

THE DEVELOPMENT OF INTERACTIVE MEDIA ON THEME  
ENERGY SAVING AT FOURTHGRADE STUDENT IN ISLAMIC  
GLOBAL SCHOOLMALANG

THESIS

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

BY

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11140011



TEACHER EDUCATION OF ISLAMIC ELEMENTARY SCHOOL  
FACULTY OF TARBIYAH AND TEACHING SCIENCES  
THE STATE ISLAMIC UNIVERSITY OF MAULANA MALIK  
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GLOBAL SCHOOL MALANG**

**THESIS**

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ENERGY SAVING AT FOURTH GRADE STUDENT IN ISLAMIC  
GLOBAL SCHOOL MALANG**

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Has been defended in front of the board of examiners on  
20<sup>th</sup> May, 2015 and has been stated

**PASSED**

And has been approved by the board of examiners as the requirement to exam an  
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## DEDICATION

الرَّحِيمِ الرَّحْمَنِ اللَّهُ بِسْمِ

Praise to God Almighty for giving everything in my life. This thesis is a great effort in the realization of my aspiration. Shalawat and Salam always bless to our Prophet Muhammad SAW because of him we get the brilliant religion.

This thesis work is dedicated to my parents, **Mr Hari Mulyono** and **Mrs Hanik Latifah**, who have always loved me unconditionally and whose good examples have taught me to work hard for the things that I aspire to achieve. I also dedicate this thesis to my sisters, **Nanda Amilia Dwi Choirun Nisak** and **my big family**, who has been encouragement in my life. Hopefully this thesis could be the motivation to reach your dreams.

## MOTTO

بِأَنَّ وَعَسَىٰ لَكُمْ خَيْرٌ مِّنْهُ وَهُوَ شَيْءٌ تَكْرَهُهُ أَنْ وَعَسَىٰ لَكُمْ كُرْهُهُ وَهُوَ الْقِتَالُ عَلَيْكُمْ كُتِبَ  
تَعْلَمُونَ لَا وَأَنْتُمْ يَعْلَمُونَ وَاللَّهُ لَكُمْ شَرُّهُ وَهُوَ شَيْءٌ تَحَدُّ

Fighting has been enjoined upon you while it is hateful to you. But perhaps you hate a thing and it is good for you; and perhaps you love a thing and it is bad for you. And Allah knows, while you know not.

Dr. Abdussakir, M.Pd  
The Lecturer of Science and Technology Faculty  
The State Islamic University of Maulana Malik Ibrahim Malang

---

ADVISOR OFFICIAL NOTE

Matter : Thesis of Dian Mustika Anggraini  
Appendixes : 4 (four) Exemplar

Dear,  
Dean of Tarbiyah and Teaching Science Faculty  
The State Islamic University of Maulana Malik Ibrahim Malang  
At  
Malang

Assalamu'alaikum Wr. Wb

After carrying out several times for guidance, both in terms of content, language and writing techniques, and after reading the following thesis:

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at Fourth Grade Student in Islamic Global School Malang

As the advisor, we argue that this thesis has been proposed and tested decent.  
Thus please tolerate presence.

Wassalamu'alaikum Wr. Wb

Advisor,

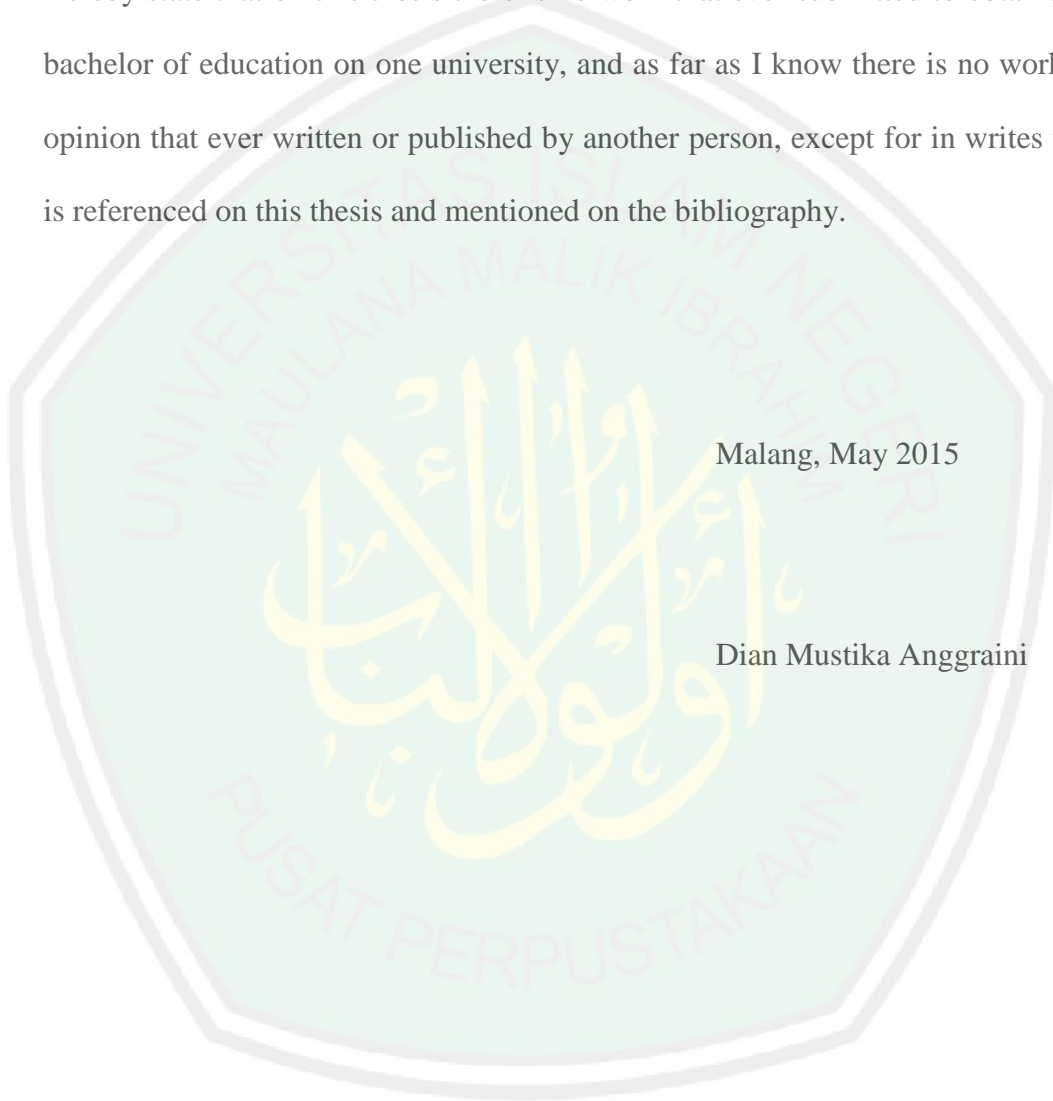
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## STATEMENT LETTER

Hereby state that on this thesis there is no work that ever submitted to obtained a bachelor of education on one university, and as far as I know there is no work or opinion that ever written or published by another person, except for in writes that is referenced on this thesis and mentioned on the bibliography.

Malang, May 2015

Dian Mustika Anggraini





## TRANSLATION GUIDELINES OF ARAB LATIN

Translation of Arab Latin in this thesis utilize the translation guidelines based on the agreement between Religion Minister and Educational and Culture Minister of Indonesia number 158/1987 and number 0543b/ U/ 1987. Those are:

### A. Huruf

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. Vokal Panjang

Vokal (a) panjang= â

Vokal (i) panjang= î

Vokal (u) panjang= û

### C. Vokal Diftong

= aw

= ay

= û

= î

## PREFACE

Praise to Allah The All Merciful and The All Compassionate. Thanks to Allah because of all blessing and guidance, so the writer is able to finish the arrangement of Research and Development “The Development of Interactive Media on Theme Energy Saving at Fourth Grade Student in Islamic Global School Malang” as the final instruction activities on The State Islamic University of Maulana Malik Ibrahim Malang. Salawat and salam uninterruptedly extended to Prophet of Muhammad, and all the families, friends, and all Moeslem.

The aim of this thesis is the requirement for obtaining bachelor degree of education (S.Pd). The specific purpose of this thesis is as a discourse of education that is still a lot of things from an education that must be developed.

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12. All the colleagues of ICP PGMI 2011 “WEXA Class” who always encourage and give support to the writer in process of arrangement and observation this report.

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Hopefully this simple thesis can be beneficial to all researchers and readers. Hopefully this thesis can become part of academic discourse in order to develop the science to the pgmi's. This thesis is still a lot of shortcomings. Therefore, the author expects criticism and suggestions from all parties for the perfection of this thesis.

Malang, May 2015

Writer

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## ABSTRACT

Anggraini, Dian Mustika. 2015. *The Development of Interactive Media on Theme Energy Saving at Fourth Grade Student in Islamic Global School*. Thesis, Teacher Education of Islamic Elementary School Program, Faculty of Tarbiyah and Teaching Sciences, The State Islamic University of Maulana Malik Ibrahim Malang. Advisor, Dr. Abdussakir, M.Pd

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The use of interactive media in the process of teaching and learning can generate new interest and desire, motivation and stimulation of learning activities, and psychological influences on students. One of the characteristics of the learning media is the media carry a message or information to students. Media is urgently needed by the students as it can motivate students in learning optimally at school. However, condition in field it is not based on theory. Many students are not understood about themes energy saving sub theme 2 learning 4. Teacher in fourth grade had difficulty when creating thematic media. It can solve by making use of the facilities at schools such as LCD and a computer lab. But the facility has not been used full potential because there is no software on thematic learning.

The development of interactive media is a solution to help students and teachers in the learning process to improve students understanding on the themes energy saving sub theme 2 learning 4 because little learning interactive media on thematic learning. Based on the problem of study above, this research aims to develop interactive media on theme energy saving at fourth grade student in Islamic Global School Malang that valid, practical, and effective.

Procedural model of product development is the adaptation model developed by Alessi and Trollip which includes 10 stages: 1) determine objectives and needs, 2) collect reference materials, 3) learn content, 4) brainstorming, 5) design learning, 6) create a flowchart, 7) create storyboards, 8) program material, 9) create support material, and 10) evaluation and revision. Developer uses this model will be more targeted, more time saving, and can produce a good product.

Results of the assessment of interactive media development theme energy saving fourth grade had a valid and interesting levels are high. Based on the results of validation and assessment of response from experts and trials. The results obtained are 1) according to material expert is good with a valid percentage of 81,25%; 2) according to design expert is good with a valid percentage of 98,00%; 3) according to linguist is good with a valid percentage of 100,00%; 4) according to the teacher as a practical and students as user this media are valid and practical. Learning use interactive media more enjoyable for students. The interactive media proved to be significantly effective to improve the understanding on the material. Because  $t_{count} 4,48 > t_{table} 1,860$  then  $H_a$  is accepted and  $H_0$  is rejected. There are very significant differences between the score of post-test with pre-test. Furthermore, from the average is known  $X_2 289.67 > X_1 76$ , means that the value of the post-test better than the pre-test. This interactive media development are already valid, practical, and effective.

*Key Words: Kata Kunci: Interactive Media, Theme Energy Saving*

## ABSTRAK

Anggraini, Dian Mustika. 2015. *Pengembangan Media Interaktif Pada tema Selalu Berhemat Energi di Siswa Kelas EmpatIslamic Global School*. Skripsi, Pendidikan Guru Madrasah Ibtidaiyah, Fakultas Ilmu Tarbiyah dan Keguruan, Universitas Islam Negeri Maulana Malik Ibrahim Malang. Pembimbing, Dr. Abdussakir, M.Pd

---

Penggunaan media interaktif pada proses pembelajaran dapat menimbulkan rangsangan pikiran, perasaan, perhatian dan minat serta perhatian siswa sedemikian rupa sehingga proses belajar dapat terjadi. Salah satu karakter media pembelajaran adalah menyampaikan pesan pembelajaran kepada siswa. Media sangat dibutuhkan oleh siswa karena dapat memotivasi siswa belajar dengan optimal di sekolah. Namun, kondisi di lapangan berbeda dengan teori. Banyak siswa yang tidak mengerti tentang tema selalu berhemat energi subtema 2 pembelajaran 4. Guru kelas 4 mengalami kesulitan ketika membuat media tematik. Hal ini bisa diatasi dengan memanfaatkan fasilitas yang ada di sekolah seperti LCD atau Laboratorium Komputer. Tetapi fasilitas yang ada tidak digunakan dengan maksimal karena belum ada software tentang pembelajaran tematik.

Pengembangan media interaktif adalah solusi untuk membantu siswa dan guru dalam proses pembelajaran untuk meningkatkan pemahaman siswa pada tema selalu berhemat energi subtema 2 pembelajaran 4 karena masih sedikit media interaktif yang tematik. Berdasarkan permasalahan di atas, penelitian ini bertujuan untuk mengembangkan media interaktif pada tema selalu berhemat energi di siswa kelas 4 islamic global school yang valid, praktis, dan efektif.

Model prosedural pengembangan produk ini adalah adaptasi model yang dikembangkan oleh Alessi dan Trollip yang meliputi 10 tahapan yaitu (1) menentukan tujuan dan kebutuhan, (2) mengumpulkan bahan acuan, (3) mempelajari isi, (4) mengembangkan ide (*Brainstorming*), (5) mendesain pembelajaran, (6) membuat *flowchart* materi, (7) membuat *storyboard* tampilan pada kertas, (8) memprogram materi, (9) membuat materi pendukung, dan (10) melakukan evaluasi dan revisi. Pengembang menggunakan model ini akan lebih terarah, lebih menghemat waktu, dan dapat menghasilkan produk yang baik.

Berdasarkan hasil validasi dan penilaian dari para ahli dan uji coba lapangan. Hasilnya terdiri dari 1) menurut ahli materi adalah bagus dengan tingkat kevalidan sebesar 81,25%; 2) menurut ahli desain pembelajaran adalah bagus dengan tingkat kevalidan sebesar 98,00% 3) menurut ahli bahasa adalah bagus dengan tingkat kevalidan 100,00%; 4) menurut guru kelas sebagai praktisi dan siswa sebagai pengguna adalah valid dan praktis. Siswa merasa senang ketika menggunakan media interaktif. Media ini sangat efektif untuk meningkatkan pemahaman siswa. Karena hasil uji coba menyatakan bahwa  $t_{hitung} 4,48 > t_{tabel} 1,860$  kemudian  $H_a$  diterima dan  $H_0$  ditolak. Dari rata-rata diketahui bahwa  $X_2 89,67 > X_1 76$ , menandakan bahwa nilai post test lebih baik daripada pre test. Pengembangan media interaktif ini terbukti valid, praktis, dan efektif.

Kata Kunci: *Media Interaktif, Selalu Berhemat Energi*

## مستخلص البحث

أنغرايني، ديان مستيكا. 2015. تطوير الوسائل المتفاعلة في الموضوع دوام التدبير القوة على الطلاب الفصل الرابع في المدرسة الإسلامية العالمية. البحث الجامعي، شعبة التربية المدرس للمدرسة الابتدائية، كلية علم التربية و التعليم، جامعة مولانا مالك إبراهيم الإسلامية الحكومية مالانج. المسريف، الدكتور عبد الشاكر، الماجستير.

