

Student books developed in this development contains cover, preface, table of contents, sheet of core competencies, basic competencies (*ind: KI-KD*), indicators per lesson, and the material is devoted to the three learning. The following is an explanation of each part of the book:

a. Cover

There are two kinds of cover on SATIS based- thematic teaching material, namely the front cover and back cover.

1) Front cover



Front cover is designed with interesting colors, images, and letters. Front cover consists of the name of developer (Soviana Idayanti), the theme of the book (*Selalu Berhemat Energi*), the basis of the development of the book (SATIS based), is used to grade IV A/ fourth grade, first semester, and information of curriculum used (*Buku Tematik Terpadu Kurikulum 2013*).

Background cover fit with the material in which the sub-themes of *Selalu Berhemat Energi* discussion on wind energy sources, then the image of windmills selected as one of technology applied of wind energy utilization in society.

2) Back Cover



Back cover design with background, color and image concatenated with the front cover image. Theme of the thematic teaching material is designed same as the front cover but smaller. Back cover consists of theme of the book (*Selalu Berhemat Energi*), book basis (SATIS based), excerpts of material, a brief review of teaching material were developed, as well as the name of the developer agencies.

b. Preface



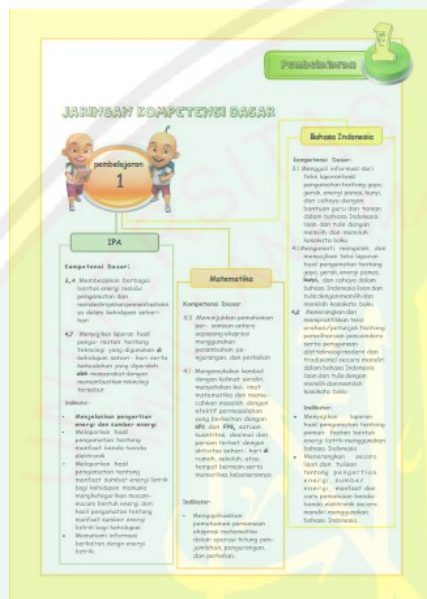
Preface contains gratitude to Allah SWT upon His mercy, developers can complete the developing SATIS based- thematic teaching materials. In the second paragraph, presented information about the books that the thematic book have been prepared on the basis of SATIS.

c. Table of Contents

Daftar Isi	
Kata Pengantar	i
Daftar Isi	ii
Subtema 1	
Pembelajaran 1	1
Pembelajaran 2	13
Pembelajaran 3	24
Ayo Mengingat Kembali	35
Daftar Pustaka	39

Table of contents contains a list of all parts of the thematic teaching materials.

- d. Sheet of KI-KD and Indicators of 1st, 2nd, and 3rd Learnings.



Sheet of KI-KD compiled by KI-KD in the 2013 Curriculum. In this case the developer adds an indicator for learning in accordance with the basis for the development of books.

- e. Learning Activities

Learning activities in this teaching material refers to the 2013 Curriculum by using a sub-theme and consists of three learning. In each lesson there is part of the core material and the supporting part.

- 1) Core material

At the core material, there are a section of thematic material and the development of material SATIS based.

a) Thematic material



Design a page that contains the thematic material is made colorful. It aims to add to the interest of students to learn the material. Furthermore, there are thematic material which is prepared using communicative language, the images associated with the material, as well as some of the exercises presented on the sidelines of the material with the aim to train students understanding what has been learned.

b) Development of materials SATIS based



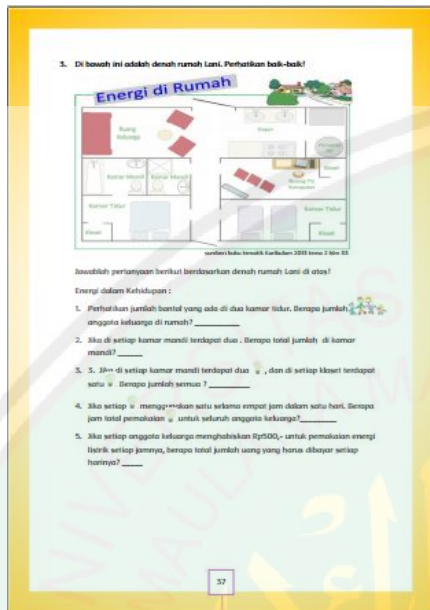
Development of material SATIS based contains information about technologies developed in the community, especially in Indonesia itself. The information are discussed with communicative language to make the students or readers enjoy in reading. Presented real images relating to technologies that are informed so that readers are more interested in and gain a real view of the technologies studied.

2) Supporting Section



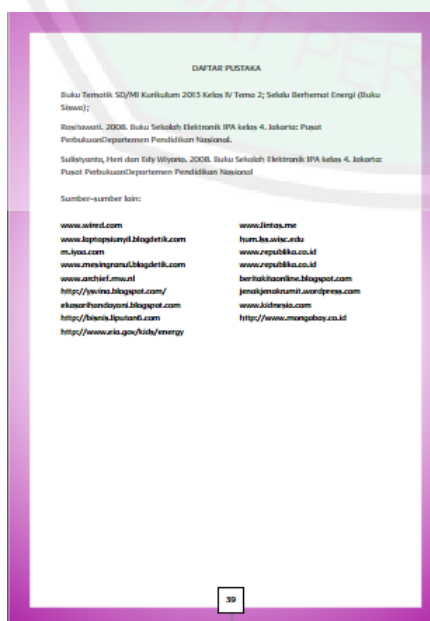
In the supporting section “*Tahukah kamu*” given a little information about the themes that will be studied and there is a monologue of a child who makes the reader think further relates to the theme. At the end of the page, followed by a sentence that contains an invitation to study the material further.

f. Evaluation page



Evaluation page intentionally made with one color so that the students' attention is not only focused on the design of the book but still concentrated on practice questions. The language used in the evaluation questions is not complicated to facilitate a student in understanding the intent of the question.

g. Bibliography



Bibliography on the student's book contains a reference source or reference books for the compile of this book.

Produced of students book in this development contains material and activities that can encourage students to learn actively. The student book contains material about the sources of energy which the material included in the theme *Selalu Berhemat Energi* consisting of three lessons. Every lesson on this book presents the material and images related to the application of technology in the community.

Each lesson in the student book contains the newest information about the science that can encourage students to actively learn to find new ideas of science and understand the concepts taught through the guidance of teachers, learning together with friends, as well as independently.

B. Experts Review of SATIS based- Thematic Teaching Material Product

Review of the teaching materials made by the validator experts held on November 27, 2014 through December 15, 2014. Data of the product assessment conducted in four stages. The first stage is obtained from the review of the product development of teaching materials made by a lecturer of Physics of UIN Maulana Malik Ibrahim Malang as a material experts. The second stage is obtained from the product assessment of teaching materials made by a lecturer of Physics UIN Maulana Malik Ibrahim Malang as a design media expert. This selection of media experts based on his ability make some teaching materials for elementary children. The third stage is obtained from the product assessment of teaching materials carried by a teacher of fourth grade thematic as learning expert and fourth stage

obtained from the results of the product assessment done at field testing are represented by 6 respondents. Identity of validation subject experts and field testing can be seen in the appendix.

The data obtained are quantitative and qualitative data. Quantitative data derived from assessment of questionnaire with Likert scale, while the qualitative data in the form of additional assessment or advice of a validator. Data review results were analyzed by using the average score on the evaluator's assessment of each item.

1. Review from the Material Expert

Exposure descriptive data of review results from material expert on product development of SATIS based- thematic teaching materials on the theme *Selalu Berhemat Energi* of the fourth grade submitted through questionnaire method with questionnaires can be seen in Table 4.1. 4.2. 4.3.

Table 4.1 Assessment of Material Expert on SATIS based-Thematic Teaching Material

Num	Statement	x	x_1	P (%)	Level of validity	Specification
1.	Suitability of SATIS based-thematic teaching materials with core competencies	4	5	80	Valid	No revision
2.	Suitability of SATIS based-thematic teaching materials with the basic competencies	5	5	100	Highly Valid	No revision
3.	The accuracy of the learning objectives based of SATIS based- thematic teaching materials	4	5	80	Valid	No revision
4.	The quality of SATIS based- thematic teaching materials	4	5	80	Valid	No revision

5.	Suitability of SATIS based-thematic teaching materials with students state	4	5	80	Valid	No revision
6.	The precision of the language used in the SATIS based- thematic teaching materials	4	5	80	Valid	No revision
7.	Suitability of the image of SATIS based- thematic teaching materials	4	5	80	Valid	No revision
8.	The consistency of SATIS based- thematic teaching materials	4	5	80	Valid	No revision
9.	The suitability of the content of SATIS based-thematic teaching materials	4	5	80	Valid	No revision
10.	Breadth of content of SATIS based- thematic teaching materials	4	5	80	Valid	No revision
Total		41	50	82	Valid	No revision

Note:

x : score of responses by the validator, Mr. Ahmad Abtokhi M,Ed as a material experts.