استخدام وسائل الإعلام التفاعلية في عملية التعليم يمكن أن يؤدي إلى التحفيز الأفكار، والمشاعر، و الانتباه، و الرغبة كذلك انتباه الطلاب احسن ما يمكن حتى يمكن أن تحدث عملية التعليم. إحدى خصائص الوسائل التعليم هو لنقل الرسالة إلى الطلاب. الوسائل التعليمية مهمة للطلاب لإعطاء الدوافع إلى الطلاب في التعلم في المدرسة. و بالعكس، الأحوال في الواقع مختلفة بالنظريات. كثير من الطلاب لا يفهمون عن المواد. وجه المدرس في الصف الرابع المشاكل عند صناعة الوسائل الموضوعية. علاجة هذه المشاكل هي بالاستفادة الوسائل الموجودة في المدرسة كمثل شاشة LCD أو المعمل الحاسوب. لكن الوسائل الموجودة لا تستخدم أحسن ما يمكن لعدم البرنامج عن التعليم الموضوعي.

تطوير الوسائل الإعلام التفاعلية هي المعالجة لمساعدة الطلاب و المدرسين في عملية التعليم لترقية الفهم الطلاب في المادة دوام التدبير القوة الفرع المادة الثانية درس الرابع لقلّة الوسائل الإعلام التفاعلية الموضوعية. وفقا على المشكلة الموجودة، الهدف من هذا البحث لتطوير الوسائل الإعلام التفاعلية في المادة دوام التدبير القوة في الطلاب الصف الرابع في المدرسة الإسلامية العالمية الصالحة، و الواقعية، و الفعالية.

شكلا لإجرائية التطوير لهذا المنتج هي التكييف من النموذج الذي وضعها ليسيو ترو ليا ليتضم من 10 مراحل: (1) تحديد الأهداف والاحتياجات، (2) جمع المواد المرجعية، (3) تعلم المضمون، (4) تطوير الأفكار (العصف الذهني)، (5) تصميم التعلم، (6) جعل المخطط انسيابيا بالمواد، (7) جعل عرض القصة المصورة على الورق، (8) برجة المواد، (9) جعل مواد الدعم، و (10) التقييم والمراجعة. استخدم المطور هذا النموذج ليكون أكثر استهدافا، وأكثر توفير الوقت، ويمكننا نتج منتج جيد.

استنادا لنتائج التحقق من صحة وتقييم الخبراء والتجار بالميدانية. النتيجة تتكون من 1 من عند الخبراء هي جيدة على درجة الصحة 81، 25 من مائة، 2 من عند الخبراء التصميم هي جيدة على درجة الصحة 98،00 من مائة، 3 من عند الخبراء اللغة هي جيدة على درجة الصحة 100،00 من مائة، 4 من عند المدرس الفصل كالممارسين و الطلاب كالمستخدمين هي صحة و واقعية. كان الطلاب سعيدا عند استخدام وسائل الإعلام التفاعلية. هذا الوسائل فعالة جدا لترقية فهما الطلاب. لأن نتائج الاختبار تفيد أنها اعتبارا من  $4,48 <$  جدوال 1،860 ثم  $Ha$  مقبولة و  $H0$  مردودة. من المتوسط معروف أن  $x_2 < 67/89 < 76x_1$  يدل على أن نتيجة الاختبار البعديا أفضل من الاختبار القبلي. ثبت على أنتطوير وسائل الإعلام التفاعلية صحة، و واقعية، و فعالة.

كلمة الرئيسية: وسائل الإعلام التفاعلية، دوام التدبير القوة



## CHAPTER I

### INTRODUCTION

#### A. The Background of Study

The government implements the latest curriculum, namely curriculum 2013. Implementation of curriculum 2013 based on various challenges related to education refers to 8 national standards of education includes content standards, process standards, competency standards, educators and educational standards, facilities and infrastructure standards, management standards, financing standards, and educational assessment standards.<sup>1</sup>

A great challenge is how to make human resources that have a productive age can be transformed into human resources who have the competencies and skills through education. Fasli Jalal also mentions that education has a very strategic role in public life.<sup>2</sup>

The solution for the challenge in the future is the curriculum 2013. Curriculum 2013 was developed with the improvement mindsets follows: 1) student-centered learning; 2) interactive learning (interactive teacher-student-society-environment nature, source/other media); 3) learning network; 4) active learning; 5) study group; 6) multimedia-based learning; 7) the development specific potential of every learner; 8) multidisciplinary; and 9) critical learning.<sup>3</sup>

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<sup>1</sup>Peraturan Menteri Pendidikan Dan Kebudayaan Nomor 67 Tahun 2013 Tentang Kerangka Dasar Dan Struktur Kurikulum Sekolah Dasar/Madrasah Ibtidaiyah

<sup>2</sup> Fasli Jalal, *Reformasi Pendidikan Dalam Konteks Otonomi Daerah*, (Yogyakarta: adicita, 2001), hlm 6.

<sup>3</sup> Ibid

The above reflects the mindset of the character of a curriculum stressing the thematic learning approach that emphasizes student involvement in learning. Students actively involved in the process of learning and in solving problems. Thus, it is developing the creativity and potential of the students. Because each child is different from one another.<sup>4</sup>

Thematic learning makes the activity become relevant and full of meaning for students, either formal or informal activities such as empowering knowledge and experience to help students understand and perceive the world of life. It will be very influential for student's experience of meaningfulness and makes the learning process more effective and interesting.<sup>5</sup>

Thematic learning has several advantages which are 1) learning materials closer to the students' lives; 2) students easily connect the subject matter with other subjects. So that the value of contextual and life-skills that are in the process of thematic learning is more real; 3) the working group, students can develop the skills learned in cognitive, affective, and psychomotor domain; 4) thematic learning accommodated various types of intelligences of students; 5) make it easy for teacher to use active student learning as a learning method.<sup>6</sup>

The Government needs to pay attention to the application of thematic learning in the field since there must be sustainable and continuously evaluated. In practice, thematic learning should always be encouraged as a learning tool for

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<sup>4</sup> Mamat SB, *Pedoman Pelaksanaan Pembelajaran Tematik* (Jakarta : Direktorat jenderal kelembagaan agama islam, 2005) hlm 4-5.

<sup>5</sup> Trianto, *Desain Pengembangan Pembelajaran Tematik* (Jakarta: Kencana Prenada Media Group) hlm 152 – 153

<sup>6</sup> Mamat SB, *loc. Cit.*

change and find a better learning and empowering, both for teachers, learners, even society.<sup>7</sup>

However, condition in the field, it is not based on theory. Based on interview with teacher class in fourth grade in Islamic Global School about learning,<sup>8</sup> Ms. Enis said that many students are not understood about themes energy saving sub theme 2 learning 4. That is because a concept in the textbook not deep and it takes a long time to teach it. Moreover, there are three subjects combined which is math, Indonesian, and art in learning. From three subjects, mathematics is the most dominant because the material emphasis on least common multiple. Students have difficulty to understand the concept about least common multiple. It is proven from test scores done by the teacher. From 23 students in fourth grade, almost 50% of students get score under the criteria. It is because they are still difficult to use formulas of least common multiple and had memorized multiplication and division. In addition, the teacher only uses a method of old that is given. The teacher is not using media. The material still abstract. So students understanding about the concept about least common multiple are still lacking. Many students do not pay attention to the teacher's explanation. In addition, the teacher has seen develop group activities or discussions in class. When the teacher gives the questions to students, they did not understand. Students seem less interested and passive in the class. So the learning is becoming less interesting and fun.

Teacher in fourth grade had difficulty when creating thematic media. It can be solve by using of the facilities at schools such as LCD and a computer lab. But

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<sup>7</sup>Mamat SB, op. Cit., hlm 6

<sup>8</sup>Based on interview with teacher's class, Enis Syfaati, S.Pd, in fourth grade in Islamic Global School at 09.00 am on Monday August 19<sup>th</sup>, 2014

the facility has not been used full potential because there is no software for thematic learning.

The use of learning media in the process of teaching and learning can generate new interest and desire, motivation and stimulation of learning activities, and psychological influences on students.<sup>9</sup> One of the characteristics of the learning media is the media carry a message or information to students. Most media can process and respond to students. So the media often called interactive media. Designing and developing interactive learning is needed to help students learn effectively in order to ensure the achievement of learning objectives.<sup>10</sup> Therefore, researcher wants to help student in fourth grade to resolve the problem on the themes energy saving sub theme 2 learning 4 materials. Actually, not only students on Islamic Global School so hard to understand the material, but also almost all schools complained about the same thing. This is because the material includes some aspects of the operations of multiplication and reserved stories in everyday life.

The development of interactive media is a solution to help students and teachers in the learning process to improve students understanding on the themes energy saving sub theme 2 learning 4 because little learning interactive media on thematic learning. Based on the issues, the researcher wants to develop interactive media on the theme energy saving to help students. Interactive Media is urgently needed by the students as it can motivate students in learning optimally at school or at home. This Media can also be studied wherever and whenever.

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<sup>9</sup> Azhar Arsyad, *Media Pembelajaran* (Jakarta : Rajawali Press, 2010), hlm 15

<sup>10</sup> Ibid

The researcher conducted observations in the Islamic Global School because since last year elementary schools in Malang were already carrying out curriculum 2013. In addition, there are facilities for the success of the process of teaching and learning. It makes easier for researcher to make and execute the interactive media.

Therefore, the researcher took the title about “The Development of Interactive Media on Theme Energy Saving at Fourth Grade Student in Islamic Global School Malang”.

#### **B. The Problem of Study**

Based on the background of the issue which has been discussed above, this research focuses on the development of interactive media theme energy saving at fourth grade student in Islamic Global School. These things in more detail can be expressed as follows:

How to develop interactive media on theme energy saving at the Fourth Grade in Islamic Global School Malang that valid, practical, and effective?

#### **C. The Objectives of Study**

Based on the problem of study above, this research aims to develop interactive media on theme energy saving at fourth grade students in Islamic Global School Malang that valid, practical, and effective.

#### **D. The Benefit of Study**

The benefits of the development, there are two uses of the usefulness of the theoretical and practical as follows:

1. Theoretically, this development is useful to develop teacher pedagogy, where the teacher must be able to develop IT based interactive media that will be used in the learning process.
2. In practice, this development is useful for producing interactive media on theme energy saving at fourth grade students in Islamic Global School Malang.

#### **E. The Limitation of Study**

Research and development is limited to the material on theme energy saving subtheme 2 learning 4. Interactive Media contains thematic learning which applicable in IT media in the form of an interactive CD and Android application that can be used by students.

#### **F. The Significances of Study**

In order to have the same understanding of each variable or terms in the title of the development of interactive media on theme energy saving at fourth grade students in Islamic Global School limits is required, as follows:

1. Interactive Media

Interactive media refers to present information in a form that is fun, interesting, easy to understand, and clearly. Information or material will be easy to understand because many senses, especially the ear and the eye, used to absorb the information.

2. Thematic learning

Learning that emphasizes student involvement in learning. Students play an active role in the process of learning and empowerment in solving problems. It is developing the creativity and potential of the students. Because of each child is different from one another.

#### **G. Product Specifications**

Product produced in the development of interactive media on theme energy saving at Fourth Grade students in Islamic Global School Malang with the following specs:

1. In order to support student success in getting knowledge about the theme energy saving subtheme 2 learning 4, researcher makes this media with media standards that comply with the curriculum 2013. There is opening slide to greet the student. And then the student is invited to pray before the study. It aims to make student always pray in everything that, will they do. After that, teacher will guide student to learn the material.
2. The physical form of interactive media is an interactive CD that can be used by teachers and students in the learning process. Students can download the application on the mobile phone. So it can be used as learning materials at home.
3. Interactive media layout is arranged as best as possible to attract interest in student learning, such as the layout of the images, font (using comic sans MS font, with 12-14), the choice of color, the shape of the table and columns with a wide variety of forms, and attractive concepts.

## CHAPTER II

### STUDY OF LITERATURE

#### A. The Previous of Study

Based on previous studies about interactive media, many research result showed that learning process use interactive media more effective than learning process without media. So, researcher want to development interactive media on theme energy saving at fourth grade in Islamic Global School Malang.

Related to this research, researcher tried to find the research that was done before. Previous studies found a thesis on teacher education of Islamic elementary school UIN Malang, written by ChoerulAnwar Badru Tamam entitled "Learning Media Development Math Multiplication Material Computer-assisted Integers to Fourth Grade SD/MI."<sup>11</sup> This research resulted in the media about learning mathematics. The subject of this development is the test fourth grade MI Muhammadiyah Probolinggo. Evaluation and revision of the media learning, computer-assisted mathematics through four stages, namely (1) validation and response material expert, (2) validation and response design expert the learning media, (3) validation and response from teacher class MI Muhammadiyah Probolinggo, (4) validation and response of field trials, namely fourth grade MI Muhammadiyah Probolinggo 24 students. Based on data analysis, validation and response from experts that the media learning, computer-assisted math has good quality and suitable for students. Based on the results of the field trials concluded that computer-assisted mathematics learning media have been already effective,

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<sup>11</sup> Choerul Anwar Badrut Tamam, "Pengembangan Media Pembelajaran Matematika Materi Perkalian Bilangan Bulat Berbantuan Komputer untuk Siswa Kelas IV SD/MI", Skripsi, Jurusan Pendidikan guru Madrasah Ibtidaiyah, Fakultas Ilmu Tarbiyah dan Keguruan, 2013.



efficient, and attractive to use basic multiplication memorization drills. The development of the work of this thesis consists of two parts. The first part contains the analytical study of the development and the second part of the CD interactive media practice multiplication.

The second study found a thesis on teacher education of islamic elementary school UIN Malang, written by Aulia Rohmawati, entitled "Development of Multimedia Interactive Learning in order to Improve The Effectiveness of Learning Material on Natural History, Appearance, and Ethnic Diversity at Fourth Grade MI Miftahul Ulum Batu city".<sup>12</sup> This research resulted in an interactive multimedia learning. Data obtained from research shows that this interactive multimedia development research proved to be able to improve the effectiveness of the study on standards of competence to understand the history, natural appearance and ethnic diversity. Multimedia has been developed in the form of educational games and digital modules proved to be valid and do not need revisions. So it deserves to be widely used in the field.

A third study found a thesis on teacher education of islamic elementary school UIN Malang, written by Muhimah Ngaziz, entitled "Development of Integrated Thematic Materials on Theme of Tourism at Second Grade in MI Ma'arif Sukun I Malang".<sup>13</sup> The result of the development of learning materials on

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<sup>12</sup> Aulia Rohmawati, "Pengembangan Multimedia Pembelajaran Interaktif untuk meningkatkan keefektifan pembelajaran pada materi sejarah, kenampakan alam, dan keragaman suku bangsa untuk siswa kelas IV A MI Miftahul Ulum Kota Batu", Skripsi, Jurusan Pendidikan guru Madrasah Ibtidaiyah, Fakultas Ilmu Tarbiyah dan Keguruan, 2014.

<sup>13</sup> Muhimah Ngaziz, "Pengembangan Bahan Ajar Tematik Terpadu Dengan tema Pariwisata pada kelas II MI Ma'arif Sukun I Malang, Skripsi, Jurusan Pendidikan guru Madrasah Ibtidaiyah, Fakultas Ilmu Tarbiyah dan Keguruan, 2014.

the theme of integrative thematic tourism are (1) the existence of thematic integrative learning materials by connecting the subjects of Indonesian language, mathematics, natural science, social science, and aqeedah morals and have gone through the process of validation of the material expert, design expert and teacher class which reaches 80%, (2) Trial results the use of learning materials for six meetings is 89,8% of students whose value  $\geq 76$  and 10.2% of students whose value  $< 76$ . While the results of interviews with students about integrative thematic materials on the theme of tourism is 93% of students like it.