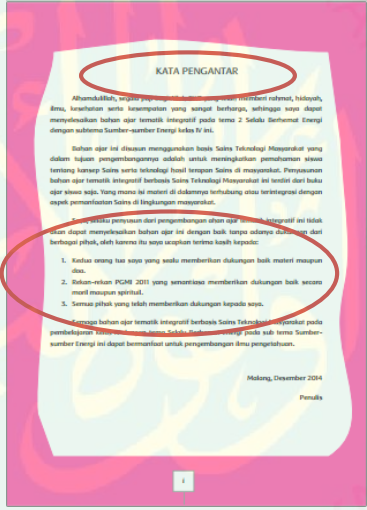
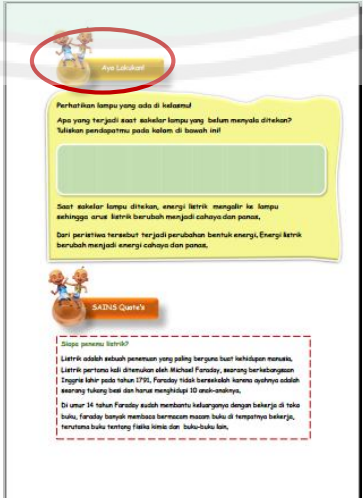
x_i : highest scores

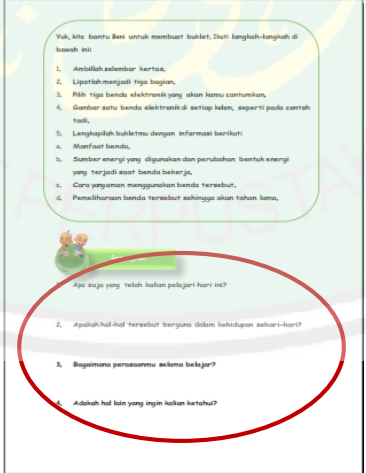
P : percentage level of validity


Table 4.1. shows the data review results of the material experts thematic of the product development SATIS based- thematic teaching materials is 82%. If matched with the table of validity criteria scores is included in the valid criteria.

The qualitative data collected from the suggestions and comments of material experts in public statements regarding with development of thematic teaching materials are presented in Table 4.2. as follows:

Table 4.2. Overview of Data Assessment and Review of Material Expert on SATIS based- thematic teaching materials

Num	Component / Position	Description of Data	Suggestions / Comments
1.	Totality	SATIS Materials	SATIS in every material need to be raised and sharpened
2.	Preface	<p>Selection of images on teaching materials</p> <p>Writing a paragraph in the preface</p> 	<p>The images used should be natural images, sources have to noted</p> <p>Writing “<i>Kata Pengantar</i>” was changed to “<i>Pengantar</i>” and there should be no paragraph of gratitude to those who have provided support.</p>
3.	Page 2	<p>1. Writing of directive sentences in the command line.</p> 	<p>Writing of directive sentences in the command line “<i>Science Quote’s</i>” changed to “<i>Serba Serbi Sains</i>”</p>

		2. Picture of a figure.	It should be added Faraday picture as an electrical inventor.
4.	Page 9	Use of grammar.	Grammar should be improved, such as the use of colons (:) must not be separated by the word in front of it. It should be added the collumns “ <i>Sains Teknologi Masyarakat</i> ” on page contained SATIS.
5.	Page 10	Names of people in a thematic story.	The names of those who used in thematic story should be changed with the Islamic names according to the developer’s agency.
6.	Page 11	Layout in the collum of “ <i>Renungkan</i> ” 	It should be added the line for students answered the questions.
7.	Page 13	Image of windmill	Image of windmill in Holland on the main page of the learning 2 should change into an image of windmills in Indonesia

			
8.	Page 30	Directive sentence	The directive sentence “ <i>Amati gambar berikut dan jelaskan!</i> ” changed more detail into “ <i>Amati gambar berikut dan jelaskan kaitan gambar dengan Sains dan Aplikasinya!</i> ”
9.	Page 34	The use of the phrase “halaman sebelumnya”.	The phrase “ <i>halaman sebelumnya</i> ” is made in more detail by stating the number of pages

All data from the review, assessment and discussion with material experts used as a revising basis for improving SATIS based- thematic teaching materials before tested on learners as users of teaching materials product development.

2. Review from the Design Expert

Product development submitted to the design expert is in the form of SATIS based- thematic teaching materials. Exposure of descriptive data of validation results from design expert on product development of SATIS based- thematic

teaching materials on the theme *Selalu Berhemat Energi* of the fourth grade submitted through questionnaire method can be seen in Table 4.3., 4.4., and 4.5.

Table 4.3. Assessment of Design Expert on SATIS based- Thematic Teaching Material

Num	Statement	x	x_1	P (%)	Level of Validity	Explanation
1.	The suitability of the selected color in the SATIS based- thematic teaching materials.	2	5	40	Less Valid	Revision
2.	The suitability image on SATIS based- thematic teaching materials.	3	5	60	Valid enough	Some revision
3.	The font size on SATIS based- thematic teaching materials according to grade 4 elementary students	4	5	80	Valid	No revision
4.	The design of cover of SATIS based- thematic teaching materials	3	5	60	Valid enough	Some revision
5.	The suitability of images with material	3	5	60	Valid enough	Some revision
6.	The layout of images on SATIS based- thematic teaching materials	2	5	40	Less Valid	Revision
7.	The images on the SATIS based- thematic teaching materials close to student life	3	5	60	Valid enough	Some revision
8.	The font used in accordance with the grade 4 elementary students	3	5	60	Valid enough	Some revision
9.	The paper size selected for SATIS based- thematic teaching materials is appropriate	4	5	80	Valid	No revision
10.	The layout on SATIS based- thematic teaching materials is interesting	3	5	60	Valid enough	Some revision
Total		30	50	60	Valid enough	Some revision

Note:

x : score of responses by Mrs. Wiwis Sasmitaninghidayah, M.Sc as a design experts.

x_i : highest scores

P : percentage level of validity

Table 4.3. shows the data review results of the material experts thematic of the product development SATIS based- teaching materials is 60%. If matched with the table of validity criteria scores is included in quite valid criteria and needs to be revised on some components of the design of teaching material. The results of the review of design experts after the revision presented in Table 4.4.

Table 4.4. Assessment of Design Expert on SATIS based- Thematic Teaching Material after Revision

Num	Statement	x	x_i	P (%)	Level of Validity	Explanation
1.	The suitability of the selected color in the SATIS based- thematic teaching materials.	5	5	100	Highly valid	No revision
2.	The suitability image on SATIS based- thematic teaching materials.	5	5	100	Highly valid	No revision
3.	The font size on SATIS based- thematic teaching materials according to grade 4 elementary students	5	5	100	Highly valid	No revision
4.	The design of cover SATIS based- thematic teaching materials	4	5	80	Valid	No revision
5.	The suitability of images with material	5	5	100	Highly valid	No revision
6.	The layout of images on SATIS based- thematic teaching materials	5	5	100	Highly valid	No revision

7.	The images on the SATIS based- thematic teaching materials close to student life	5	5	100	Highly valid	No revision
8.	The font used in accordance with the grade 4 elementary students	5	5	100	Highly valid	No revision
9.	The paper size selected for SATIS based- thematic teaching materials is appropriate	5	5	100	Highly valid	No revision
10.	The layout on SATIS based- thematic teaching materials is interesting	5	5	100	Highly valid	No revision
Total		49	50	98	Highly valid	No revision

Note:

x : score of responses by Mrs. Wiwis Sasmitaninghidayah, M.Sc as a design experts.


x_i : highest scores

P : percentage level of validity

Table 4.4. shows the data review results of the material experts thematic of the product development SATIS based- teaching materials is 98%. If matched with the table of validity criteria scores is included in the highly valid criteria.

The qualitative data collected from the suggestions and comments of design experts in public statements regarding with development of thematic teaching materials are presented in Table 4.5. as follows:

Table 4.5. Overview of Data Assessment and Review of Design Expert on SATIS based- teaching materials

Num	Component / Position	Description of Data	Suggestions / Comments
1.	Front cover and back cover	The use of color on the cover 	The blue color of the clouds are less attractive to students, it should be changed to be more bright and flashy.
2.	KI-KD pages	Images of “Upin-Ipin”	Images of “Upin and Ipin” in each pages of KI-KD should not be monotonous and change to other images
3.	Totality	Layout	Layout of the first to the last page should not be the same or monotonous.
		Color selection	The use of color on some pages less attractive.

All data from the review, assessment and discussion with design experts used as a revising basis for improving SATIS based- thematic teaching materials before tested on learners as users of teaching materials product development.

3. Review from the Thematic Teaching Expert

Product development submitted to the fourth grade thematic teacher of elementary is in the form of SATIS based- thematic teaching materials. Exposure descriptive data of validation results from thematic teaching expert on product development of SATIS based- thematic teaching materials on the theme *Selalu Berhemat Energi* of the fourth grade submitted through questionnaire method can be seen in Table 4.6. and 4.7.

Table 4.6. Assessment of Thematic Teaching Expert on SATIS based- Thematic Teaching Material

Num	Statement	x	x_1	P (%)	Level of Validity	Explanation
1.	The level of completeness of the material contained on the SATIS based- thematic teaching materials developed is good?	4	5	80	Valid	No revision
2.	Does the material contained in the SATIS based- thematic teaching materials in accordance with the 2013 curriculum (already distinctively thematic)?	5	5	100	Highly Valid	No revision
3.	How systematic description of learning contents in the development of the SATIS based- thematic teaching materials?	4	5	80	Valid	No revision
4.	What style of language used in the development of SATIS based- thematic teaching materials is	3	5	60	Valid enough	Some revision

	already clear and according to the students' level of understanding?					
5.	Is the material presented through the development of SATIS based- thematic teaching materials can motivate students to study harder?	4	5	80	Valid	No revision
6.	Is teaching materials developed can facilitate teachers and students in learning activities?	4	5	80	Valid	No revision
7.	Is the evaluation instrument developed and packaged in the SATIS based- thematic teaching materials can measure the ability of students?	4	5	80	Valid	No revision
8.	Is the SATIS based- thematic teaching materials developed easy to use?	4	5	80	Valid	No revision
	Number	32	40	80	Valid	No revision

Specification:

x : score of responses by the validator, Mrs. Nur Cholilah, S.Pd as a thematic teaching expert.

x_i : highest scores

P : percentage level of validity

Table 4.6. shows the data review results of the material experts thematic of the product development SATIS based- teaching materials is 80%. If matched with the table of validity criteria scores is included in the valid criteria.