The fourth study found a thesis on teacher education of islamic elementary school UIN Malang, written by Najib anshori, entitled "The Development of Integrative Learning Thematic Media Using Adobe Flash Cs4 for FirstGrade of Elementary School, Malang Islamic State 2".<sup>14</sup> Research results based on the assessment of the validator material expert that 80%, 85% of design expert, teacher class at first grade thematic integrative amounted to 85%, a large group of 88%, a small group of 99.3%, and individual groups of 96% with overall points included in a qualifying good. While the results of learning as measured through the pretest and posttest learning outcomes there is a growing reach 9%. Overall it can be concluded that thematic learning media integrative developed including the qualification that it deserves thematic learning used in integrative curriculum 2013 at first class SD/MI.

Based on previous studies that had already been discovered by researchers then it can be concluded that the research thesis written by Choerul Anwar, Aulia

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<sup>14</sup> Najib Anshori, "The Development of Thematic Integrative Learning Media Using Adobe Flash Cs4 For 1<sup>st</sup> grade of State Islamic Elementary School Malang 2, Skripsi, Jurusan Pendidikan guru Madrasah Ibtidaiyah, Fakultas Ilmu Tarbiyah dan Keguruan, 2014.

Rohmawati, Muhimah Ngaziz, and Najib Anshori previous studies as a researcher is different with this research. It is at the focus of the material researched object, the location of research, as well as the resulting products of each study.

Researcher included a table of differences, similarities and the originality of research to make it easy in the Table 2.1 below:

**Table 2.1**  
**Originality Research**

Research Titles	Similarities	Differences	Originality of Research
1. Mathematics mediadevelopment, learningmaterial computer assisted integer multiplication for students of Fourth Grade students (byCarolAnwar Badru Tamam: 2013)	Development of computer-assisted learning media	The resulting product is media of learning mathematics integer multiplication material	This research is a study of the development of interactive media on the theme energy saving subtheme 2 learning 4.The development model used the Alliance and Trolli. This interactive mediadevelopment using the software I-spring.
2. Development of multimedia interactive learningfor enhancing learning effectiveness in material history, natural features,and ethnic diversity for students of class IV A MI Miftahul Ulum Batu City ( by Aulia Rohmawati : 2014)	Development of interactive multimedia	1. Learning the material history, natural features,and ethnic diversity 2. Location of the study in MI Miftahul Ulum Batu City	
3. Development of integrated thematic materials on the theme of tourism on class II MI Ma'Arif Sukun I Malang (by Muhimah Ngaziz: 2014)	The development of thematic integrated textbook	1. Use of Theme Tourism 2. Students in Grades 2 MI Ma'Arif sukun I Malang	
4. The development of thematic integrative learning media using adobe flash CS4 for First Grade of State Islamic Elementary School Malang 2(oleh M. Najib Anshori: 2014)	The development of integrated learning, thematic media	1. Media development using adobe flash CS4 2. ForFirst Grade at MIN 2 Malang	

## B. Study of Theory

Study of the development of interactive media on theme energy saving on subtheme 2 learning<sup>4</sup> in the Islamic Global School includes a few things that need to be understood more deeply (1)media (2)learning theory (3)Thematic Learning Model.

### 1. Media

#### a. Understanding The Media

The media comes from the Latin mediums which literally means 'the middle', 'intermediate' or 'introduction'. In Arabic, the media is an intermediary or an introductory message from the sender to the recipient. The term "media" is often associated with the word "technology" which is derived from the Latin word *tekne* (English art) and *logos* (a language of Indonesia "Science").<sup>15</sup>

While according to Djamarah and Zain, the media is a tool that can serve as an intermediary to achieve learning objectives.<sup>16</sup> Media education is a bridge from the learning messages conveyed by the message source (teacher) to the recipient of the message (the students). So the messages can be absorbed properly in accordance with its purpose.<sup>17</sup> Media

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<sup>15</sup>Azhar, op.cit., hlm 3

<sup>16</sup> Djamarah dan Azwar Zain., *Strategi Belajar Mengajar* (Jakarta: PT Rineka Cipta, 2010), hlm 120.

<sup>17</sup>Sri Anitah W.,*Strategi Pembelajaran di SD* (Jakarta: Universitas Terbuka, 2009), hlm 6.11

education can stimulate the sense of sight, hearing, smelling, tasting and touching. For that an educator needs to have a nice learning medium.<sup>18</sup>

As part of the learning system, the media have practical values are the ability to: 1) makes the concept of abstract into concrete; 2) bring difficult object into the learning environment; 3) displays the objects are too large; 4) displays the objects that cannot be observed directly; 5) students interact directly with the environment; 6) observing the movement too fast; 7) build learning motivation of students in the class; and 8) gives the message or information learned, minimizing time and space.<sup>19</sup>

Variance opinions above, researcher concluded that the media is an intermediary device that is used to convey a message from the sender to the receiver. So it can stimulate the thoughts, feelings, concerns and interests as well as the attention of the students so that learning can occur. For the teacher needs to have a media to support learning materials can be absorb students optimally.

#### b. Types of Learning Media

Learning media in general can be grouped into 3 types<sup>20</sup>, namely;

##### 1) Visual Media

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<sup>18</sup>Daryanto,*Media Pembelajaran* (Bandung: Alfabeta, 2010), hlm 162

<sup>19</sup> Trianto,*Mengembangkan Model Pembelajaran Tematik* (Jakarta : Prestasi Pustaka, 2010), hlm 202

<sup>20</sup>Sri Anitah W, *op.cit.*, hlm 6.130-6.30

Visual media is media that can only be seen by using the sense of sight. Visual media consists of visual projected and non visual projected.<sup>21</sup> This media is used to express facts or ideas through the use of words, numbers and symbols. This visual media type such as graphs, charts, diagrams, posters, cartoons and comics.<sup>22</sup>

## 2) Audio Media

Audio media is media that contain messages in auditive (only audible) that can stimulate the thoughts, feelings, concerns, and the ability of students to learn the materials. This audio media type such audio cassette, CD audio and radio programs.<sup>23</sup> The use of audio media in thematic learning in elementary school to train skills that relate to aspects of listening skills.<sup>24</sup>

## 3) Audio Visual Media

Audio visual media is a combination of audio and visual. An example of the audio visual media including video and television programs about education, instructional, slide sounds, and CD interactive. By using audio visual media, the presentation of the contents thematic learning will be more complete.

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<sup>21</sup>Ibid hlm 6.30

<sup>22</sup> Rusman, *Model-Model Pembelajaran: Mengembangkan Profesionalisme Guru* (Jakarta: PT Raja Grafindo Persada, 2012), hlm 274-275

<sup>23</sup>Sri Anitah W, *Op. Cit.*, hlm 6.15

<sup>24</sup>Rusman, *op. Cit.*, hlm 275

### c. CD Interactive Media

The CD interactive is a very interesting teaching media and most practical computer media. Computer media using CD interactive can receive a response from the students. They directly study and understand the material.<sup>25</sup> This is similar to Prastowo said that the CD interactive is a CD that combines some of the learning media (audio, video, text, or graphic). It is interactive to control a command or the natural behavior of the learning.<sup>26</sup>

Advantages of CD interactive by Prastowo as follows<sup>27</sup>: 1) can deliver the information in text and graphics; 2) interactive learners; 3) can manage a report or response learners; 4) can control the hardware of other media; 5) can be connected with a video to watch over the activities of the learning learners.

Researcher can conclude that the CD interactive is an interesting learning media used in the learning process in the classroom. It serves the material in the form of audio, video, text, or graphics with computer. For students not only hear and see, but also give an active response. So it can improve student learning activities in the classroom.

Researcher can also conclude that learning media is a tool that is used by teachers to deliver the message of learning to the students to

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<sup>25</sup> Dina Indriana, *Ragam Alat Bantu Media Pengajaran* (Jogjakarta: Diva Press, 2011), hlm 116

<sup>26</sup> Andi Prastowo, *Panduan Kreatif Membuat Bahan Ajar Inovatif* (Jogjakarta: Diva Press, 2011), hlm 330

<sup>27</sup> Ibid 332

optimize the learning process. Therefore, teacher needs to have a media to support learning materials can be understood students optimally.

#### d. The Importance of Use of Media in Islamic Perspective

The importance of use of media learning based on the Hadith:

نَحْنُ مَعَاشِرَ الْأَنْبِيَاءِ أَمْرًا أَنْ نُنْزِلَ النَّاسَ مَنَازِلَهُمْ وَنُكَلِّمُهُمْ عَلَى قَدْرِ عُقُولِهِمْ (رواه أبو بكر بن الشيخير)

“We as the prophets were commanded to put someone as a spokesman to them in accordance with their ability”<sup>28</sup>

From the Hadith, teachers in explaining the material to students should really know the condition and ability of students. Teachers should not be concerned with material that is not related to the student. On other way, teachers should try to create a material that matches the student’s ability and packed with interesting.

There is a rationale to use media in learning on koran surah An-Nahl verse 44, namely:

﴿يَتَفَكَّرُونَ وَلَعَلَّهُمْ إِلَيْهِمْ نُزِّلَ مَا لِلنَّاسِ لِيُبَيِّنَ الذِّكْرَ إِلَيْكَ وَأَنْزَلْنَا وَالزُّبُرِ بِالْيَمِينِ﴾

“[We sent them] with clear proofs and written ordinances. And we revealed to you the message that you may make clear to the people what was sent down to them and that they might give thought.”

The application of media should pay attention to the development of the students. Without knowing and understanding the development of

<sup>28</sup>Sudiyono, *Ilmu Pendidikan Islam*, (Jakarta:PT Rienka Cipta, 2009), hal180



the students, the teacher will be difficult to achieve learning objectives. As the word of God Almighty in Surah An-Nahl verse 125, namely:

أَعْلَمُ هُوَ رَبُّكَ إِنَّ أَحْسَنَ هِيَ بِالَّتِي وَجَدْتَهُمُ الْحَسَنَةَ وَالْمَوْعِظَةَ بِالْحِكْمَةِ رَبِّكَ سَبِيلٍ إِلَىٰ أَدْعُ

بِالْمُهْتَدِينَ أَعْلَمُ وَهُوَ سَبِيلُهُ عَنِ ضَلَّ يَمَن

“Invite to the way of your Lord with wisdom and good instruction, and argue with them in a way that is best. Indeed, your Lord is most knowing of who has strayed from His way, and He is most knowing of who is [rightly] guided.”

## 2. Theory of Learning

### a. Theory of cognitive development Jean Peaget

Cognitive theory assumes that learning is organizing and cognitive aspects of perception to get understanding. The principles of cognitive theory, learning is a change perception and understanding are not always visible as behavior.<sup>29</sup> The cognitive activities are assimilated and accommodate a variety of information or knowledge of the environment to be a particular mental structure.

According to Piaget, someone has a learning process that will follow the pattern of a particular stage of development and in accordance with its age. One cannot learn anything beyond cognitive ability. Each stage of the development of the cognitive structure of

<sup>29</sup> Bambang Warsita, *Teknologi Pembelajaran, Landasan dan Aplikasinya* (Jakarta: Rineka Cipta, 2008) hlm 69

content represents the typical stages in accordance with the differences in phases.<sup>30</sup>

The stages of cognitive development in Piaget as follows<sup>31</sup>:

1) Sensorimotorik phase (0-2 years)

In this phase of cognitive knowledge is still limited onpreception of her senses and motor activities. The behavior is still limited to simple motor response caused by stimulation of the activities. Children are using the skills and abilities that are carried from birth, such as viewing, grasping and hearing to study the environment.<sup>32</sup>

2) Pre operational phase (2-7 years)

In this phase of thinking are more symbolic, egocentric and intuitive. So that it does not involve operational thinking. This phase is also called phase of intuition because it is affected by perception and egocentrism. It is very important in the way children think looks at things from the point of view of him.<sup>33</sup> At this phase it seems language proficiency and mastery of the concept

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<sup>30</sup> Ibid

<sup>31</sup> Rifa'i, Achmad dan Catharina Tri Anni, *Psikologi Pendidikan* (Semarang: Unnes Press, 2009), hlm 26-30

<sup>32</sup> Ibid, hlm 27

<sup>33</sup> Sapriati, Amalia, *Pembelajaran IPA di SD* (Jakarta: Universitas Terbuk, 2009.), hal 1.11

is thriving. At this phase cannot think conceptually but can be observed.<sup>34</sup>

### 3) Concrete operational phase (7-12 years)

Concrete operational phase is base to think concrete can be seen, touched, felt from an object or event.<sup>35</sup> At this phase there are changes from a less logical thinking becomes more logical, the child is able to solve concrete problems.<sup>36</sup> Children are only able to deal with things that are real or with things they can imagine.<sup>37</sup>

### 4) The formal operations phase (12-15 years)

In this phase children are capable to think abstract, idealistic and logical. Formal operational thought seems clearer to solving verbal problems. In this phase cognitive ability reaches top developments. The child is able to predict, think about a substance as well as hypotension, about the case of the structure of the language and dialogue.<sup>38</sup>

So it can be concluded by Piaget's theory of cognitive learning is the learning process to follows the pattern and phase of development according to age. One cannot learn anything beyond

<sup>34</sup> Lapono, Nabisi. 2008. *Belajar dan Pembelajaran SD* (Jakarta: Departemen Pendidikan Nasional, direktorat Jendral Pendidikan Tinggi) hal 1-20

<sup>35</sup> Sapriati, *op.cit.*, hal 1.12

<sup>36</sup> Lapono, *op.cit.*, hal 1-20

<sup>37</sup> *Ibid* hal 1.12

<sup>38</sup> Rifai, *op.cit.*, hal 30

their cognitive abilities. So teachers need to pay attention to every phase of the development student learning.

b. Learning theory of constructivism

According to the learning theory of constructivism is process build knowledge for student by actively to think, build concept and gives meaning to something he had learned.<sup>39</sup> According to Sardiman, learning is an active activity where the subjects learn to build own knowledge. Student studied to find own meaning from the things they are learning.<sup>40</sup>

Learning theory of constructivism assumed that learners have the ability to build new knowledge based on knowledge that has been mastered. The role of the teacher as a facilitator or only creator of the learning conditions that the learners actively seeking his own information, assimilate and adapt its own information and construct a new knowledge based on knowledge which belonged to each of them.<sup>41</sup>

Learning theory of constructivism proposed by two principles, namely 1) knowledge cannot be obtained passively but actively by the cognitive structure of students; 2) the cognition function is adaptive and help organizing through real experience owned children.<sup>42</sup> According to constructivism, learning strategy emphasizes to use knowledge in the learning by meaningful, follow student's thinking and emphasize on

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<sup>39</sup>Bambang Warsita, *op.cit*, hal 78

<sup>40</sup> Sardiman, *Interaksi & Motivasi Belajar Mengajar* (Jakarta: Raja Grafindo Persada, 2011), hlm 38

<sup>41</sup> Lapono, *op.cit*, hal 1-26

<sup>42</sup> *ibid*, hlm 1-28

processes, and learning activities in real context. It is not depend on text book.<sup>43</sup>

Thus, according to constructivism learning theory, learning is an activity that allows the subjects own construct knowledge. Students have been able to scientifically find themselves thinking of his knowledge of their learning process. The teacher in this case acts as a mediator and facilitator to assist in optimizing student learning.

c. Behaviorism learning theory

Basic concepts in this theory that learning is one of the types of individual behavior are done consciously. Learning is defined as the process of the establishment of the relationship between stimulus and response.<sup>44</sup> Humans are strongly influenced by events in the environment that will provide learning experiences. The most important to apply this teory is teachers, instructional designer, instructional programs developers must understand the characteristics of the students and the environment. So that the success rate of students during the learning activities can be known.<sup>45</sup> Learning theory is paying more attention to the observed behavior. Indicators of the success of this learning theory are

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<sup>43</sup>Bambang Warsita, *op.cit.*, hlm 79

<sup>44</sup> Lapono , *op.cit.*, hlm 1-15

<sup>45</sup>Bambang Warsita , *op.cit.*, hlm 66-67

the students get excited about passionate, proactive in learning, and there is a change in mindset, behaviors, and attitudes of their own accord.<sup>46</sup>

So it can be concluded, according to the theory of behaviorism, learning is the type of behavior caused the result of stimulus and response. Therefore, the role of the teacher is very influential in providing stimulus through the meaning experience in learning. Teachers must be resourceful in creating conditions for learning. So that students get excited about and interested in following the process of learning.