The qualitative data collected from the suggestions and comments of thematic teaching experts in public statements regarding with development of thematic teaching materials are presented in Table 4.7.as follows:

Table 4.7. Overview of Data Assessment and Review of Thematic Teaching Expert on SATIS based- teaching materials

Num	Component / Position	Description of Data	Suggestions / Comments
1.	Totality	The contents	Writing materials are in accordance with the K-13, are complementary existing teaching materials, facilitate on thematic teaching and learning, and can be more motivating students
		The rule of prepositions and affixes	Need a little note in the preposition to perfection material.
2.	Evaluation page	Evaluation questions	Evaluation questions are good and can be used to measure a student's ability.

All data from the review, assessment and discussion with thematic teaching experts used as a revising basis for improving SATIS based- thematic teaching materials before tested on learners as users of teaching materials product development.

C. Field Testing Results

1. Quantitative Data

Data validation obtained from the results of field testing on thematic teaching materials in grade 4 of elementary students held on December 16, to December 18, 2014. Product development testing is in the form of SATIS based- thematic learning teaching materials. Data validation of product development submitted to student of 4A of MIN Buduran Sidoarjo represented by 6 correspondents. Criteria of 6 correspondents are 2 higher part correspondent, 2 middle part correspondent, and 2 lower part correspondent. Exposure of quantitative data from field testing results are presented in Table 4.8 as follows:



Table 4.8. Assessment of Main Field Testing on SATIS based- Thematic Teaching Material

Num	Statement	x_1	x_2	x_3	x_4	x_5	x_6	Σx	Σx_i	P (%)	Level of Validation	Explanation
1.	SATIS based- thematic teaching materials can facilitate the learning	5	5	5	5	4	4	28	30	93,3	Highly Valid	No revision
2.	Using SATIS based- thematic teaching materials can give encouragement in learning	5	5	3	3	5	5	26	30	86,7	Highly Valid	No revision
3.	Easy to understand the material in the SATIS based- thematic teaching materials	4	4	4	4	5	4	25	30	83,3	Valid	No revision
4.	Easy to answer the questions on SATIS based- thematic teaching materials	3	3	4	4	4	3	21	30	70	Valid	No revision
5.	Typeface and font size contained in this SATIS based- thematic teaching materials is appropriate	4	5	5	5	5	5	29	30	96,7	Highly Valid	No revision
6.	The language used in SATIS based- thematic teaching materials easy to understand	5	4	5	5	5	4	28	30	93,3	Highly Valid	No revision
7.	Meet the words that are difficult for studying in learning SATIS based- thematic teaching materials	5	4	3	3	5	4	24	30	80	Valid	No revision
8.	Need the help of others such as friends, teachers, or parents when studying the teaching materials	4	4	3	3	3	3	22	30	73,3	Valid	No revision

9.	SATIS based- thematic teaching materials that has been developed is interesting to learn	5	5	4	4	5	5	28	30	93,3	Highly Valid	No revision
10.	SATIS based- thematic teaching materials can increase the motivation in learn	5	5	5	5	4	5	29	30	96,7	Highly Valid	No revision
Total		45	44	41	41	45	42	260	300	86	Highly Valid	No Revision



Specification:

x_1 : Respondent 1 represents the student are higher part on fourth grade of MIN
Buduran Sidoarjo named Laili Nurin Nabila

x_2 : Respondent 2 represents the student are higher part on fourth grade of MIN
Buduran Sidoarjo named Arya Eka Saputra

x_3 : Respondent 3 represents the student are middle part on fourth grade of MIN
Buduran Sidoarjo named Princess Puspita Illiyil

x_4 : Respondent 4 represents the student are middle part on fourth grade of MIN
Buduran Sidoarjo named Cindhya Reva Islenia

x_5 : Respondent 5 represents the student are lower part on fourth grade of MIN
Buduran Sidoarjo named Rafly FD

x_6 : Respondent 6 represents the student are lower part on fourth grade of MIN
Buduran Sidoarjo named M. Ahyar F

Σx : Total number of evaluators answer scores (real value)

Σx_i : Total number of scores the highest response (expected value)

P : percentage level of validity

Table 4.8. shows the data review results of the validation assessment of main field testing of the product development SATIS based- teaching materials is 86%. If matched with the validity criteria scores table is included in the highly valid criteria so that the product had not to be revision.

The qualitative data collected from the suggestions and comments of main field testing in public statements regarding to the products of teaching materials that have been tested are as follows:

- a. The design of the book is good and the book is very interesting.
- b. The book is very complete with the addition of information about Science is not yet known to the children.

In field trials *before* and *after* design for product development is used as a remedial model material. The presentation of data pre-test and post-test were obtained from the results of operational field testing on students of class IV A are presented in Table 4.9. below:

**Table 4.9. Assessment of Operational Field Testing Results at
*Pre-test and Post test***

No	Name	Pre-Test	Post-Test
1.	Abbrar Bintang Firmansyah	80	85
2.	Achmad Nadhif Al Fuadi	75	90
3.	Adam Setya Pratama	60	80
4.	Ahmad Khamdani	65	90
5.	Aisyah Tasnia Husna	65	70
6.	Alvia Natasya Agustin	70	80
7.	Andi Rahman Halim	70	85
8.	Annisa Fitra Farahiyah	65	80
9.	Ariella Valencia Nur A	65	75
10.	Arya Eka Syahputra	80	85
11.	Cindhya Reva Islenia	70	90
12.	Cintarissa Bintang Putri	75	80

13.	Dinda Avrilia Oma	65	65
14.	Divan Nurrachman	75	85
15.	Farhani Zakiya	65	80
16.	Fuad Satria Ar-Rasid	75	85
17.	Hasto Dipo A	80	85
18.	Hilmi Fuady	70	85
19.	Laili Nurin Nabila	85	95
20.	Mala Aliviana	60	60
21.	Manaf Ahmadil Huda	70	80
22.	Mauliza Rahmania	75	95
23.	M. Fajar Maulana	75	80
24.	M. Ahyar F	60	75
25.	M. Hamdan Ashari	75	75
26.	M. Raihan Rizky F	65	75
27.	M. Sholehudin Majid	70	75
28.	Nabil Fajrul Falah	75	85
29.	Nur Faizza C U	80	95
30.	Primasy Ayunda F S	55	80
31.	Putri Najwa Tazkia	75	90
32.	Putri Puspita Illiyil	70	85
33.	Rafly F D	50	70
34.	Riska Nanda Octaviani	60	75
35.	Rizki Ahmad Syahroni	70	80
36.	Rizqi Mubarok Dawam	75	90
37.	Syaharani Wibisono	75	80
38.	Tiara Dwi Saputri	65	75
Total		2655	3090
Average		69,86	81,31

Based on data in Table 4.9. shows that the average value of the pretest was 69,86 and the average value of post-test was 81,31. This indicates that the value of the post-test better than the pre-test. So there is a significant difference to the use of teaching materials have been developed.

CHAPTER V

ANALYSIS AND DISCUSSION

Chapter V is the most important chapter through out this thesis. This chapter will actually answer the objectives of this study that deals with three main issues namely specification of the product, the effectiveness and attractiveness of the product and the students' achievement after using this product.

A. The Form of Product

The development of SATIS based- thematic teaching materials is initiated by the fact that the thematic teaching materials is still very complex and there is a lack of supporting approaches teaching materials. Due to this condition therefore, SATIS approach is chosen that is hoped to contribute to the fulfillment of this gap. Thus the result of this development is intended to meet the availability of thematic teaching materials that can increase the effectiveness and attractiveness the thematic learning, especially on the topic *Selalu Berhemat Energi* for fourth grade elementary school.

The development procedure of SATIS based-thematic teaching material are achieved through several stages starting from research analysis, needs assessment and proof of concept, that is going to product planning and design, preliminary product development, preliminary field test, revisioning from the reviewer until main field test, final product revision.

The results of the reviewers (validators) and field testing are converted to a percentage scale in order to know the level of validity. Through this level of

validity, the decision whether the product needs to be revised or not can be made.

This following table is a qualification assessment criteria for this product.

Table 5.1. Qualification Level of Validity Based on Percentage

Percentage (%)	Level of validity	Specification
84 – 100	Highly Valid	No Revision
68 – 84	Valid	No Revision
52 – 68	Valid Enough	Some Revision
36 – 52	Less Valid	Revision
20 – 36	Highly less Valid	Revision

1. The Content of Product

To get the percentage of validity, this study utilized this formula below:

$$P = \frac{\Sigma X}{\Sigma X_i} \times 100 \%$$

The ΣX here is referring to the total score given by the reviewers of this product while ΣX_i is referring to the total of maximum score of the formula.

This study found out that the ΣX from the validator of product material (Mr Abtokhi, M.Pd) is 41. While the maximum score is 50. Therefore its percentage of validity can be gotten as a valid qualification (82%). It is therefore this product does not need for any revision.

$$P = \frac{\Sigma X}{\Sigma X_i} \times 100 \%$$

$$P = \frac{41}{50} \times 100 \%$$

$$= 82\%$$

Exposure data from the review of material expert on SATIS based- thematic teaching materials in Table 4.1 are gets the suitability of the product with core competencies is suitable while with the basic competencies is very suitable. Therefore the accuracy of the learning objectives based of SATIS based- thematic teaching materials is good as well as the quality of the product.

The precision of the language used is good qualified. Therefore the suitability of product with students state, the suitability of the content and the images are good qualified. The content not only good but also breadth. While the consistency of SATIS based- thematic teaching materials is good.

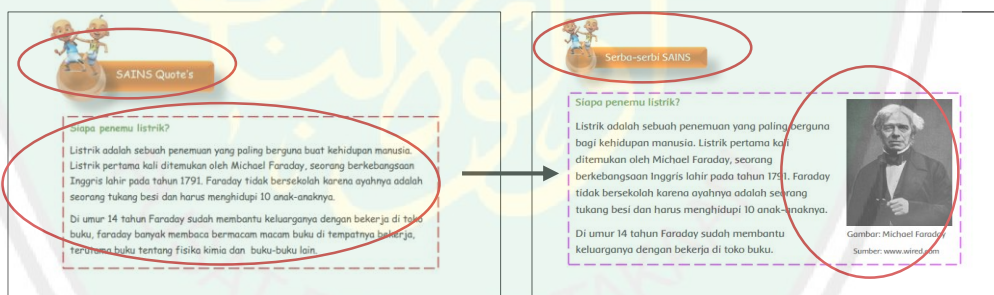
Based on a review of the validator experts (questionnaire and responses as attached in appendix), the teaching materials developed basically are not needs any revision. However, suggestions and comments from the validator submitted through open statement questionnaire attempted to realized so that the result of product development is getting better.

Revising product development of SATIS based- teaching materials based on the criticism and suggestions in table 4.2 are presented as follows:

- a. SATIS in every material need to be raised and sharpened
- b. The images used should be natural images, sources have to noted.



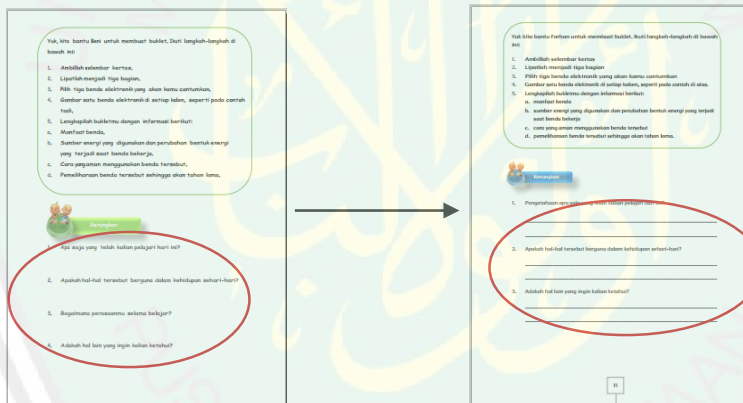
- c. Writing “*Kata Pengantar*” was changed to “*Pengantar*” and there should be no paragraph of gratitude to those who have provided support.
- d. Writing of directive sentences in the command line “*Science Quote’s*” changed to “*Serba Serbi Sains*”
- e. It should be added Faraday picture as an electrical inventor.



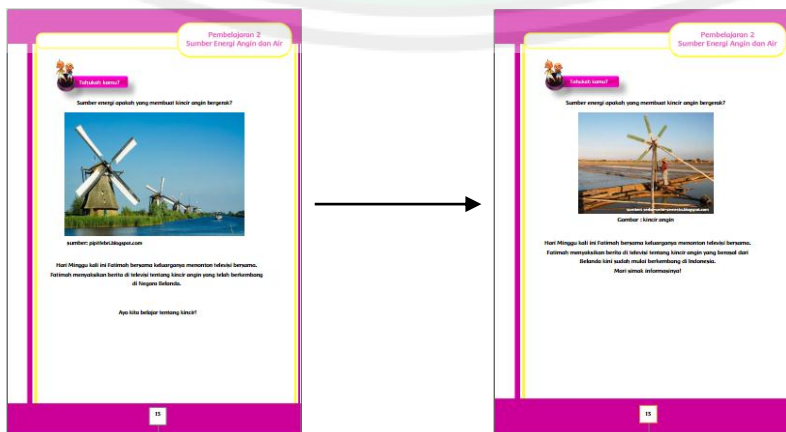
- f. Grammar should be improved, such as the use of colons (:): must not be separated by the word in front of it.
- g. It should be added the columns “*Sains Teknologi Masyarakat*” on page contained SATIS.



- h. The names of those who used in thematic story should be changed with the Islamic names according to the developer's agency.
- i. It should be added the line for students answered the questions.



- j. Image of windmill in Holland on the main page of the learning 2 should change into an image of windmills in Indonesia



- k. The directive sentence “*Amati gambar berikut dan jelaskan!*” changed more detail into “*Amati gambar berikut dan jelaskan kaitan gambar dengan Sains dan Aplikasinya!*”
- l. The phrase “*halaman sebelumnya*” is made in more detail by stating the number of pages.

2. The Media of Product

To get the percentage of validity, this study utilized this formula below:

$$P = \frac{\Sigma X}{\Sigma X_i} \times 100 \%$$

The ΣX here is referring to the total score given by the reviewers of this product while ΣX_i is referring to the total of maximum score of the formula.

This study found out that the ΣX from the validator of product design (Mrs Wiwis Sasmitaninghidayah, M.Sc) is 30. While the maximum score is 50. Therefore its percentage of validity can be gotten as a valid enough qualification (60%). It is therefore this product need for some revision.

$$P = \frac{\Sigma X}{\Sigma X_i} \times 100 \%$$

$$P = \frac{30}{50} \times 100 \%$$

$$= 60\%$$

Based on the result that is obtained above (60%), the percentage of design validity 60% is still valid enough, so that the thematic teaching material needs to be some revision. After the first revision the ΣX given by the same validator is 49.

Therefore its percentage of validity can be gotten as a highly valid qualification (98%). It is therefore this product not need for any revision.

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

$$P = \frac{49}{50} \times 100 \%$$

$$= 98\%$$

Exposure data from the review of material expert on SATIS based- thematic teaching materials in Table 4.4 are gets the suitability of the selected color, images and its layout, font size, and paper size in the SATIS based- thematic teaching material are very well qualification. Another very well qualification are also gotten on the images which is close to the students life. While the design of cover of SATIS based- thematic teaching materials is good.

Based on a review of the validator experts (questionnaire and responses as attached in appendix), the teaching materials developed basically are not needs any revision. However, suggestions and comments from the validator submitted through open statement questionnaire attempted to realized so that the result of product development is getting better.

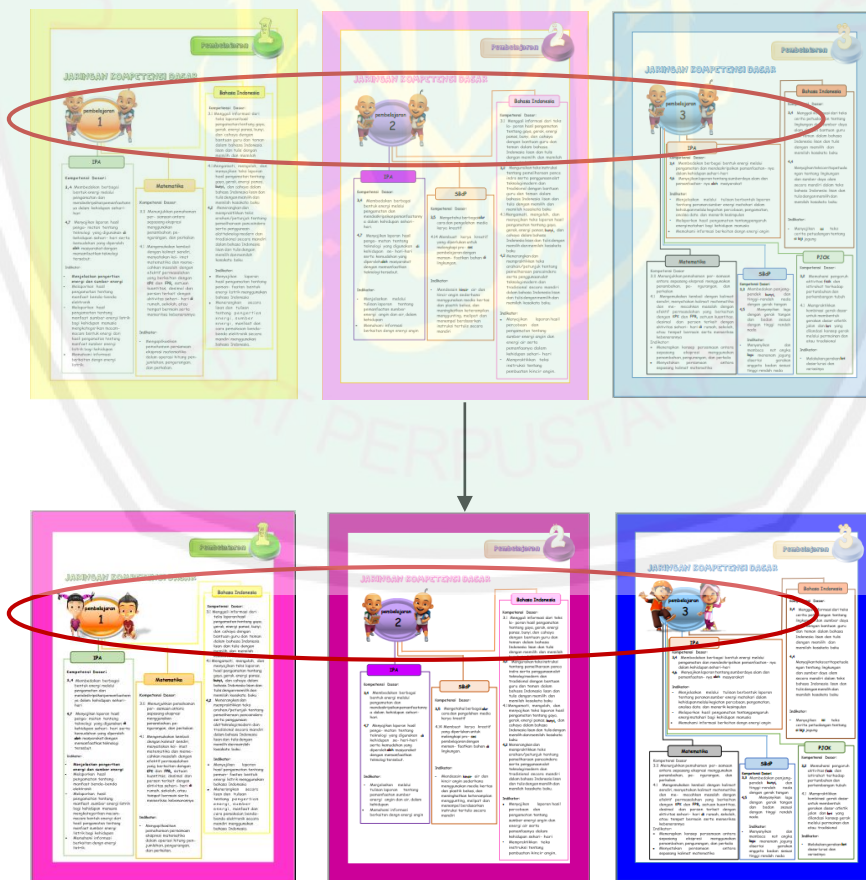
Revising product development of SATIS based- teaching materials based on the criticism and suggestions in table 4.5 are presented as follows:

- a. Layout of the first to the last page should not be the same or monotonous.
- b. The use of color on some pages less attractive

- c. The blue color of the clouds are less attractive to students, it should be changed to be more bright and flashy.



- d. Images of “Upin and Ipin” in each pages of KI-KD should not be monotouns and change to other images.



3. The Thematic of Product

To get the percentage of validity, this study utilized this formula below:

$$P = \frac{\Sigma X}{\Sigma X_i} \times 100 \%$$

The ΣX here is referring to the total score given by the reviewers of this product while ΣX_i is referring to the total of maximum score of the formula.

This study found out that the ΣX from the validator of the thematic of product (Mrs Cholilah, S.Pd) is 30. While the maximum score is 40. Therefore its percentage of validity can be gotten as a valid qualification (80%). It is therefore this product does not need for any revision.

$$P = \frac{\Sigma X}{\Sigma X_i} \times 100 \%$$

$$P = \frac{30}{40} \times 100 \%$$

$$= 80\%$$

Exposure data from the review of material expert on SATIS based- thematic teaching materials in Table 4.6 are gets the level of completeness of the material contained is good. While the material contained is actually in accordance with the 2013 curriculum (already distinctively thematic) and the systematic description of learning contents in the development of the SATIS based- thematic teaching materials is also clear.

The style of language used in the development of SATIS based- thematic teaching materials is quite clear and according to the students' level of

understanding. The other suggestion about material presented through the development of SATIS based- thematic teaching materials can motivate students to study harder so, the teaching materials developed can facilitate teachers and students in learning activities. At the end of book, there is evaluation instrument. This evaluation instrument can measure the ability of students therefore the SATIS based- thematic teaching materials developed is easy to use.