### 3. Thematic Learning Model

#### a. Learning model

According to Joyce & Weil argues that the learning model is a plan or pattern that can be used to form a long-term plan curriculum, designing learning materials, guiding learning in class or another. The learning model can be made into a pattern of choice, meaning that teachers may choose appropriate learning model and efficient way to achieve the goal of education.<sup>47</sup>

Arends said that the term teaching learning model refers to a particular approach to instruction that includes its goals, syntax, environment, and management system.<sup>48</sup> The term learning model leads to a certain learning models include the purpose, syntax, environment, and

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<sup>46</sup>Muhammad Thobronidan Arif Mustofa, *Belajar & Pembelajaran* (Jakarta: Ar-Ruzz media, 2011), hlm 178

<sup>47</sup>Rusman, *op.cit.*, hlm 133

<sup>48</sup>Trianto, *op.cit.*, hlm74

system management. In teaching a certain material should be chosen model of learning that best suit the goal achieved. Therefore, in choosing a model of learning should have considerations such as learning material, the level of cognitive development of students, and the facilities available. So that the learning objectives that have been set.<sup>49</sup>

The model is a learning plan or pattern designed in carrying out the learning process for some consideration (instructional material, cognitive developmental level of the students, and the means or facilities available). So the learning objectives can be achieved optimally.

b. Thematic learning model

1) Understanding learning thematic

Thematic learning model is one integrated learning model which is a system of learning that allows students, either individually or in groups, actively explores and find the concept and principles of academic holistically, meaningful and authentic. Thematic learning in practice refers to a theme developed by teachers with students.<sup>50</sup>

The same thing with Anita, learning is defined as a thematic learning activities designed around the main idea and involves several areas of subjects related to the theme. Thematic learning uses a central theme in the learning activities. All learning activity was centered on these themes. Thematic learning helps student see

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<sup>49</sup> Trianto, *op. Cit.*, hlm77

<sup>50</sup> Rusman, *op.cit.*, hlm 254

relationships between ideas and concepts. So as to improve the understanding of the student what he had learned.<sup>51</sup>

Thematic learning offers learning model which makes the learning activities are relevant and full of meaning to empower students with the knowledge and experience to help students understand and perceive the world in his life. Teachers should be able to form a learning experience in order to have an effect on students's experience of meaningfulness and makes the learning process more effective and interesting.<sup>52</sup>

Researcher concluded that thematic learning is a learning model that combines some of the learning materials from a variety of standard competence and basic competence from one or multiple subjects.

## 2) Thematic learning foundation

Thematic learning has a position and a potential strategic success in the learning process in primary school. The thematic learning needed a solid foundation and strong.

The foundation of thematic learning in elementary school as follows<sup>53</sup>

### a) Philosophical foundation

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<sup>51</sup>Anitah, *op.cit.*, hlm 3.10-3.12

<sup>52</sup>Trianto, *op.cit.*, hlm 83

<sup>53</sup>Rusman, *op.cit.*, hlm 255-257



Thematic learning influenced by three streams of philosophy was progressivism; constructivism; and humanism. The progressivism looked the learning process needs emphasized to build creativity, give some activities, natural atmosphere and observing the student experience. The constructivism think that experience of students as key learning. The humanism saw students in terms of uniqueness/distinctiveness, potential, and motivation.

b) Psychological foundation

Related to the student's development psychology and psychology of learning. Piaget divided student thinking into the development phase as follows: phase sensorimotor (0-2 years), pre operational (2-7 years), operational concrete (7-11 years) and formal operational (7-15 years). Children ages of elementary school are on concrete operational stage. Students still think concretely with a situation that is close to daily life. So haven't been able to select out the concept from a variety of disciplines. Then to delivery of learning for students of low grade, the material must be relevant and should be presented together.

c) Juridical foundation

With regard to the regulatory policy supports the thematic learning in elementary school. In law No. 20 of 2003

on the national education system was declared that every student on every unit of education is entitled to educational services according to talent, interests and abilities. From the above it can be concluded that the thematic learning has three foundations are 1) the philosophical foundation; 2) psychological foundation; 3) juridical foundation. Teachers should pay attention to the third runway when planning, implementing and assessing the process and results in the implementation of thematic model.

### 3) Thematic learning characteristics

Thematic learning as a model of learning in elementary school has the following characteristics<sup>54</sup>:

#### a) Student centered

Thematic learning centered on students. This is in accordance with the modern learning approach that puts more students as the subject of study. While more teachers serve as facilitators that provide excellence in students for learning activities.

#### b) Provide direct experience

Thematic learning gives direct experience to students. With this direct experience, students with a concrete as a basis to understand the things that are more abstract in nature.

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<sup>54</sup> Rusman, *op.cit.*, hlm 258-259

- c) Separation of subjects is not so clear.

In the separator between thematic learning subjects became not so clear. Learning focus is directed on discussion of themes that are most closely related to student life

- d) Present the concept of the various subjects.

Thematic learning presents concepts from a wide range of subjects in a learning process. Thus, students are able to understand these concepts as a whole. This is necessary to help students in solving the problems faced in everyday life

- e) Thematic learning is flexible.

Teachers can connect learning materials from one subject to the other subjects. Connecting with student life and the environment of the school.

- f) Learning outcomes in accordance with the interests and needs of the students.

Students are given the opportunity to optimize the potential of assets in accordance with the interests and needs

- g) Using the principles of learning while playing and fun.

Thematic learning adopts the principles of the PAKEM learning active learning, creative, effective and fun.<sup>55</sup>

#### 4) The Advantages thematic learning

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<sup>55</sup>Trianto, *op.cit.*, hlm 92

Thematic learning has several advantages. Thematic learning advantages for teachers among others are as follows<sup>56</sup>

- a) Provided more time for learning
- b) Relationships between subjects and topics can be taught logically and naturally
- c) Teachers can help students expand learning opportunities to many different aspects of life
- d) To develop a community facility

While for students, including:

- a) Could be more focused on the learning process, rather than results of study
- b) Provides an integrated learning approach
- c) Provides student-centered curriculum that is associated with the interests, needs and intelligence; they make decisions on their own and responsible for the success of the study
- d) Stimulates independent inquiry and discovery within and outside of class
- e) Helps students build relationships between concepts and ideas.

Therefore, increasing appreciation and understanding. It can be concluded that thematic learning model is a model of learning which combines some of the material into a theme that is close to the student life strategic applied in primary schools.

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<sup>56</sup>Trianto, *op.cit.*, hlm 89

## CHAPTER III

### METHOD OF RESEARCH

#### A. Development Model

The researcher used the method of research and development because the researcher wanted to produce interactive media. Procedural model of product development is the adaptation model developed by Alessi and Trollip which includes 10 stages: 1) determine objectives and needs, 2) collect reference materials, 3) learns content, 4) brainstorming, 5) design learning, 6) creates a flow chart, 7) create storyboards, 8) program material, 9) creates support material, and 10) evaluation and revision.<sup>56</sup>The developer uses this model will be more targeted, more time saving, and can produce a good product.

Developer doing adaptations resulting in a product with the following components: (1) logo, (2) picture pray before the study and after the study, (3) material (4) material, (5) examples, (6) evaluation, (7) summary, and (8) the instructions. This adaptation was done with the hope that the resulting product has a complete component in accordance with the requirements of the material.

Logos is basically the introduction program. But in function, the logo is intended as an introductory program identity. Material are needed to explain of least common multiple in everyday life and how to save energy effectively.

This Model generally can be described as follows. The first programs are the logo or opening slide. Next, the students are invited to pray before the study, the material, studying examples, do an evaluation.

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<sup>56</sup>Alessi dan Trollip, "*Computer Based Instruction: Methods And Development*", New Jersey: Prantice Hall, 1991.

## B. Procedure Development

Designing or developing learning programs (courseware) is a process that requires planning and special skill. Courseware is usually developed by a team of various professions, for example, material expert, design expert, linguists, teacher class, and other related. Nevertheless, there is also a courseware developed individually.<sup>57</sup>

Development of courseware requires three stages, namely planning, development, and evaluation.<sup>58</sup> Alessi and Trollip spell out in detail the third stage it into 10 stages here: 1) determine objectives and needs, 2) collect reference materials, 3) learn content, 4) brainstorming, 5) design learning, 6) creates a flowchart, 7) create storyboards, 8) program material, 9) creates support material, and 10) evaluation and revision. Developers use the development Model Alessi and Trolli to develop this interactive media. It is based on that this model is a complete and detailed model. In addition, this model makes it easy for the implementation of the development.<sup>59</sup>

The procedure product development can be explained as follows.

1. Determine Objectives and Needs.

Activities performed at this stage are to determine the material, the purpose of learning the material data analysis needs.

2. Collect Reference Materials

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<sup>57</sup>Soulier, *The Design and Development of Computer Based Instruction* (Massachusetts: Allyn and Bacon, Inc, 1988), hlm 1

<sup>58</sup>Ibid, hlm 2

<sup>59</sup>Abdussakir, *op.cit.*

Activities performed at this stage are to collect the necessary reference materials. Reference materials collected include materials or books related to learning materials, interactive media development, programming and computer.

### 3. Learn Content

Activities performed at this stage are learning reference materials have been collected in the previous stage.

### 4. Brainstorming

Activities performed at this stage are to collect ideas from everywhere, which related to development will be carried out. The idea is based on learning objectives, learning material and learning methodology. In addition, the ideas collected relating to the design and shape of the programs that will be developed. The ideas are collected and then selected based on ease of implementation and suitable to the material.

### 5. Design Learning

Activities performed at this stage are (1)analyze the study and concepts, learning, (2) make the description of learning, and (3) evaluate and revise the plan as well as the evaluation of learning.

### 6. Create AFlowchart

Flowchart contains not only the order of presentation of the materials start to finish, but also all the possibility that would happen. For example, decision making and when students make mistakes. Flowcharts are useful

as programming directions. So it's to facilitate the preparation of programming.

#### 7. Create A Storyboard

An activity performed at this stage is to create storyboards. Create a storyboard is the process of creating a form of display on a paper that will be "transferred" to the computer screen. Storyboards contain material that includes learning the material will be presented, questions, feedback, instructions, pictures, and animations. Storyboards are called worksheet or instructional design.

#### 8. Program Material

Activities performed at this stage are the process of "moving" the display from storyboards to the computer screen. This stage is called programming.

#### 9. Create Support Material

Activities performed at this stage are to make support material that is required in the operation of the program. Support material such as computer specifications, and product content.

#### 10. Evaluation and Revision

Activities performed at this stage are to evaluate and revise the program that has been developed. Evaluation and revision are done based on feedback, comments, and suggestions of some experts such as material experts, design experts, linguist, and teacher class. Evaluation and revision of the trial results are also carried out.



## C. Product Trials

### 1. Trial Design

The tests used for collecting data as a basis to know about valid, practical, and effectiveness of the product. Before that, the product has to consult with several experts like material, design, and language. After consultation, the product was recognized and valued by the teacher class.

Trial design uses descriptive. Descriptive design allows a developer to get quantitative data and qualitative data which are very beneficial to perfecting the product.

The test phase was carried out is a consulting, research and response, and individual tests. Each of these stages can be described as follows.

#### a. The consultation phase

The consultation phase consisted of some of the following activities.

- 1) Material experts, design experts, and linguists give comments and suggestions on the draft I interactive media.
- 2) Developer performs data analysis the results of consultations in the form of comments and suggestions for improvement.
- 3) Developer fixes drafts I produced interactive media into interactive media products II the drafts based on the results of data analysis consultation.

#### b. Response and assessment phase

Response and assessment phase consists of the following activities.

- 1) Teacher class provides feedback and assessment of draft II.

- 2) Developer responses data analysis and assessment.
- 3) The developer makes improvement drafts II became draft, III based on data analysis and assessment responses.

c. Individual trials phase

Individual test do twice. The first phase of the individual trials conducted three students and a second phase of individual trials were committed six students. The implementation of individual trials twice based on interactive media product that is more focused on individual learning.

1) Individual trials of the first phase.

Individual trials of the first phase consist of the following activities.

- a) Developer observed that students are learning the material theme energy saving sub theme 2 learning 4 using interactive media product draft III and continued by doing the interview.
- b) Developer performs data analysis the results of observation and interviews.
- c) The developer makes improvements to draft III to draft IV based on the results of data analysis observation and interview.

2) Individual trials second phase

Individual trials second phase consists of the following activities.

- a) Developer observed that students are learning the theme energy saving sub theme 2 learning 4 using drafts IV and continued by doing the interview.
- b) Developer performs data analysis the results of observation and interviews.
- c) The developer makes improvements from draft IV to final product based on the results of data analysis, observation and interview.

## 2. The Subject Tests

Interactive media development, test subject is material expert, design expert, linguists, teacher class, and the students of fourth grade Islamic Global School. Selection of Islamic Global School as a location for a test based on several reasons, namely (1) the students has difficulty learning the theme energy saving sub theme 2 learning 4, (2) has a computer lab but there has been no use of the maximum by the teacher. Because of the there has been no software in accordance with thematic, and (3) the ability of the students is very diverse.

While the developer chooses the fourth grade test as a subject because it is based on getting the curriculum 2013. In addition, the material is difficult because the student must memorize multiple and related with daily problem.

a. Material expert

Material expert in the development of interactive media is someone who has a master's degree in mathematics education. Selection material expert is based on the consideration that those concerned have competence in the field of mathematical material. Material expert gives comments and suggestions about learning material in interactive media.

b. Design expert

Expert in the design development of interactive media is a lecturer of elementary education, which already has a working time of at least 5 years. Selection design expert is based on the consideration that the lecturer is often associated with the world of children and have competence in the development of interactive media.

c. Linguists

Linguist in the development of interactive media is an Indonesian lecturer and became a lecturer in primary education who already has at least 5 years working period.

d. Teacher class

This teacher class is an undergraduate education as well as a teacher's class at the Islamic Global School in Malang. Selection teacher class was based on the consideration that has had a lot of teaching experience and is more aware of the character of students.