Based on the results of the assessment or responses of fourth grade thematic teacher of MIN Buduran Sidoarjo (questionnaire responses and assessment as attached in appendix), indicates that the comments of fourth grade thematic teacher is positive (good). So the product development of teaching materials do not need to be revision. Then, no criticism from fourth grade thematic teacher, just that there is advice given by learning experts that need a little note in the preposition to perfection material.

B. Analysis of the Effectiveness and Attractiveness of the Product

To measure effectiveness and attractiveness of this product as explained in chapterv III through the questionnaire given to 6 students by following this formula below:

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

From the table 4.8 in chapter IV, it shows that the total percentage from the small grup (6 students) test is 86%. However this validity of this product is highly valid and needs not to be revision at all. While the description of each criteria for the questionnaire given to 6 students can be analyzed as follows:

SATIS based- thematic teaching materials can facilitate the learning gets assessment with a percentage of 93,3%. This indicate that the thematic teaching materials very facilitate the learning. Using SATIS based- thematic teaching materials can give encouragement in learning gets assessment with a percentage of 86,7%. This indicate that thematic teaching materials very give encouragement in learning.

The easiness of students to understand the material in the SATIS based- thematic teaching materials gets assessment with a percentage of 83,3%. This indicates that this thematic teaching material can be easily understood by students. Therefore easiness to answer the questions on SATIS based- thematic teaching materials gets assessment with a percentage of 70%, This indicates that the evaluation questions is not easy and not difficult, and can be used to measure a student's ability.

Typeface and font size contained in this SATIS based- thematic teaching materials is appropriate gets assessment with a percentage of 96,7%. This indicates that the typeface and font size that is contained in this thematic teaching material is very facilitate students in reading. While the language used in SATIS based- thematic teaching materials easy to understand gets assessment with a percentage of 93,3%. This indicates that the language used in the development of teaching materials can be very easy for understood by students.

Finding the words that are difficult for studying in learning SATIS based- thematic teaching materials gets assessment with a percentage of 80%. This indicates that only a few difficult words found in the book.

The requirements help of others such as friends, teachers, or parents when studying the teaching materials gets assessment with a percentage of 73,3%. This indicates that this thematic teaching material can be used by students either through the help of friends, teachers, or parents and 30% of students can learn by themselves through this thematic teaching material. Then, the SATIS based- thematic teaching materials that has been developed is interesting to learn gets assessment with a percentage of 93,3%. This shows that the thematic teaching materials assessed very interesting by students to augment their interest in learning. While the SATIS based- thematic teaching materials can increase the motivation in learn gets assessment with a percentage of 96,7%. This shows that students are very highly motivated of this thematic teaching material.

C. The Students' Achievement

The students achievement in this study is measured by the differences between pre-test and post-test. This SATIS based- thematic teaching material is utilized in the class field testing with 38 students is presented in Table 5.2. bellow:

Table 5.2. Students Achievement at *Pre-test*

Num	Name	Minimum Criteria	Pre-Test	Description
1.	Abbrar Bintang Firmansyah	72	80	Passed
2.	Achmad Nadhif Al Fuadi	72	75	Passed
3.	Adam Setya Pratama	72	60	Not passed
4.	Ahmad Khamdani	72	65	Not passed
5.	Aisyah Tasnia Husna	72	65	Not passed
6.	Alvia Natasya Agustin	72	70	Not passed
7.	Andi Rahman Halim	72	70	Not passed

8.	Annisa Fitra Farahiyah	72	65	Not passed
9.	Ariella Valencia Nur A	72	65	Not passed
10.	Arya Eka Syahputra	72	80	Passed
11.	Cindhy Reva Islenia	72	70	Not passed
12.	Cintarissa Bintang Putri	72	75	Passed
13.	Dinda Avrilia Oma	72	65	Not passed
14.	Divan Nurrachman	72	75	Passed
15.	Farhani Zakiya	72	65	Not passed
16.	Fuad Satria Ar-Rasid	72	75	Passed
17.	Hasto Dipo A	72	80	Passed
18.	Hilmi Fuady	72	70	Not passed
19.	Laili Nurin Nabila	72	85	Passed
20.	Mala Aliviana	72	60	Not passed
21.	Manaf Ahmadil Huda	72	70	Not passed
22.	Mauliza Rahmania	72	75	Passed
23.	M. Fajar Maulana	72	75	Passed
24.	M. Ahyar F	72	60	Not passed
25.	M. Hamdan Ashari	72	75	Passed
26.	M. Raihan Rizky F	72	65	Not passed
27.	M. Sholehudin Majid	72	70	Not passed
28.	Nabil Fajrul Falah	72	75	Passed
29.	Nur Faizza C U	72	80	Passed
30.	Primasy Ayunda F S	72	55	Not passed
31.	Putri Najwa Tazkia	72	75	Passed
32.	Putri Puspita Illiyil	72	70	Not passed
33.	Rafly F D	72	50	Not passed
34.	Riska Nanda Octaviani	72	60	Not passed
35.	Rizki Ahmad Syahroni	72	70	Not passed
36.	Rizqi Mubarak Dawam	72	75	Passed
37.	Syaharani Wibisono	72	75	Passed
38.	Tiara Dwi Saputri	72	65	Not passed
Total			2655	
Average			69,86	

Looking at the pre-test score in the Table 5.2. it clearly shows that the students that have been passed the criteria are 16 and who have not passed are 22. The percentage of students who have passed or not passed with following formula:

$$\begin{aligned} \text{Students who are not passed} &= \frac{\Sigma \text{ Not Passed Students}}{\Sigma \text{ Total of Students}} \times 100 \% \\ &= \frac{16}{38} \times 100 \% \\ &= 42\% \end{aligned}$$

$$\begin{aligned} \text{Students who are passed} &= \frac{\Sigma \text{ Passed Students}}{\Sigma \text{ Total of Students}} \times 100 \% \\ &= \frac{22}{38} \times 100 \% \\ &= 58\% \end{aligned}$$

From the formulas, known that the students' achievement who are passed less than 80%. So, need to new treatment to increase the students' achievement, that is by implementing the SATIS based- thematic teaching material and it can be measure the effectiveness of the book.

After implementing the SATIS based- thematic teaching material, students are given post-test to know the result of using of the book. The result of post-test is presented in Table 5.3. bellow.

Table 5.3. Students Achievement at *Post-test*

Num	Name	Minimum Criteria	Post-Test	Description
1.	Abbrar Bintang Firmansyah	72	85	Passed
2.	Achmad Nadhif Al Fuadi	72	90	Passed
3.	Adam Setya Pratama	72	80	Passed
4.	Ahmad Khamdani	72	90	Passed
5.	Aisyah Tasnia Husna	72	70	Not passed
6.	Alvia Natasya Agustin	72	80	Passed
7.	Andi Rahman Halim	72	85	Passed

8.	Annisa Fitra Farahiyah	72	80	Passed
9.	Ariella Valencia Nur A	72	75	Passed
10.	Arya Eka Syahputra	72	85	Passed
11.	Cindhy Reva Islenia	72	90	Passed
12.	Cintarissa Bintang Putri	72	80	Passed
13.	Dinda Avrilia Oma	72	65	Not passed
14.	Divan Nurrachman	72	85	Passed
15.	Farhani Zakiya	72	80	Passed
16.	Fuad Satria Ar-Rasid	72	85	Passed
17.	Hasto Dipo A	72	85	Passed
18.	Hilmi Fuady	72	85	Passed
19.	Laili Nurin Nabila	72	95	Passed
20.	Mala Aliviana	72	60	Not passed
21.	Manaf Ahmadil Huda	72	80	Passed
22.	Mauliza Rahmania	72	95	Passed
23.	M. Fajar Maulana	72	80	Passed
24.	M. Ahyar F	72	75	Passed
25.	M. Hamdan Ashari	72	75	Passed
26.	M. Raihan Rizky F	72	75	Passed
27.	M. Sholehudin Majid	72	75	Passed
28.	Nabil Fajrul Falah	72	85	Passed
29.	Nur Faizza C U	72	95	Passed
30.	Primasy Ayunda F S	72	80	Passed
31.	Putri Najwa Tazkia	72	90	Passed
32.	Putri Puspita Illiyil	72	85	Passed
33.	Rafly F D	72	70	Not passed
34.	Riska Nanda Octaviani	72	75	Passed
35.	Rizki Ahmad Syahroni	72	80	Passed
36.	Rizqi Mubarak Dawam	72	90	Passed
37.	Syahrani Wibisono	72	80	Passed
38.	Tiara Dwi Saputri	72	75	Passed
		Total	2655	
		Average	69,86	

Looking at the post-test score in the Table 5.3. it clearly shows that the students that have been passed the criteria are 34 and who have not passed are 4 students. The percentage of students who have passed or not passed with following formula:

$$\begin{aligned} \text{Students who are not passed} &= \frac{\Sigma \text{ Not Passed Students}}{\Sigma \text{ Total of Students}} \times 100 \% \\ &= \frac{4}{38} \times 100 \% \\ &= 11\% \end{aligned}$$

$$\begin{aligned} \text{Students who are passed} &= \frac{\Sigma \text{ Passed Students}}{\Sigma \text{ Total of Students}} \times 100 \% \\ &= \frac{22}{38} \times 100 \% \\ &= 89\% \end{aligned}$$

From the formulas, known that the students' achievement who are passed the criteria is 89%. So the SATIS based-thematic teaching material is effective and can improve the students' achievement.

While, from Table 5.2. and Table 5.3. are known that the post-test score is much higher than its pre-test ($81,31 > 69,86$). That increase in score indicate that the SATIS based-thematic teaching material can actually improve the students achievement.

In addition, to see and to strengthen the influence of this product, t test is implemented. Test carried out using t test with significance in terms of 0,05.