Teacher class gives feedback and assessment. Moreover, teacher class gives comments for repair of components are assessed.

e. Fourth grade students

Individual tests do in the first year of lessons 2014/2015. Execution of individual tests is conducted in two phases. The first phase of the individual test carried out in December 2014. Individual trial subjects are the first phase of three students in fourth grade Islamic Global School. These three students taken at random and representative groups capable of low, medium and high score test. The selection of the subject tests is also based on consideration of the teacher class that is easy to be interviewed. The second phase of the individual trials conducted in December 2014. Subjects of individual trials second phase are six students in fourth grade Islamic Global School. Six students are taken at random and representative groups capable of low, medium, and high score test. The subjects of the second phase of the individual trials were taken from different individual test subjects in the first phase. Selection of test subjects is also based on consideration of the teacher class that is easy for the interview.

3. Types of Data

The Data collected in this interactive media development are qualitative and quantitative. Qualitative data are obtained from the results of consultations with material expert, design experts, linguists, and teacherclass. The qualitative data were also obtained from the

observation and interview. Quantitative data obtained from the assessment from the validator and student at fourth grade.

#### 4. Data Collecting Instrument

Data collecting instrument includes assessment and response. Question form responses and rates given to the teacher class. Teacher class gives feedback and assessment of all aspects of each component of the interactive media. Assessment, responses and question form designed with four choices of scores are 1, 2, 4, 5. The score 3 is not included with consideration to facilitate the classification of answers in relation to decision making for the repair of the product. A description of the values 1, 2, 4, and 5 can be seen in Table 3.3.

Data are also obtained through consultation with material expert, design experts, and linguists. Another activity to obtain data is doing observations on students who are following the trials of individuals and continued with the implementation of the interviews of all trial subjects.

#### 5. Data Analysis Techniques

Data analysis in the development of interactive media is descriptive. A descriptive analysis was conducted to process data the results of consultations, the results of the assessment and feedback, observations, and interviews. The results of the data analysis used as a basis for the implementation of improvements to the media. To determine percentage from the result of response, developer uses this formula as follows:

$$P = \frac{\sum x}{\sum xi} \times 100\%$$

**Description:**

X : score the answers by the validator

xi : score the highest answer

P : percentage rate valid

In order to provide meaning and decision-making responses and results data from assessment to revision of media used the eligibility levels qualifying criteria as in Table 3.3 below.

**Table 3.3**  
**Eligibility Qualifications**

Qualification assessment		The eligibility rate	Describes revision
Scale	Description		
5	Very appropriate, very readable, very accurate, very regular, very excellent, very capable, and very substantial	Valid	No revision
4	Appropriate, readable, accurate, regular, excellent, capable, and substantial	Valid	No revision
2	Less appropriate, less readable, less accurate, less regular, less excellent, less capable, and less substantial	Less Valid	Need revision
1	Very inappropriate, very less readable, very less accurate, very poorly organized, very ugly, very poor, very less substantial	Very less valid	Need revision

## CHAPTER IV

### THE RESULTS OF RESEARCH AND DEVELOPMENT

#### A. The Implementation of Development

Procedural models developed for this product is the adaptation model by Alessi and Trollip. There are 10 stages 1) determine objectives and needs, 2) collect reference materials, 3) learns content, 4) brainstorming, 5) design learning, 6) creates a flowchart, 7) create storyboards, 8) program material, 9) creates support material, and 10) evaluation and revision.

##### 1. Determine Objectives and Needs

Learning materials in this product are the thematic learning themes energy saving. The goal is that students can be easier to understand the concept of a material. In addition, students can also apply materials to save energy, according the example given in the media and can take advantage of useless things.

At this stage the researcher determines needs in the implementation of the development. Needs is theoretical study, study materials, books on I-spring, and media development as well as the computer/laptop.

##### 2. Collect Reference Materials

Reference materials collected include thematic lesson books for students and teachers, the manual use of I-spring, and books supporting material. The developer is looking for reference material as much as possible to strengthen and simplify the concept that will be given to students.

##### 3. Learn Content



An activity at this stage is the learn reference materials have been collected in the previous stage. The developer does not wait until all the reference material collected. In the stage of studying the content, developer learns the existing reference materials and gradual.

#### **4. Brainstorming**

Developer develops media from reference material that has been studied before. Developer determined that interactive media have the following characteristics 1) use color to make students interested in media, 2) there are reading about prayer before and after study 3) using the display menu that is easily chosen 4) using the animation on concept of material 5) use different colors in any material.

#### **5. Design Learning**

Material themes saving energy have a good design to make it easy for students. At the beginning of the study, students will see the opening menu display afterward students are invited to pray before the study. Students click on the material to be studied. In each view, there are many symbols that instruction, evaluation, home, and exit. Instructions symbol to inform the function of each symbol to students. Evaluation symbol, to start the test. Home Symbol to return to the main menu to select material and cross symbol used to exit the interactive media.

Students choose the material to be learned, but the teacher directs students to choose the material sequentially. The first material which prime numbers, developer uses number tables to facilitate students in finding prime numbers.

Students will be involved directly in the game and match the answers. Not only that, but the students are also invited to prove a prime number and not the Prime or composite. After that, students will conclude the definition of primes and gives examples of prime numbers.

The second factor is the material, at the beginning of the developer gives the definition of the factor and prime factors along with examples. Then students are invited to conclude the difference between factors and prime factors. The last, students were invited to work on an example of the question.

The third material is prime factorization. The developer gives definitions and examples of prime factorization to students. The developer also provided the material factor tree interactively.

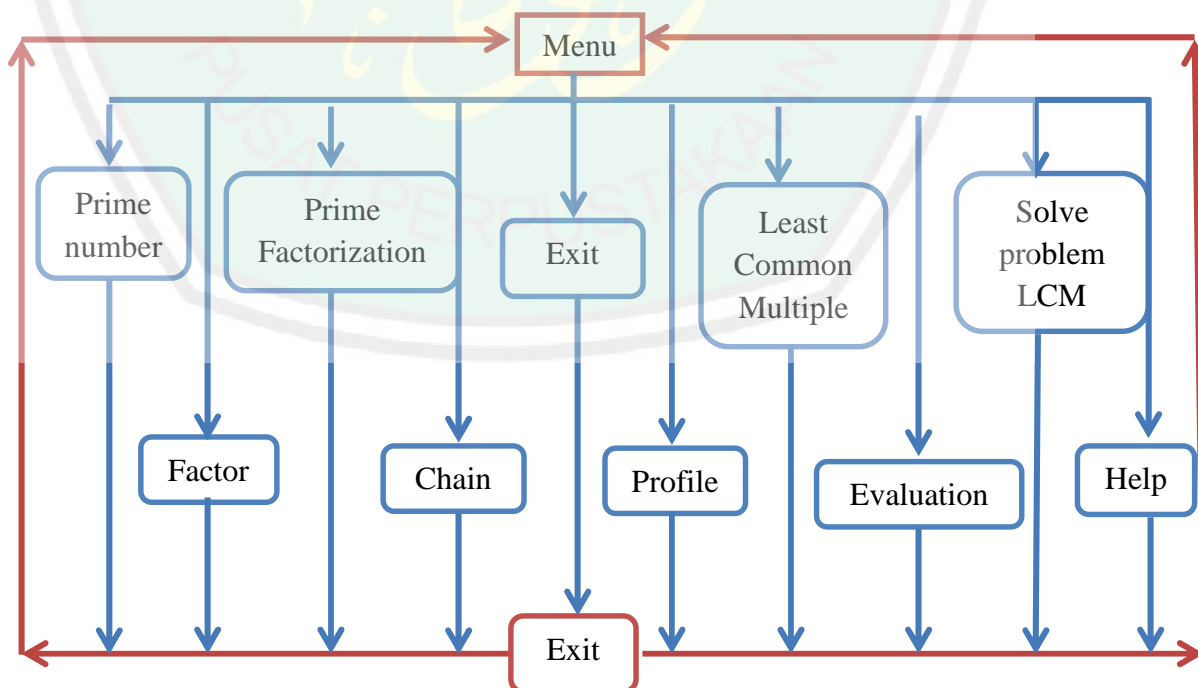
The fourth material is a multiple of the least common multiple. The developer gives the concept of multiples of numbers. Then invite students to observe themultiple number. Afterward, studentsconcluded the definition of multiples of numbers. Similarly, multiple numbers and least common multiple,the developer creates the concept of the animation so easy to understand. After students understand about the least common multiple then students are invited to determine the least common multiple. Students are told how to determine least common multipleand give an exam to practice.

The fifth material solves the problem of least common multiple. Students are given examples of questions that relate to their daily activities. The developer also relates the material with the theme about saving energy. In the example question, students can match with the existing answers.

Sixth material is chained. Students are invited to take advantage of useless objects. Students create a necklace from the materials according to the instructions given.

All the material has been studied by students. It's time to student working on evaluation. There are 15 multiple choice questions. The developer determines the score standard amounted to 75. If the student scores less than 75, students have not mastered the material. After the students answering all the questions, the display will show the score and a review of each question. Students can learn and know the explanation of each question.

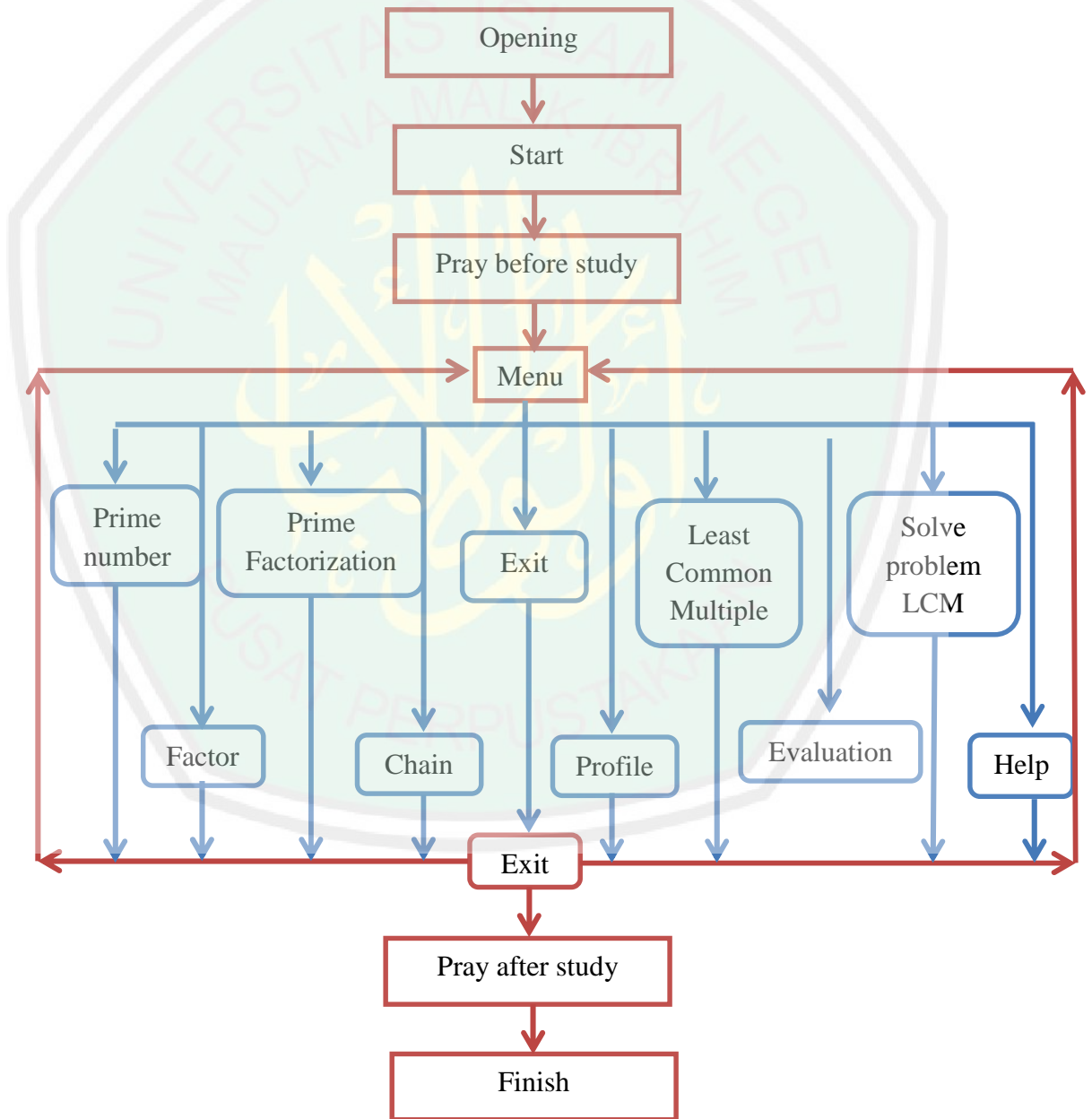
End of learning, students is invited to pray after the study. Students can return to the main menu or choose the cross symbol to get out of the media. This interactive media provided the voice to support the material studied. This Design, Interactive Media as in Figure 4.1 below.



**Figure 4.1 Design Interactive Media**

## 6. Create A Flowchart

A flowchart of interactive media is not made in detail. Flowchart in this interactive media only made in outline. Flowchart does not detail from a program called pseudo flowchart. This media pseudo flowchart arranged as in Figure 4.2 below.

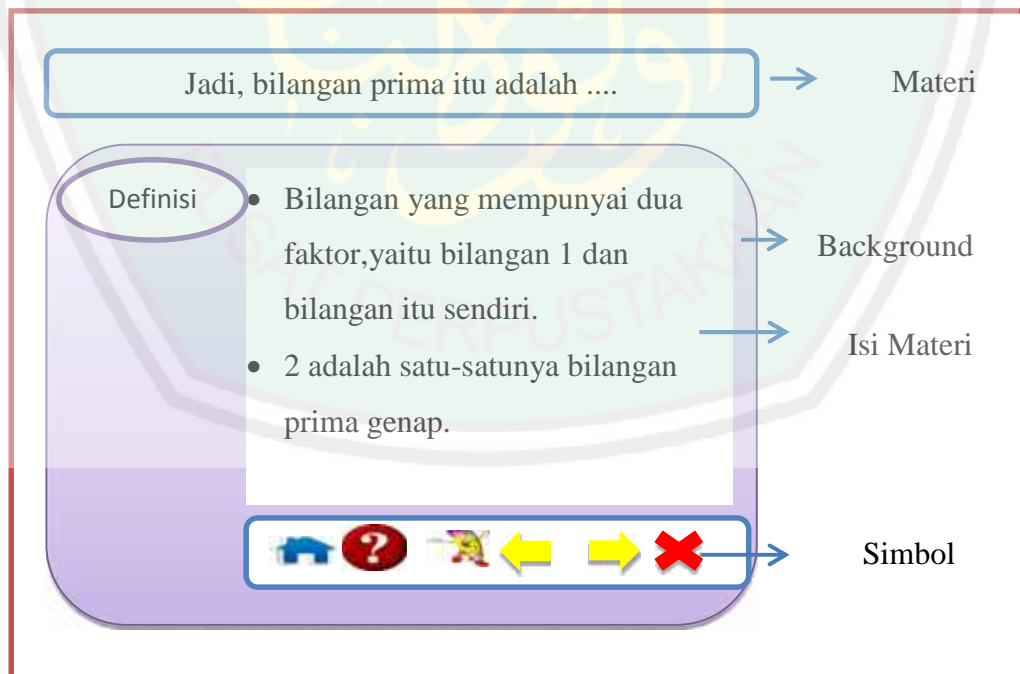


**Figure 4.2 Flowchart interactive media**

## 7. Create A storyboard

Create a storyboard is the process of creating the appearance of the paper to be "transferred" to the computer screen. Storyboard contains material that will be presented, questions, feedback, instructions, pictures, and animations. Storyboards are often called a worksheet. This time, the developer does not create storyboards for all display. Sometimes developers designed a display directly on a computer screen. However, for a complex display developer have to create storyboards.

The developer will be easier in designing a display with storyboards. A single sheet of storyboards, contains a display will be shown on a computer screen. The developer creates storyboard example can be seen in Figure 4.3 here.

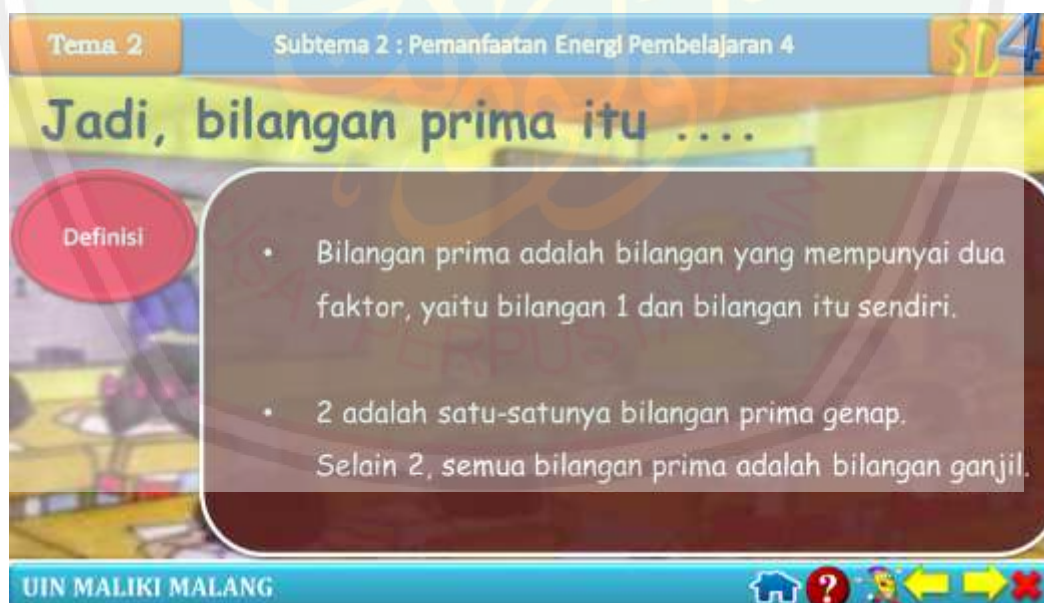


**Figure 4.3 Storyboard interactive media**

## 8. Program Material

The developer uses the power point program that was changed to flash player through the software I-spring. I-spring is one of the tools that changes the presentation file into flash and SCORM/AICC. It is the form commonly used in learning with e-learning LMS (Learning Management System). The application I-spring can be used to make the evaluation questions and change the PowerPoint files to flash quickly and easily.

The first step is to program the display design and menu system. After all display programmed, it's time to process of moving the display from storyboards to the computer screen. Figure 4.4 is an example of the results of the moving storyboards of the computer screen in Figure 4.3.



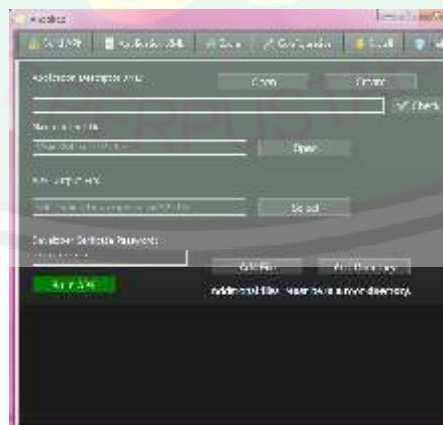
**Figure 4.4 Program material interactive media**

After the slide power point that developer creates has been filled with content. The final step is to publish it to convert to android. The developer does the

steps below for publications. Developer clicks the tab I-spring and select Publish. The developer clicks the tab I-spring and select Publish. Then, the developer clicks publish and wait a while. Interactive media is ready to use.

The developer is not only develops on your computer or laptop, but also on smartphones. The developer will convert flash swf file to android apk file. To create android applications, the first step is to prepare the needed materials. Materials needed include file results publish i-spring, andraided, adobe air SDK, Java 5.0 and Java 7.0.

All materials should be installed in the computer. The developer creates one folder. The folder's name is android. There are files AIR\_SDK.rar and Andaired.rar. Andaired is software used to convert files results publish I-spring into the application android. To run the Andaired, developer follows these steps. Developer opens file Andaired.exe in the folder C:\android\Andaired. The display will appear as shown below as in Figure 4.5.



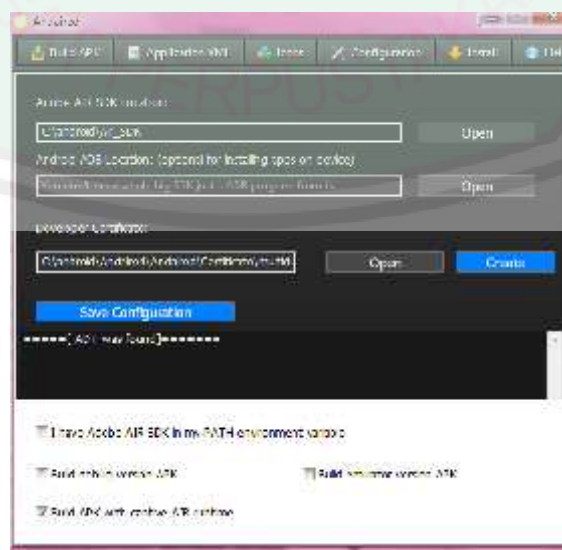
**Figure 4.5 Andaired**

The developer clicks the tab Configuration. This section is used to set the program Andaired. This is the display tab Configuration as in Figure 4.6.



**Figure 4.6 Tab Configuration**

The next step is to find the location of the folder is Air\_SDK. Click Open in the Adobe AIR SDK Location. The developer is looking for a folder AIR\_SDK in C:\android\AIR\_SDK. The developer has already found the folder AIR\_SDK the display will appear as in Figure 4.7.



**Figure 4.7 AIR\_SDK**



The next step is to find the certificate ' APK ' in the folder andaired. Clickopen in the Developer Certificate. Developersearch file multidukasi. p12 in folder C:\android\Andaired\Certificate. The developer has already found the certificate, click Save Configuration to the new configuration. If it has been stored, the notification will appear New Configuration Saved. As in Figure 4.8 below.



**Figure 4.8 Save Configuration**

The next step is making the Application Descriptor XML. The application is a file used to configure, manage and describe how a component, module or application to work. Application Descriptor XML has a role to set the file name, icon, and version, publish, display settings, etc.

To create the file, the developer performs the following steps. The developer chooses the Unique Application Identifier and rename them with Interactive Media energy saving. Developer selects the Require AIR SDK Version 3.5. Developerfills the file name with the Interactive Media energy saving. The developer changed the name in the Name displayed to Interactive Media energy

saving. Afterward select the Main Content file. Developer clicks Open to find swf application files results publish I-spring. The developer chooses the Optional advanced parameters and Select the fullscreen. By pressing the button Generate Application Descriptor, save screen will appear. Developer keeps files in C:\android\interaktif with the name of Interactive Media energy saving.xml. After pressing the button Save will appear icon builder. Click Open to open the browser to look for the icon. The developer uses saving energy icon as this interactive media identity. Click the create button to create the icon. Icons successfully created in various sizes.

Build applications to process applications for Android. Select the Application Descriptor XML. Click the Open button. Search the location of Interactive Media saving energy.xml in C:\android\interaktif. Click check to validate the application.xml.

The developer chooses APK File Output. Click Select button, choose a location in the C:\android\Aplikasiku. Developers give the name of Interactive Media saving energy.apk. Click Save button, publish location APK has been determined. Click the Build button APK to start the process create APK. The application has been successfully created.

## **9. Create Support Material**

Supporting material includes the operating instructions and specifications of computers and smartphones. The operating instructions can be read when students are already running this interactive media. Students get information such as a description of the symbols contained in the media.

Minimum computer specifications are used to create android applications from Microsoft Power Point is an Intel core 2 duo, 1 Giga memory, Windows vista up with infrastructure 32 bits, Microsoft Office 2007 full installation, and flash player 11 upwards. Minimum smartphone specifications are ARMv7 Processor, OpenGL, 550MHz, Android 2.3 (Gingerbread) upwards, and 256 MB of RAM Memory.

#### **10. Evaluation and revision**

At this stage the media have been developed. The result of this development was named as the drafts I. Final development activities are evaluation and revision of the media. There are four stages include stage I, stage II, stage III, and stage IV in evaluation and revision. Developer consults the media to materialexpert, design experts, linguists about the draft I in phase I. The consultation results are analyzed for basis implementation of revised drafts I. The result revised draft I called draft II.

In phase II, draft II media have feedback and assessed by teachers in fourth grade Islamic Global School Malang. Based on feedback and the assessment of teacher, all components are appropriate. Teacher's class said interactive media is quite good and doesn't need to be revised.

In phase III, draft III media tested to 3 students from fourth grade of Islamic Global School Malang. The three students use draft III media in learning. The results of observation and interviews showed that media can be operated easily. Based on the analysis of the results of observation and interviews, drafts III was changed to draft IV.

In stage IV, draft IV media tested to 6 students from fourth grade of Islamic Global School Malang. The six students use draft IV media in learning. The results of observation and interview shows drafts IV has been able to run successfully and the learning material can be understood by students. Draft IV media is set as the end product and not revised again.

## **B. Development Results**

There are four stages include 1) the development of phase I, 2) the development of phase II, 3) the development of phase III, 4) the development of phase IV. Each stage can be explained as follows.

### **1. Result of Development of Phase I**

#### **a. Data and data analysis**

Developer consults the media to material expert, design experts, linguists about the draft I in phase I. Data validation is obtained from results of the evaluation carried out by three validators. They are three educational lecturers as a material expert, design experts, and linguists. The identity of this validator can be seen in the attachment.

Data are quantitative data and qualitative data. Quantitative data is the assessment of the scale of Linkert. Qualitative data is assessment or advice from the validator as in Table 4.1 below

**Table 4.1**  
**Criteria for Validation Assessment by Material Experts, Design Experts, and Linguist**

Description	Score
Very Nice	5
Nice	4
Less Good	2
No Good	1

**Table 4.2**  
**Criteria for Validation Assessment by Students**

Description	Score
A	5
B	4
C	2
D	1

Data and data analysis of this stage is the result of consultation with material expert, experts design, and linguist.

- 1) Material expert validation phase I
  - a) Data and data analysis consultancy

Quantitative data from the results of validation from material experts can be seen in Table 4.3

**Table 4.3**  
**Interactive Media Assessment Data by Material Expert Phase I**

No	Statement	x	xi	Percent (%)	Valid Criteria	Description
1.	Material according to subject character	4	5	80%	Valid	No revision
2.	Development of the conceptual material	5	5	100%	Valid	No revision
3.	Material completes	4	5	80%	Valid	No revision
4.	Material regularly	4	5	80%	Valid	No revision
5.	Acceptable with the development of the students	4	5	80%	Valid	No revision

6.	The logical connection between the facts, concepts and theories	4	5	80%	Valid	No revision
7.	The concept suitable with core competence and basic competence in curriculum 2013	4	5	80%	Valid	No revision
8.	Outlining the concept of material and activities in accordance with grade 4.	4	5	80%	Valid	No revision
9.	Emphasize the skills of the process.	4	5	80%	Valid	No revision
10.	There are questions that are able to measure the results of student learning.	4	5	80%	Valid	No revision
11.	There are questions that guide students to make conclusions.	2	5	40%	Less valid	Need revision
12.	There are questions that emphasize the skills of the process.	4	5	80%	Valid	No revision
13.	Evaluation instructions easy to understand	2	5	40%	less valid	Need revision
14.	Delivery of materials and instructions are easy to understand for students	4	5	80%	Valid	No revision
15.	The delivery of the material is interesting.	4	5	80%	Valid	No revision
16.	Volume synchronization backsound on media with other audio	4	5	80%	Valid	No revision
<b>TOTAL</b>		<b>61</b>	<b>80</b>	<b>76,25%</b>	<b>Valid</b>	<b>No revision</b>

**Description:**

X : score the answers by the validator

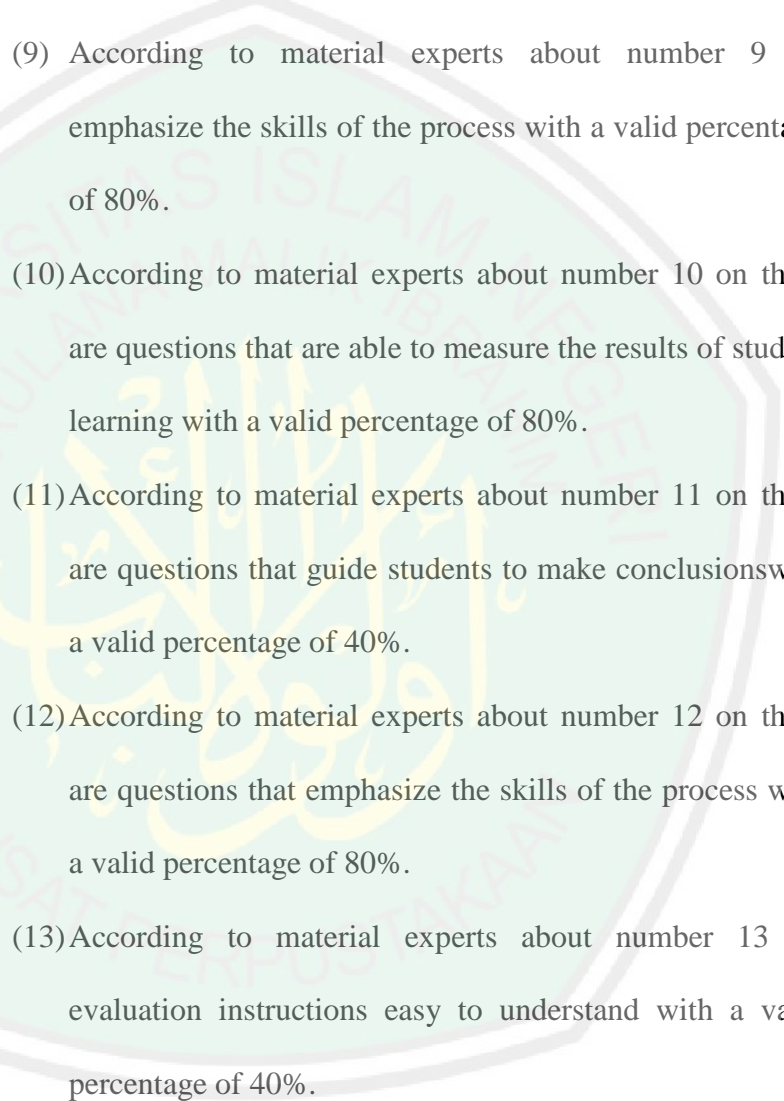
xi : score the highest answer

P : percentage rate valid

$$P = \frac{\sum x}{\sum xi} \times 100\%$$

Table 4.3 showed that the results of assessment of material experts to the interactive media is good, with the percentage of valid 76, 25%. The following is an analysis of each question.