Step of *t* test

Step 1. Make H_a and H_o in the form of sentences

H_a : there is a difference in student's achievement before and after using the SATIS based- thematic teaching materials on the theme 2 *Selalu Berhemat Energi*.

H_o : there is no difference in student's achievement before and after using the SATIS based- thematic teaching materials on the theme 2 *Selalu Berhemat Energi*.

Step 2. Finding *t* with formula

$$t = \frac{\bar{D}}{\sqrt{\frac{d^2}{N(N-1)}}}, \text{ and } N = 38, N - 1 = 38 - 1 = 37$$

$$\bar{D} = 81,31 - 69,86$$

$$= 11,45$$

$$t_{\text{table}} = 2,021$$

Step 3. Determine the criteria.

H_o accepted if $t < t_{\text{tables}}$

H_o rejected if $t \geq t_{\text{tables}}$

Step 4. Calculation

Table 5.3 Calculation of *t* test

Case	X ₁	X ₂	D = (X ₂ - X ₁)	D ²
1	80	85	5	25
2	75	90	15	225

3	60	80	20	400
4	65	90	25	625
5	65	70	5	25
6	70	80	10	100
7	70	85	15	225
8	65	80	15	225
9	65	75	10	100
10	80	85	5	25
11	70	90	20	400
12	75	80	5	25
13	65	65	0	0
14	75	85	10	100
15	65	80	15	225
16	75	85	10	100
17	80	85	5	25
18	70	85	15	225
19	85	95	10	100
20	60	60	0	0
21	70	80	10	100
22	75	95	20	400
23	75	80	5	25
24	60	75	15	225
25	75	75	0	0
26	65	75	10	100
27	70	75	5	25
28	75	85	10	100
29	80	95	15	225
30	55	80	25	625
31	75	90	15	225
32	70	85	15	225
33	50	70	20	400
34	60	75	15	225
35	70	80	10	100
36	75	90	15	225
37	75	80	5	25
38	65	75	10	100
Total	2655	3090	435	6525

$$d^2 = \sum D^2 - \frac{(\sum D)^2}{N}$$

$$d^2 = 6525 - \frac{(435)^2}{38}$$

$$d^2 = 6525 - \frac{189225}{38}$$

$$d^2 = 6525 - 4979,60$$

$$d^2 = 1545,40$$

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

$$= \frac{11,45}{\sqrt{\frac{1545,40}{38(38-1)}}}$$

$$= \frac{11,45}{\sqrt{\frac{1545,40}{38(37)}}}$$

$$= \frac{11,45}{\sqrt{\frac{1545,40}{1406}}}$$

$$= \frac{11,45}{\sqrt{1,10}}$$

$$= \frac{11,45}{1,05}$$

$$= 10,90$$

Step 5. Comparing t and t_{table}

$$t = 10,90$$

$$t_{\text{table}} = 2,021$$

Step 6. Conclusion

The result of the calculation above shows that t is greater than t_{tables} ie $10,90 > 2,021$ then H_0 is rejected and H_a accepted, so there is a significant difference between the value of students' achievement before and after using the SATIS based- thematic teaching materials. It shows that thematic teaching materials developed give positive impact that is able to improve students' achievement.



CHAPTER VI

CONCLUSION

Chapter VI mainly describe two things namely: the result of product development; and the recommendation for product utilization, dissemination, and further development.

A. The Result of Product Development

The SATIS based- thematic teaching material on “*Selalu Berhemat Energi*” for improving fourth grade students’ achievement in MIN Buduran Sidoarjo consist of cover, preface, table of contents, sheets of KI-KD and indicators per learning. It also includes learning activities that contain the core material and supporting section, evaluation, and bibliography.

This SATIS based- thematic teaching material has been assessed with good qualification. This qualification is based on the result of reviewers who are the thematic teacher, material and design experts. The thematic teacher get value of total 80%, which means the qualification of SATIS based- thematic teaching material on “*Selalu Berhemat Energi*” is valid and needs not revision. The value from field testing also indicate that this SATIS based- thematic teaching material is highly valid which is 86%. The result of review from the material expert gets the value of 82%. It indicates that the thematic teaching material is valid and need no revision. While from the design expert gets value of 60% that indicates the thematic teaching material is still valid enough that needs some revision. However that is gotten value gets after revision of the design media expert is 98% and it show the

qualification is highly valid and therefore the material needs no to be revised again. But, the book will still be improved based on suggestions and comments from each reviewers.

The SATIS based- thematic teaching material on “*Selalu Berhemat Energi*” which has been developed is also got proven by the calculation using t test with significance level of 0,05 obtained results of $t > t_{table}$ is $10,90 > 2,021$ means that H_0 is rejected and H_a accepted. Furthermore, from the mean it is clear that X_2 is greater than X_1 ($81,31 > 69,86$) and it also shows that post-test is better than the pre-test. Therefore it can be concluded that there are significant differences of students’ learning achievement on thematic learning before and after using the SATIS based- thematic teaching materials on “*Selalu Berhemat Energi*”.

B. Recommendation

This SATIS based- thematic teaching material on “*Selalu Berhemat Energi*” that has been developed is actually only a supporting thematic book for fourth grade students of elementary school in curriculum 2013. Even though this development product had been revised as suggested by the reviewers, the further revision is still highly needed in order to create a more perfect product. This is due to the fact that there is always a missing element that needs further researcher to contribute in fulfilling the hole.

Beside that this teaching material is limited only to theme 2 “*Selalu Berhemat Energi*” with subtheme 1 and it only consist of 3 learning topics. Hence in order have a better implementation it will be good if it is added into one whole theme before it is continuously developed.

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**Angket Tanggapan/Penilaian Validasi Pengembangan Bahan Ajar tematik
berbasis Sains Teknologi Masyarakat (STM)
Tema “ Selalu Berhemat Energi”**

A. Pengantar

Berkaitan dengan pelaksanaan kurikulum 2013 bahwasanya pada pembelajaran SD/MI menggunakan pendekatan terintegrasi yaitu dengan cara mengintegrasikan seluruh konten mata pelajaran kedalam berbagai tema. Buku/bahan ajar tematik kurikulum 2013 untuk kelas 4 SD/MI dirasa masih sedikit memuat aplikasi sains pada masyarakat. Sehingga terkadang siswa masih merasa kesulitan memahami materi yang sedang diajarkan guru. Maka dalam hal ini, peneliti bermaksud mengembangkan buku tematik 2013 yang ada kedalam bentuk Bahan ajar tematik berbasis Sains Teknologi Masyarakat.

Buku/bahan ajar tematik kurikulum 2013 kompetensi yang berkenaan dengan sikap keagamaan dan sosial dikembangkan secara tidak langsung (*indirect teaching*) yaitu pada waktu peserta didik belajar tentang pengetahuan (Kompetensi Inti 3) dan penerapan pengetahuan (Kompetensi Inti 4). Melalui pengembangan bahan ajar tematik berbasis Sains Teknologi Masyarakat inilah peneliti bermaksud pula menjembatani daya nalar peserta didik serta kemampuan sikap sosial peserta didik.

Untuk maksud di atas, peneliti mohon kesediaan Bapak/Ibu agar mengisi angket di bawah ini sebagai ahli pembelajaran tematik integratif. Tujuan dari pengisian angket adalah mengetahui kesesuaian pemanfaatan bahan ajar ini sebagaimana yang telah dirancang berdasarkan KI dan KD pada kurikulum 2013. Hasil pengukuran melalui angket ini akan digunakan sebagai penyempurna bahan ajar agar dapat dimanfaatkan dalam pembelajaran. Sebelumnya saya sampaikan terimakasih atas kesediaan Bapak/Ibu sebagai ahli pembelajaran tematik integratif.

**Angket Tanggapan/Penilaian Validasi Pengembangan Bahan Ajar tematik
berbasis Sains Teknologi Masyarakat (STM)
Tema “ Selalu Berhemat Energi”**

Nama :

NIP :

Instansi :

Pendidikan :

Alamat :

B. Petunjuk Pengisian Angket

1. Sebelum mengisi angket ini mohon terlebih dahulu Bapak/ Ibu membaca atau mempelajari bahan ajar yang telah dikembangkan.
2. Pilihlah salah satu angka pada jawaban yang sesuai dengan penilaian Bapak/Ibu anggap paling tepat.

Keterangan :

1. Sangat tidak jelas, tidak sesuai, tidak relevan, tidak sistematis, tidak memotivasi, tidak mengukur kemampuan.
2. Kurang jelas, kurang sesuai, kurang relevan, kurang sistematis, kurang memotivasi, kurang mengukur kemampuan.
3. Cukup jelas, Cukup sesuai, cukup relevan, cukup sistematis, cukup memotivasi, cukup mengukur kemampuan.
4. Jelas, sesuai, relevan, sistematis, memotivasi, mengukur kemampuan.
5. Sangat jelas, Sangat sesuai, Sangat relevan, Sangat sistematis, Sangat memotivasi, Sangat mengukur kemampuan.

**Angket Tanggapan/Penilaian Validasi Pengembangan Bahan Ajar tematik
berbasis Sains Teknologi Masyarakat (STM)
Tema “ Selalu Berhemat Energi”**

Pertanyaan-pertanyaan Angket.

Berilah tanda silang (\checkmark) pada alternative jawaban yang dianggap paling sesuai.