- (1) According to material experts about number 1 on material according to subject character with a valid percentage of 80%.
- (2) According to material experts about number 2 on development of the concept of matter with a valid percentage of 100%.
- (3) According to material experts about number 3 on material complete with a valid percentage of 80%.
- (4) According to material experts about number 4 on material regularly with a valid percentage of 80%.
- (5) According to material experts about number 5 on acceptable with the development of the students with a valid percentage of 80%.
- (6) According to material experts about number 6 on the logical connection between the facts, concepts and theories with a valid percentage of 80%.
- (7) According to material experts about number 7 on the concept suitable with core competence and basic competence in curriculum 2013 with a valid percentage of 80%.

- 
- (8) According to material experts about number 8 on outlining the concept of material and activities in accordance with grade 4 with a valid percentage of 80%.
- (9) According to material experts about number 9 on emphasize the skills of the process with a valid percentage of 80%.
- (10) According to material experts about number 10 on there are questions that are able to measure the results of student learning with a valid percentage of 80%.
- (11) According to material experts about number 11 on there are questions that guide students to make conclusions with a valid percentage of 40%.
- (12) According to material experts about number 12 on there are questions that emphasize the skills of the process with a valid percentage of 80%.
- (13) According to material experts about number 13 on evaluation instructions easy to understand with a valid percentage of 40%.
- (14) According to material experts about number 14 on the delivery of materials and instructions are easy to understand for students with a valid percentage of 80%.



(15) According to material experts about number 15 on the delivery of the material is interesting with a valid percentage of 80%.

(16) According to material experts about number 16 on Volume synchronization background on media with other audio with a valid percentage of 80%.

Although in general the interactive media is valid and not revised, but in the analysis of each question show that there are two numbers that are less valid namely number 11 and 13. Validation statement number 11 is there are questions that guide students to make conclusions and validation statement number 13 is evaluation instructions easy to understand. A material expert does not agree with the statement.

b) Qualitative data

Qualitative data from the results of validation from material experts can be seen in Table 4.4

**Table 4.4**  
**Criticism and Suggestions by Material Expert of Interactive Media**

<b>Name of material experts</b>	<b>Criticism and suggestions</b>
Yeni Tri Asmaningtias, M.Pd	<ol style="list-style-type: none"> <li>1. Font and color is still too stiff</li> <li>2. There is no relationship least common multiple and saving energy</li> <li>3. The image is not one theme, it's best made in a theme</li> <li>4. Slide 33 need explanation in detail</li> <li>5. Slide the 21 largest communion multiples? Or least common multiple? Or greatest common factor?</li> </ol>









Based on feedbacks indicated in table 4.4 that many aspects still need to be improved. The researcher has to do revisions as the developer of the product.

c) Product revision

Based on analyses, revision of interactive media is as follows.

**Table 4.5**  
**Revision of Interactive Media Based on Validation of Material Expert**

No	Revised overview	Before revision	After revision
1	Color display is less attractive		
2	Background with color of writing more clarified		
3	The writings of greatest common multiple changed to the least common multiple		

<p><b>4</b></p>	<p><b>The calendar view is more attractive and descriptive writings are summarized</b></p>		
<p><b>5</b></p>	<p><b>The background is made in one theme in schools. Not the children who are waking up</b></p>		
<p><b>6</b></p>	<p><b>Need guidance about evaluation</b></p>		
<p><b>7</b></p>	<p><b>The images are not only small but also magnified into the background</b></p>		

2) Material expert validation phase II

a) Data and data analysis consultancy

Quantitative data from the results of validation from material experts can be seen in Table 4.6

**Table 4.6**  
**Interactive Media Assessment data by Material Expert phase II**

No	Statement	x	xi	Percent (%)	Validity criteria	Description
1.	Material according to subject character	4	5	80%	Valid	No revision
2.	Development of the concept of matter	5	5	100%	Valid	No revision
3.	Material completes	4	5	80%	Valid	No revision
4.	Material regularly	4	5	80%	Valid	No revision
5.	Acceptable with the development of the students.	4	5	80%	Valid	No revision
6.	The logical connection between the facts, concepts and theories.	4	5	80%	Valid	No revision
7.	The concept suitable with core competence and basic competence in curriculum 2013	4	5	80%	Valid	No revision
8.	Outlining the concept of material and activities in accordance with grade 4.	4	5	80%	Valid	No revision
9.	Emphasize the skills of the process.	4	5	80%	Valid	No revision
10.	There are questions that are able to measure the results of student learning.	4	5	80%	Valid	No revision
11.	There are questions that guide students to make conclusions.	4	5	80%	Valid	No revision
12.	There are questions that emphasize the skills of the process.	4	5	80%	Valid	No revision
13.	Evaluation instructions easy to understand	4	5	80%	Valid	No revision
14.	Delivery of materials and instructions are easy to understand for students	4	5	80%	Valid	No revision
15.	The delivery of the material is interesting.	4	5	80%	Valid	No revision
16.	Volume synchronization backsound on media with other audio	4	5	80%	Valid	No revision
<b>TOTAL</b>		<b>65</b>	<b>80</b>	<b>81,25%</b>	<b>Valid</b>	<b>No revision</b>

**Description:**

X : score the answers by the validator

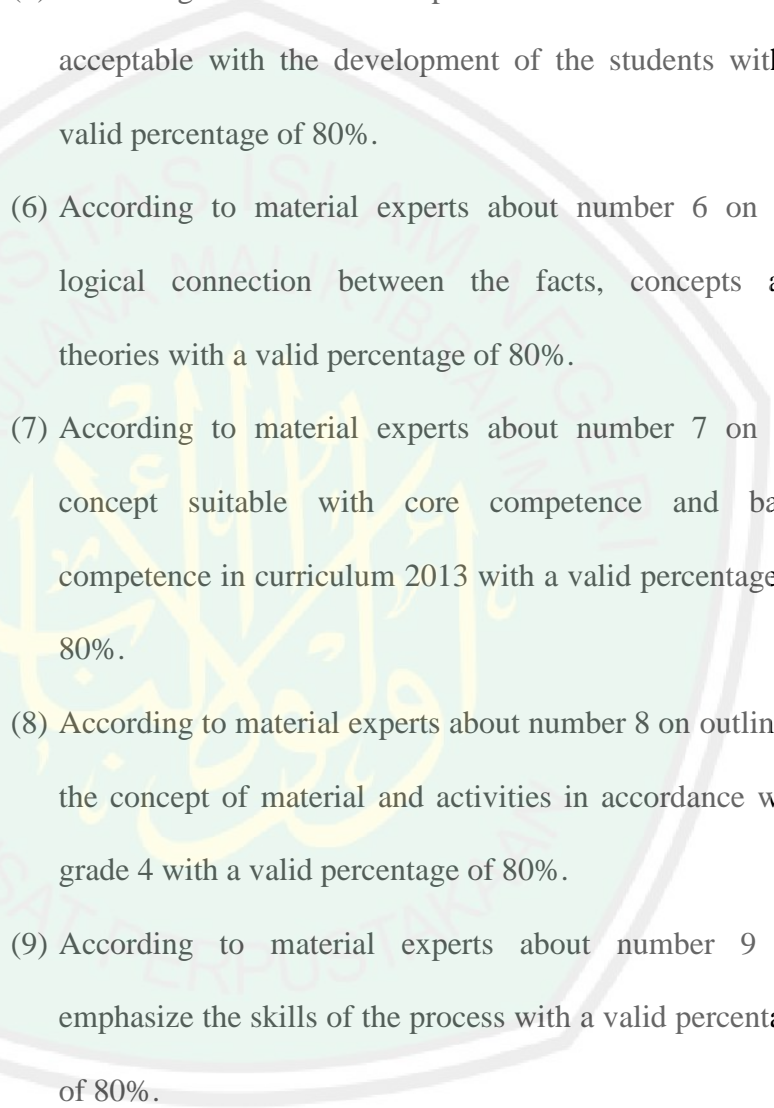
xi : score the highest answer

P : percentage rate valid

$$P = \frac{\sum x}{\sum xi} \times 100\%$$

After some revisions based on assessment by material expert on phase I, researcher asks validation again to find out if there are still parts that are less valid and needs to be revised again. Results of second validation of material experts can be seen in table 4.6 above. It appears that after doing some revision, interactive media have been good with the percentage of valid 81,25%. There are no criticism and advice from the material experts. Based on an analysis of each question there is no revision again.

- (1) According to material experts about number 1 on material according to subject character with a valid percentage of 80%.
- (2) According to material experts about number 2 on development of the concept of matter with a valid percentage of 100%.
- (3) According to material experts about number 3 on material complete with a valid percentage of 80%.

- 
- (4) According to material experts about number 4 on materials regularly with a valid percentage of 80%.
- (5) According to material experts about number 5 on acceptable with the development of the students with a valid percentage of 80%.
- (6) According to material experts about number 6 on the logical connection between the facts, concepts and theories with a valid percentage of 80%.
- (7) According to material experts about number 7 on the concept suitable with core competence and basic competence in curriculum 2013 with a valid percentage of 80%.
- (8) According to material experts about number 8 on outlining the concept of material and activities in accordance with grade 4 with a valid percentage of 80%.
- (9) According to material experts about number 9 on emphasize the skills of the process with a valid percentage of 80%.
- (10) According to material experts about number 10 on there are questions that are able to measure the results of student learning with a valid percentage of 80%.

(11) According to material experts about number 11 on there are questions that guide students to make conclusions with a valid percentage of 80%.

(12) According to material experts about number 12 on there are questions that emphasize the skills of the process with a valid percentage of 80%.

(13) According to material experts about number 13 on Evaluation instructions easy to understand with a valid percentage of 80%.

(14) According to material experts about number 14 on the Delivery of materials and instructions are easy to understand for students with a valid percentage of 80%.

(15) According to material experts about number 15 on the delivery of the material is interesting with a valid percentage of 80%.

(16) According to material experts about number 16 on volume synchronization backsound on media with other audio with a valid percentage of 80%.

### 3) Design expert validation phase I

#### a) Data and data analysis consultancy

Quantitative data from the results of validation from design experts can be seen in Table 4.7

**Table 4.7**  
**Interactive Media Assessment Data by Design Expert Phase I**

No	Statement	x	xi	Percent (%)	Validity criteria	Description
1.	An interesting media packaging	5	5	100%	Valid	No Revision
2.	Use appropriate typeface in the media	5	5	100%	Valid	No Revision
3.	Precision is typing layout	5	5	100%	Valid	No Revision
4.	Typing is clear	5	5	100%	Valid	No Revision
5.	Exact image position	5	5	100%	Valid	No Revision
6.	Use good illustrations	5	5	100%	Valid	No Revision
7.	Consistent use of the system	2	5	40%	Less Valid	Need revision
8.	Suitability organizing media content	5	5	100%	Valid	No Revision
9.	Kind of a nice assessment	4	5	80%	Valid	No Revision
10.	The ease of language used in interactive media	5	5	100%	Valid	No Revision
<b>TOTAL</b>		<b>46</b>	<b>50</b>	<b>92,00%</b>	<b>Valid</b>	<b>No Revision</b>

**Description:**

X : score the answers by the validator

xi : score the highest answer

P : percentage rate valid

$$P = \frac{\sum x}{\sum xi} \times 100\%$$

Table 4.7 showed that the results of assessment by design experts to the interactive media is good, with the percentage of valid 92,00 %. The following is an analysis of each question.



- (1) According to design experts about number 1 on an interesting media packaging with a valid percentage of 100%.
- (2) According to design experts about number 2 on use appropriate typeface in the media with a valid percentage of 100%.
- (3) According to design experts about number 3 on precision typing layout with a valid percentage of 100%.
- (4) According to the design experts about number 4 on typing is clear with a valid percentage of 100%.
- (5) According to design experts about number 5 on exact image position with a valid percentage of 100%.
- (6) According to design experts about number 6 on Use good illustrations with a valid percentage of 100%.
- (7) According to design experts about number 7 on Consistent use of the system with a valid percentage of 40%.
- (8) According to design experts about number 8 on Suitability organizing media content with a valid percentage of 100%.
- (9) According to design experts about number 9 on kind of a nice assessment with a valid percentage of 80%.

(10) According to the design experts about number 10 on the ease of language used in interactive media with a valid percentage of 100%.

Although in general the interactive media are valid and not revised, but in the analysis of each question show that there is one number that is less valid namely number 7. Validation statement number 7 is consistent use of the system. Design expert does not agree with the statement.

b) Qualitative data

Qualitative data from the results of validation from design experts can be seen in Table 4.8

**Table 4.8**  
**Criticism and Suggestions by Design Expert of Interactive Media**



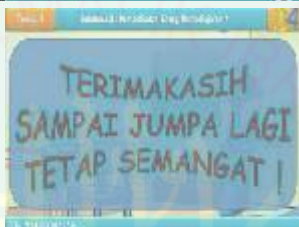

<b>Name of Design Expert</b>	<b>Criticism and suggestions</b>
Dr. Muhammad Walid, M.A	The developer should be more complete instructions for easier use

Based on feedback, as indicated in table 4.8 that many aspects still need to be improved. The researcher has to do revisions as the developer of the product.

c) Product revision

Based on analyses, revision of interactive media is as follows.

**Table 4.9**  
Revision of Interactive Media Based on Validation of Design Expert

No	Revised overview	Before revision	After revision
1	There should be a symbol for the return or exit. The symbol should be more complete		
2	When it comes out there is a choice between continued or not		

4) Design expert validation phase II

a) Data and data analysis consultancy

Quantitative data from the results of validation from design experts can be seen in Table 4.10

**Table 4.10**  
Interactive Media Assessment data by Design Expert phase II

No	Statement	x	xi	Percent (%)	Validit y criteria	Description
1.	An interesting media packaging	5	5	100%	Valid	No Revision
2.	Use appropriate typeface in the media	5	5	100%	Valid	No Revision
3.	Precision is typing layout	5	5	100%	Valid	No Revision
4.	Typing is clear	5	5	100%	Valid	No Revision
5.	Exact image position	5	5	100%	Valid	No Revision
6.	Use good illustrations	5	5	100%	Valid	No Revision
7.	Consistent use of the system	4	5	80%	Valid	No revision

8.	Suitability organizing media content	5	5	100%	Valid	No Revision
9.	kind of a nice assessment	5	5	100%	Valid	No Revision
10.	The ease of language used in interactive media	5	5	100%	Valid	No Revision
<b>TOTAL</b>		<b>49</b>	<b>50</b>	<b>98,00%</b>	<b>Valid</b>	<b>No Revision</b>

#### Description:

X : score the answers by the validator

xi : score the highest answer

P : percentage rate valid

$$P = \frac{\sum x}{\sum xi} \times 100\%$$

After some revisions based on assessment by design expert on phase I, researcher asks validation again to find out if there are still parts that are less valid and needs to be revised again. Results of second validation of design experts can be seen in table 4.10 above. It appears that after doing some revision, interactive media have been good with the percentage of valid 98,00%. There are no criticism and advice from the design experts. Based on an analysis of each question there is no revision again.

- (1) According to design experts about number 1 on an interesting media packaging with a valid percentage of 100%.

- (2) According to design experts about number 2 on use appropriate typeface in the media with a valid percentage of 100%.
- (3) According to the design experts about number 3 on precision typing layouts with a valid percentage of 100%.
- (4) According to the design experts about number 4 on typing is clear with a valid percentage of 100%.
- (5) According to design experts about number 5 on exact image position with a valid percentage of 100%.
- (6) According to design experts about number 6 on Use good illustrations with a valid percentage of 100%.
- (7) According to design experts about number 7 on Consistent use of the system with a valid percentage of 80 %.
- (8) According to design experts about number 8 on suitability organizing media content with a valid percentage of 100%.
- (9) According to design experts about number 9 on kind of a nice assessment with a valid percentage of 100%.
- (10) According to the design experts about number 10 on the ease of language used in interactive media with a valid percentage of 100%.

#### 5) Linguist validation

- a) Data and data analysis consultancy

Quantitative data from the results of validation by linguist can be seen in Table 4.11

**Table 4.11**  
Interactive Media Assessment data by Linguist

No	Statement	x	xi	Percent (%)	Validity criteria	Description
1.	Word choice in material	5	5	100%	Valid	No Revision
2.	The language is easy to understand by users	5	5	100%	Valid	No Revision
3.	Interactive media is a pleasure to read and understood	5	5	100%	Valid	No Revision
4.	The language used in accordance with the EYD	5	5	100%	Valid	No Revision
5.	The language used is suitable for fourth grade	5	5	100%	Valid	No Revision
6.	The phrase used is not ambiguous.	5	5	100%	Valid	No Revision
<b>TOTAL</b>		<b>30</b>	<b>30</b>	<b>100%</b>	<b>Valid</b>	<b>No Revision</b>

**Description:**

X : score the answers by the validator

xi : score the highest answer

P : percentage rate valid

$$P = \frac{\sum x}{\sum xi} \times 100\%$$

Table 4.11 showed that the results of the assessment by linguist to the interactive media are good, with the percentage of valid 100,00 %. The following is an analysis of each question.

- (1) According to linguist about number 1 on word choice in material with a valid percentage of 100%.

(2) According to linguist about number 2 on the language is easy to understand by users with a valid percentage of 100%.

(3) According to linguist about number 3 on interactive media is a pleasure to read and understood by a valid percentage of 100%.

(4) According to linguist about number 4 on the language used in accordance with the EYD with a valid percentage of 100%.

(5) According to linguist about number 5 on the language used is suitable for fourth grade with a valid percentage of 100%.

(6) According to linguist about number 6 on the phrase used is not ambiguous with a valid percentage of 100%.

b) Qualitative data

Qualitative data from the results of validation by linguist can be seen in Table 4.12

**Table 4.12**

**Criticism and Suggestions by Linguist of Interactive Media**

<b>Name of Linguist</b>	<b>Criticism and suggestions</b>
Hj. Siti Annijat Maimunah, M.Pd	<ol style="list-style-type: none"> <li>1. Please edit the votes pile up</li> <li>2. The Narrator can be filled with different voices</li> </ol>

Based on feedback, as indicated in Table 4.12 that many aspects still need to be improved. Researcher has to do revisions as the developer of the product.

c) Product revision

Based on the analysis, developer revises product with improved sound filler material as background for pile up again. The developer did not revise the product with a different sound because the developer had trouble finding someone willing to be voiced.

On the development of phase I, the resulting drafts II interactive media. Draft II interactive media is the result of the revision of the drafts I interactive media based on consultation with material experts, design experts, and linguists. Thus, it is expected that a draft II interactive media will be more effective, efficient and more attractive compared to the drafts I interactive media.

## 2. Result of Development of Phase II

a. Validation teacher class

1) Data and data analysis consultancy

Quantitative data from the results of validation by teacher class can be seen in Table 4.13



**Table 4.13**  
**Interactive Media Assessment data by teacher**

<b>No</b>	<b>Statement</b>	<b>x</b>	<b>xi</b>	<b>Percent (%)</b>	<b>Validity criteria</b>	<b>Description</b>
1.	The concept suitable with core competence and basic competence in curriculum 2013	5	5	100%	Valid	No Revision
2.	Outlining the concept of material and activities in accordance with grade 4.	5	5	100%	Valid	No Revision
3.	A clear theme of identity	5	5	100%	Valid	No Revision
4.	The completeness of components in the student guide	4	5	80%	Valid	No Revision
5.	Clarity in a characteristic theme	4	5	80%	Valid	No Revision
6.	Development of the concept of matter	5	5	100%	Valid	No Revision
7.	Material completes	5	5	100%	Valid	No Revision
8.	Material regularly	5	5	100%	Valid	No Revision
9.	Acceptable with the development of the students.	4	5	80%	Valid	No Revision
10.	Appropriate learning strategies	4	5	80%	Valid	No Revision
11.	Ease to use student	5	5	100%	Valid	No Revision
12.	Organizing the material interested	4	5	80%	Valid	No Revision
13.	Evaluation of results study clearly	5	5	100%	Valid	No Revision
14.	Emphasize the skills of the process.	4	5	80%	Valid	No Revision
15.	There are questions that are able to measure the results of student learning.	4	5	80%	Valid	No Revision
16.	There are questions that guide students to make conclusions.	5	5	100%	Valid	No Revision
17.	There are questions that emphasize the skills of the process.	4	5	80%	Valid	No Revision
18.	Evaluation instructions	4	5	80%	Valid	No Revision

	easy to understand					
19.	Delivery of materials and instructions are easy to understand for students	4	5	80%	Valid	No Revision
20.	The delivery of the material is interesting.	4	5	80%	Valid	No Revision
21.	Volume synchronization backgrounds on media with other audio	4	5	80%	Valid	No Revision
22.	The right layout	5	5	100%	Valid	No Revision
23.	The consistency to use of space and typing	5	5	100%	Valid	No Revision
	<b>TOTAL</b>	<b>103</b>	<b>115</b>	<b>89,57%</b>	<b>Valid</b>	<b>No Revision</b>

**Description:**

X : score the answers by the validator

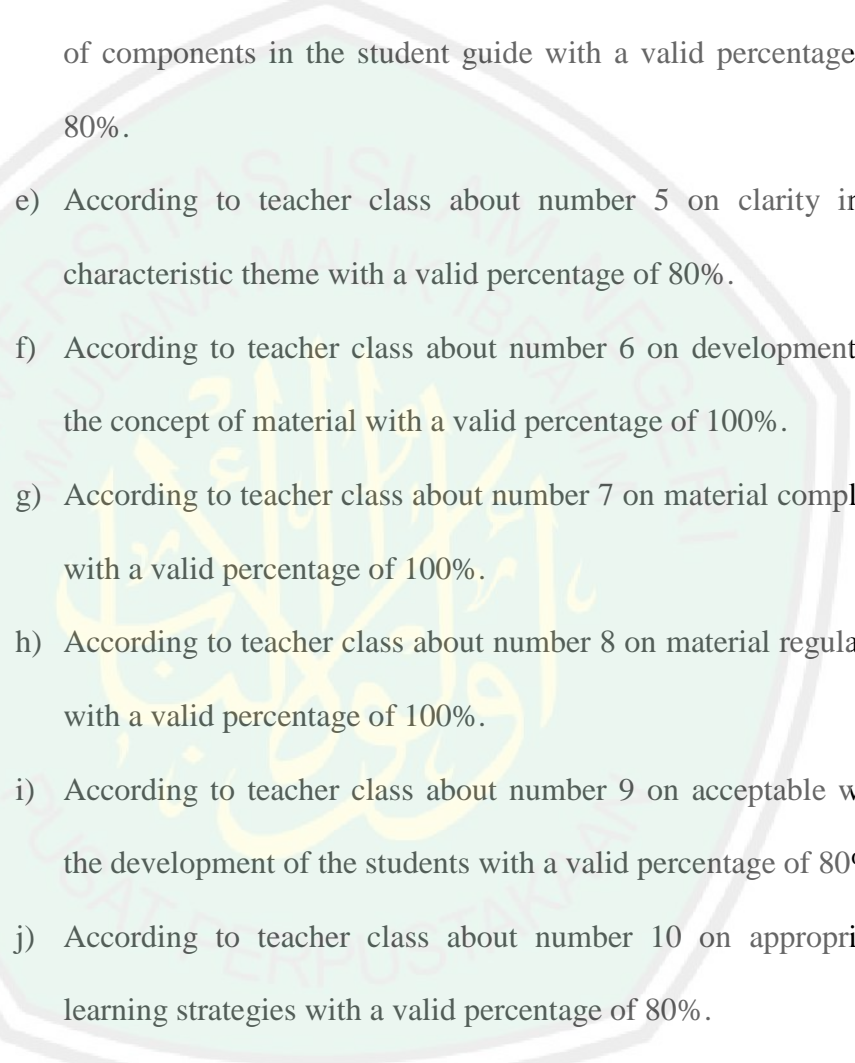
xi : score the highest answer

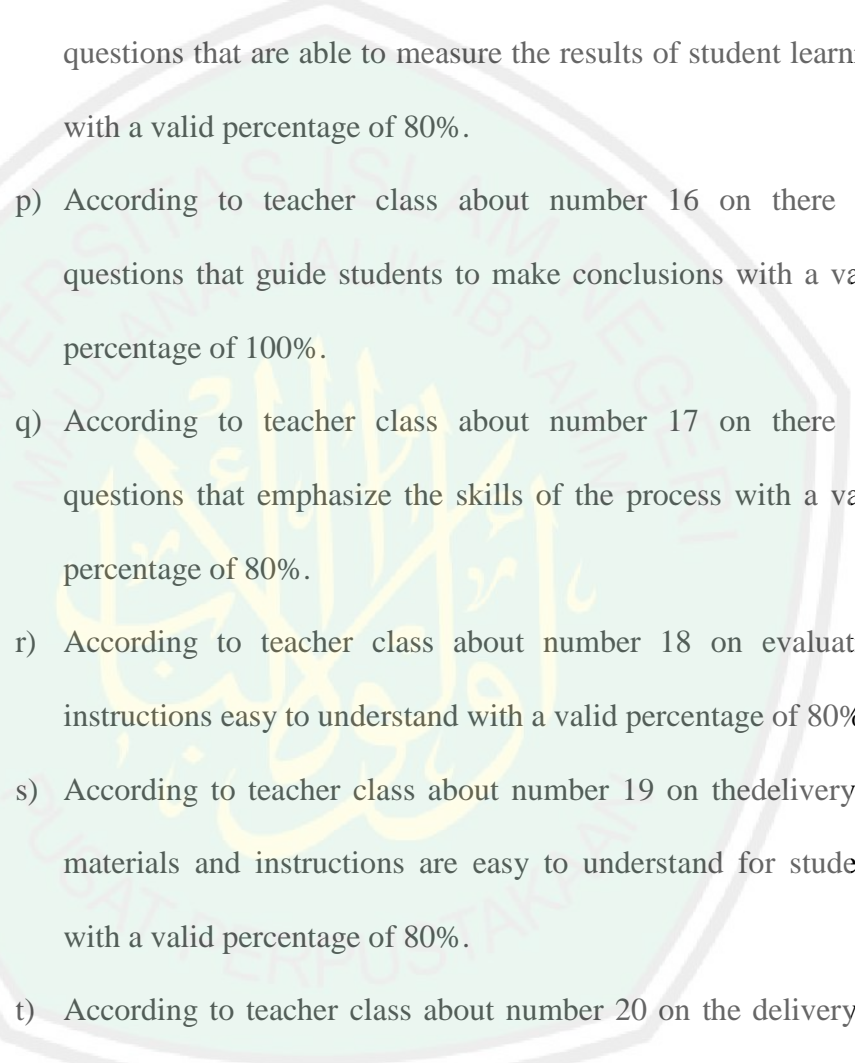
P : percentage rate valid

$$P = \frac{\sum x}{\sum xi} \times 100\%$$

Table 4.13 showed that the results of the assessment by teacher class at fourth grade Islamic Global School Malang to the interactive media is good, with the percentage of valid 89,57%. The following is an analysis of each question.

- a) According to teacher class about number 1 on the concept suitable with core competence and basic competence in curriculum 2013 with a valid percentage of 100%.
- b) According to teacher class about number 2 on outlining the concept of material and activities in accordance with fourth gradewith a valid percentage of 100%.

- 
- c) According to teacher class about number 3 on a clear theme of identity with fourth gradewith a valid percentage of 100%.
  - d) According to teacher class about number 4 on the completeness of components in the student guide with a valid percentage of 80%.
  - e) According to teacher class about number 5 on clarity in a characteristic theme with a valid percentage of 80%.
  - f) According to teacher class about number 6 on development of the concept of material with a valid percentage of 100%.
  - g) According to teacher class about number 7 on material complete with a valid percentage of 100%.
  - h) According to teacher class about number 8 on material regularly with a valid percentage of 100%.
  - i) According to teacher class about number 9 on acceptable with the development of the students with a valid percentage of 80%.
  - j) According to teacher class about number 10 on appropriate learning strategies with a valid percentage of 80%.
  - k) According to teacher class about number 11 on ease to use student with a valid percentage of 100%.
  - l) According to teacher class about number 12 on organizing the material interested with a valid percentage of 80%.
  - m) According to teacher class about number 13 on evaluation of results study clearly with a valid percentage of 100%.

- 
- n) According to teacher class about number 14 on emphasize the skills of the process with a valid percentage of 80%.
- o) According to teacher class about number 15 on there are questions that are able to measure the results of student learning with a valid percentage of 80%.
- p) According to teacher class about number 16 on there are questions that guide students to make conclusions with a valid percentage of 100%.
- q) According to teacher class about number 17 on there are questions that emphasize the skills of the process with a valid percentage of 80%.
- r) According to teacher class about number 18 on evaluation instructions easy to understand with a valid percentage of 80%.
- s) According to teacher class about number 19 on the delivery of materials and instructions are easy to understand for students with a valid percentage of 80%.
- t) According to teacher class about number 20 on the delivery of the material is interesting with a valid percentage of 80%.
- u) According to teacher class about number 21 on Volume synchronization backsound on media with other audio with a valid percentage of 80%.
- v) According to teacher class about number 22 on the right layout with a valid percentage of 100%.

w) According to teacher class about number 23 on the consistency to use of space and typing with a valid percentage of 100%.

## 2) Qualitative data

Qualitative data from the results of validation by teacher class can be seen in Table 4.14

**Table 4.14**  
**Criticism and Suggestions by Teacher Class of Interactive Media**

Name of teacher	Criticism and suggestions
Akhmad Susanto, S.S	Overall interactive media have been made quite representative in presenting material in fourth grade. It just needs to be maximized is standardizing curriculum 2013 to be complex.

Table 4.14 explained that interactive media is quite represented in the delivery of material in fourth grade. Teacher class said that interactive media is quite good and doesn't need to be revised.

On the development of phase II, the resulting draft III media. Draft III interactive media are the result of revisions to the draft II interactive media based on feedback and assessment of teacher class fourth grade Islamic Global School Malang.

### 3. Result of Development of Phase III

#### a. Data and data analysis

On the development of the phase III individual test was conducted in the first phase. The subject of trials consisted of 3 students, namely Adinda, Wildan, andAldi that represents students who are well-capable,

medium, and low on the advice of teachers of fourth grade. Three students subject the test using draft III interactive media in learning the theme saving energy. Quantitative data from result of development of phase III as in Table 4.15.



**