No.	Kriteria	Nilai				
		1	2	3	4	5
1.	Bagaimana tingkat kelengkapan materi yang terdapat pada bahan ajar tematik berbasis Sains Teknologi Masyarakat yang dikembangkan ini?					
2.	Apakah materi yang terdapat dalam pada bahan ajar tematik berbasis Sains Teknologi Masyarakat yang dikembangkan ini sesuai dengan kurikulum 2013 (sudah berciri khas tematik) ?					
3.	Bagaimana sistematis uraian isi pembelajaran dalam pengembangan pada bahan ajar tematik berbasis Sains Teknologi Masyarakat?					
4.	Apakah gaya bahasa yang digunakan dalam pengembangan bahan ajar ini sudah jelas dan sesuai dengan tingkat pemahaman siswa?					
5.	Apakah materi yang disajikan melalui pengembangan pada bahan ajar tematik berbasis Sains Teknologi Masyarakat ini					

**Angket Tanggapan/Penilaian Validasi Pengembangan Bahan Ajar tematik
berbasis Sains Teknologi Masyarakat (STM)
Tema “ Selalu Berhemat Energi”**

	dapat memberikan motivasi kepada siswa agar lebih giat belajar?					
6.	Apakah bahan ajar yang dikembangkan dapat mempermudah guru dan siswa dalam kegiatan pembelajaran?					
7.	Apakah instrument evaluasi yang dikembangkan dan dikemas dalam pada bahan ajar tematik berbasis Sains Teknologi Masyarakat ini dapat mengukur kemampuan siswa?					
8.	Apakah pada bahan ajar tematik berbasis Sains Teknologi Masyarakat yang dikembangkan mudah digunakan?					

C. Komentar dan saran :

**Angket Tanggapan/Penilaian Validasi Pengembangan Bahan Ajar tematik
berbasis Sains Teknologi Masyarakat (STM)
Tema “ Selalu Berhemat Energi”**



Malang, Desember 2014
Ahli Pembelajaran Tematik,

.....
NIP.

Appendix VIII

INSTRUMEN VALIDASI PENGEMBANGAN BAHAN AJAR BERBASIS SAINS TEKNOLOGI MASYARAKAT (STM) TEMA “SELALU BERHEMAT ENERGI” OLEH SISWA

A. Pengantar

Adik, buku tematik yang telah kita pelajari di sekolah mengintegrasikan konten mata pelajaran Ilmu Pengetahuan Alam, Matematika, Bahasa Indonesia, SPdB, dan PJOK, Ilmu Pengetahuan Sosial, dan PKn diintegrasikan ke dalam berbagai tema. Buku/ajar tematik kurikulum 2013 kompetensi yang berkenaan dengan sikap keagamaan dan sosial dikembangkan secara tidak langsung langsung (*indirect teaching*) yaitu pada waktu peserta didik belajar tentang pengetahuan (Kompetensi Inti 3) dan penerapan pengetahuan (Kompetensi Inti 4). Maka dalam hal ini, peneliti bermaksud melakukan pengembangan bahan ajar tematik dikhususkan pada tingkat SD/MI dengan mengintegrasikan sains dan aplikasinya kepada kompetensi pengetahuan dan penerapan pengetahuan.

Berkaitan dengan pelaksanaan pengembangan bahan ajar dengan tema “*Selalu Berhemat Energi*” subtema “*Sumber-sumber Energi*” maka peneliti bermaksud untuk mengembangkan bahan ajar tersebut dengan integrasi Sains Teknologi Masyarakat (STM). Untuk maksud di atas, peneliti mohon kesediaan adik sebagai siswa kelas IV agar mengisi angket di bawah ini sebagai pemakai bahan belajar. Tujuan dari pengisian angket adalah mengetahui kesesuaian pemanfaatan bahan ajar ini sebagaimana yang telah dirancang berdasarkan berdasarkan KI dan KD pada kurikulum 2013. Hasil pengukuran melalui angket akan digunakan untuk menyempurnakan bahan ajar, agar dapat dimanfaatkan dalam kegiatan belajar mengajar. Sebelumnya saya sampaikan terima kasih atas kesediaan adik sebagai pemakai media belajar.

Nama :

Kelas :

Sekolah :

B. Petunjuk Pengisian Angket

1. Sebelum mengisi angket ini, mohon terlebih dahulu adik membaca atau mempelajari bahan ajar yang dikembangkan.
2. Pilihlah salah satu angka pada jawaban yang sesuai dengan penilaian yang adik anggap paling tepat.

Skala Penilaian/ Tanggapan				
1	2	3	4	5

Keterangan:

- a. Skor 1 untuk tidak jelas, tidak sesuai, tidak relevan, tidak sistematis, tidak memotivasi, tidak mengukur kemampuan.
- b. Skor 2 untuk kurang jelas, kurang sesuai, kurang relevan, kurang sistematis, kurang memotivasi, kurang mengukur kemampuan.
- c. Skor 3 untuk cukup jelas, cukup sesuai, cukup relevan cukup sistematis, cukup memotivasi, cukup mengukur kemampuan.
- d. Skor 4 untuk jelas, sesuai, relevan, sistematis, memotivasi, mengukur kemampuan.
- e. Skor 5 untuk sangat jelas, sangat sesuai, sangat relevan, sangat sistematis, sangat memotivasi, sangat mengukur kemampuan.

C. Pertanyaan-pertanyaan Angket

1. Apakah bahan ajar tematik berbasis Sains Teknologi Masyarakat (STM) dapat memudahkan adik dalam belajar?

1	2	3	4	5
Tidak memudahkan	Kurang memudahkan	Cukup memudahkan	Memudahkan	Sangat memudahkan

2. Apakah dengan menggunakan bahan ajar tematik berbasis Sains Teknologi Masyarakat (STM) ini dapat memberi semangat dalam belajar adik?

1	2	3	4	5
Tidak memberi semangat	Kurang memberi semangat	Cukup memberi semangat	Memberi semangat	Sangat memberi semangat

3. Apakah adik mudah memahami materi yang ada di dalam bahan ajar tematik berbasis Sains Teknologi Masyarakat (STM) yang telah dikembangkan ini?

1	2	3	4	5
Tidak Mudah	Kurang mudah	Cukup mudah	Mudah	Sangat mudah

4. Menurut adik, bagaimana soal-soal pada bahan ajar tematik berbasis Sains Teknologi Masyarakat (STM) ini?

1	2	3	4	5
Tidak Mudah	Kurang mudah	Cukup mudah	Mudah	Sangat mudah

5. Bagaimana jenis huruf dan ukuran huruf yang terdapat dalam bahan ajar tematik ini?

1	2	3	4	5
Tidak Mudah	Kurang mudah	Cukup mudah	Mudah	Sangat mudah

6. Apakah bahasa yang digunakan dalam bahan ajar mudah dipahami?

1	2	3	4	5
Tidak Mudah dipahami	Kurang mudah dipahami	Cukup mudah dipahami	Mudah dipahami	Sangat mudah dipahami

7. Selama mempelajari bahan ajar ini, apakah adik menemui kata-kata yang sulit?

1	2	3	4	5
Sangat menemukan	Menemukan	Cukup menemukan	Kurang menemukan	Tidak menemukan

8. Selama menggunakan bahan ajar, apakah kalian memerlukan bantuan orang lain seperti teman, guru, atau orang tua?

1	2	3	4	5
Sangat membutuhkan	Membutuhkan	Cukup membutuhkan	Kurang membutuhkan	Tidak membutuhkan

9. Menurut adik, bahan ajar tematik berbasis Sains Teknologi Masyarakat (STM) yang telah dikembangkan ini menarik untuk dipelajari?

1	2	3	4	5
Tidak Menarik	Kurang menarik	Cukup menarik	Menarik	Sangat menarik

10. Apakah bahan ajar tematik berbasis Sains Teknologi Masyarakat (STM) ini dapat menambah motivasi adik dalam belajar?

1	2	3	4	5
Tidak Memotivasi	Kurang memotivasi	Cukup memotivasi	Memotivasi	Sangat memotivasi

Terimakasih

Angket Tanggapan/penilaian Ahli Desain Bahan Ajar Tematik Berbasis STM “Selalu Berhemat Energi”

Petunjuk pengisian :

1. Sangat tidak tepat, sangat tidak serasi, sangat tidak jelas, sangat tidak menarik
2. Kurang tepat, kurang serasi, kurang jelas, kurang menarik
3. cukup tepat, cukup serasi, cukup jelas, cukup menarik
4. tepat, serasi, jelas, menarik
5. Sangat tepat, sangat serasi, sangat jelas, sangat menarik

A. Berilah tanda silang (√) pada alternative jawaban yang dianggap paling sesuai.

No.	Kriteria	Nilai				
		1	2	3	4	5
1.	Bagaimana kesesuaian warna yang dipilih pada bahan ajar tematik berbasis STM ini.					
2.	Bagaimana kesesuaian gambar pada bahan ajar tematik berbasis STM.					
3.	Ukuran tulisan pada bahan ajar tematik berbasis STM sesuai dengan siswa MI kelas 4					
4.	Bagaimana desain <i>cover</i> pada bahan ajar tematik berbasis STM					
5.	Bagaimana kesesuaiann gambar dengan materi					
6.	Bagaimana tata letak gambar pada bahan ajar tematik berbasis STM					
7.	Gambar pada bahan ajar tematik berbasis STM dekat dengan kehidupan siswa					
8.	Jenis huruf yang digunakan sesuai dengan siswa MI kelas I					

**Angket Tanggapan/penilaian Ahli Desain Bahan Ajar Tematik Berbasis STM
“Selalu Berhemat Energi”**

9.	Ukuran kertas yang dipilih untuk bahan ajar tematik berbasis STM tepat					
10.	Layout pada bahan ajar tematik berbasis STM menarik					

B. Komentar dan saran :

Malang, November 2014

Ahli Desain,

.....

NIP.

Angket Tanggapan/penilaian Ahli Desain Bahan Ajar Tematik Berbasis STM
“Selalu Berhemat Energi”

Identitas Ahli

Identitas Pribadi

Nama :
NIP :
Jabatan :
Alamat :

Riwayat Pendidikan :

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.....
.....

Profesi yang sedang di tekuni :

.....
.....
.....

Pengalaman dalam bidang pendidikan :

.....
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.....

Buku / Bahan ajar yang pernah di tulis :

.....
.....
.....

**Angket Tanggapan/penilaian Ahli Materi Bahan Ajar Tematik Berbasis STM
“Selalu Berhemat Energi”**

Petunjuk pengisian :

1. Sangat tidak tepat, sangat tidak serasi, sangat tidak jelas, sangat tidak menarik
2. Kurang tepat, kurang serasi, kurang jelas, kurang menarik
3. cukup tepat, cukup serasi, cukup jelas, cukup menarik
4. tepat, serasi, jelas, menarik
5. Sangat tepat, sangat serasi, sangat jelas, sangat menarik

A. Berilah tanda silang (√) pada alternative jawaban yang dianggap paling sesuai.

No	Kriteria	Nilai				
		1	2	3	4	5
1.	Kesesuaian bahan ajar tematik berbasis STM dengan standart inti					
2.	Kesesuaian bahan ajar tematik berbasis STM dengan kompetensi dasar					
3.	Ketepatan tujuan pembelajaran bahan ajar tematik berbasis STM					
4.	Kualitas teknik bahan ajar tematik berbasis STM					
5.	Kesesuaian bahan ajar tematik berbasis STM dengan keadaan siswa					
6.	Ketepatan bahasa yang dipakai dalam bahan ajar tematik berbasis STM					
7.	Kesesuaian jenis-jenis dan bentuk gambar bahan ajar tematik berbasis STM					
8.	Konsistensi bahan ajar tematik berbasis STM					

Angket Tanggapan/penilaian Ahli Materi Bahan Ajar Tematik Berbasis STM
“Selalu Berhemat Energi”

9.	Kesesuaian isi bahan ajar tematik berbasis STM					
10.	Keluasan isi bahan ajar tematik berbasis STM					

B. Komentar dan saran :

Malang, November 2014

Ahli Materi,

.....

NIP.

**Angket Tanggapan/penilaian Ahli Materi Bahan Ajar Tematik Berbasis STM
“Selalu Berhemat Energi”**

Identitas Ahli

Identitas Pribadi

Nama :
NIP :
Jabatan :
Alamat :

Riwayat Pendidikan :

.....
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Profesi yang sedang di tekuni :

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Pengalaman dalam bidang pendidikan :

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.....

Buku / Bahan ajar yang pernah di tulis :

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APPENDIXES

Appendix IV

Identity of Validation Expert

Num	NAME	PROFESSION	VALIDATOR	REASON
1.	Mr. Ahmad Abtokhi, M.Ed	<ol style="list-style-type: none"> 1. Doctoral degree in Physics Education from Surabaya State University 2. Lecturer of Physics in the Physics Department of the State Islamic University of Maulana Malik Ibrahim Malang 	Material expert	The person concerned has the competence in the field of material science and the material in this developing is STS-based which the learning tend to science learning.
2.	Mrs. Wiwis Sasmitaning hidayah, M.Sc	<ol style="list-style-type: none"> 1. masteral degree of Physics from Sepuluh November Institute of Technology of Surabaya 2. Lecturer in the Department of Physics, State Islamic University Maulana Malik Ibrahim Malang 	Design media expert	The person concerned has the competence in the field of learning media especially in worksheet book. She have been made many worksheet book of elementary.
3.	Mrs. Nur Cholilah, M.Ed	<ol style="list-style-type: none"> 1. Sholar degree for Elementary Teacher Education from Surabaya State University 2. Thematic teacher in IV A of MIN Buduran Sidoarjo 	Thematic learning expert	The person concerned has the competence in the field of thematic learning that she already has much experience in teaching.

Appendix XI

The Value of Pre-Test and Post-Test of IV A

No	Name	Pre-Test	Post-Test
1.	Abbrar Bintang Firmansyah	80	85
2.	Achmad Nadhif Al Fuadi	75	90
3.	Adam Setya Pratama	60	80
4.	Ahmad Khamdani	65	90
5.	Aisyah Tasnia Husna	65	70
6.	Alvia Natasya Agustin	70	80
7.	Andi Rahman Halim	70	85
8.	Annisa Fitra Farahiyah	65	80
9.	Ariella Valencia Nur A	65	75
10.	Arya Eka Syahputra	80	85
11.	Cindy Reva Islenia	70	90
12.	Cintarissa Bintang Putri	75	80
13.	Dinda Avrilia Oma	65	65
14.	Divan Nurrachman	75	85
15.	Farhani Zakiya	65	80
16.	Fuad Satria Ar-Rasid	75	85
17.	Hasto Dipo A	80	85
18.	Hilmi Fuady	70	85
19.	Laili Nurin Nabila	85	95
20.	Mala Aliviana	60	60
21.	Manaf Ahmadil Huda	70	80
22.	Mauliza Rahmania	75	95
23.	M. Fajar Maulana	75	80
24.	M. Ahyar F	60	75
25.	M. Hamdan Ashari	75	75
26.	M. Raihan Rizky F	65	75
27.	M. Sholehudin Majid	70	75
28.	Nabil Fajrul Falah	75	85
29.	Nur Faizza C U	80	95
30.	Primasy Ayunda F S	55	80
31.	Putri Najwa Tazkia	75	90
32.	Putri Puspita Illiyil	70	85
33.	Rafly F D	50	70
34.	Riska Nanda Octaviani	60	75
35.	Rizki Ahmad Syahroni	70	80
36.	Rizqi Mubarak Dawam	75	90
37.	Syahrani Wibisono	75	80
38.	Tiara Dwi Saputri	65	75
Total		2655	3090
Average		69,86	81,31

Appendix XIII

DOCUMENTATION



The thematic teaching material book



Situation when students had doing a pre-test





Situation when students learning with thematic teaching material



Situation when students had doing a post-test

Appendix XIV

CURRICULUM VITAE



Name : Soviana Idayanti
Born : June 16th, 1994
Address : Jl Tawang Bhakti no 11 Tawangrejo Kartoharjo, Madiun 63113
Address in Malang : Jl Joyomulyo 340A Merjosari Malang
Faculty/Departement : Tarbiyah and Teaching Science Faculty/ Islamic Elementary
Teacher Education
Phone number : 085791308065
Biography of education : (1999-2005) SDN 02 Tawangrejo Madiun
(2005-2008) MTsN Sidoarjo
(2008-2011) MAN Sidoarjo
(2011-2015) PGMI UIN Malang
Informal education : (2011-2013) Modern Islamic Boarding School of Ma'had
Sunan Ampel Al'aly
(2103-2015) Salafy Islamic Boarding School of Al Mubarak
Malang

Appendix X

SOAL POST TEST UJI KOMPETENSI SISWA

NAMA :

KELAS :

NO ABSEN :

A. Berilah tanda silang (X) pada jawaban yang benar!

1. Energi adalah
 - a. kemampuan untuk menjaga sesuatu
 - b. kemampuan untuk melakukan sesuatu
 - c. tenaga untuk mendorong sesuatu
 - d. tenaga untuk menjaga sesuatu
2. Sumber energi pada lampu adalah
 - a. cahaya
 - b. panas
 - c. minyak bumi
 - d. listrik
3. Penemu listrik adalah
 - a. Thomas Alfa Edison
 - b. Michael Faraday
 - c. John Alfa Edison
 - d. Alexander Graham Bell
4. Microwave memanfaatkan perubahan energi
 - a. listrik menjadi bunyi
 - b. listrik menjadi gerak
 - c. listrik menjadi panas
 - d. listrik menjadi cahaya
5. Di bawah ini merupakan pembangkit listrik yang telah diterapkan di Indonesia, kecuali
 - a. Pembangkit Listrik Tenaga Surya
 - b. Pembangkit Listrik Tenaga Sampah
 - c. Pembangkit Listrik Tenaga Air
 - d. Pembangkit Listrik Tenaga Plastik
6. Contoh perubahan energi angin menjadi energi listrik adalah
 - a. kipas angin
 - b. kincir angin
 - c. kipas listrik
 - d. kincir air
7. $25 \times 3 - 7 =$
 - a. 63
 - b. 78
 - c. 73
 - d. 68
8. Kita bisa menyampaikan informasi tertentu kepada pembaca melalui....
 - a. Papan tulis
 - b. Buku tulis
 - c. Buklet
 - d. Brosur

Appendix IX

SOAL PRE TEST UJI KOMPETENSI SISWA

NAMA :

KELAS :

NO ABSEN :

A. Berilah tanda silang (X) pada jawaban yang benar!

1. Energi adalah
 - a. kemampuan untuk menjaga sesuatu
 - b. kemampuan untuk melakukan sesuatu
 - c. tenaga untuk mendorong sesuatu
 - d. tenaga untuk menjaga sesuatu
2. Sumber energi pada lampu adalah
 - a. cahaya
 - b. panas
 - c. minyak bumi
 - d. listrik
3. Penemu listrik adalah
 - a. Thomas Alfa Edison
 - b. Michael Faraday
 - c. John Alfa Edison
 - d. Alexander Graham Bell
4. Pemanfaatan setrika memanfaatkan perubahan energi
 - a. listrik menjadi bunyi
 - b. listrik menjadi gerak
 - c. listrik menjadi panas
 - d. listrik menjadi cahaya
5. PLTA adalah singkatan dari
 - a. Pembangkit Listrik Tenaga Api
 - b. Pembangkit Listrik Tenaga Asap
 - c. Pembangkit Listrik Tenaga Air
 - d. Pembangkit Listrik Tenaga Accu
6. Contoh perubahan energi angin menjadi energi listrik adalah
 - a. kipas angin
 - b. kincir angin
 - c. kipas listrik
 - d. kincir air
7. $25 \times 3 - 7 =$
 - a. 63
 - b. 78
 - c. 73
 - d. 68
8. Kita bisa menyampaikan informasi tertentu kepada pembaca melalui....
 - a. Papan tulis
 - b. Buku tulis
 - c. Buklet
 - d. Brosur

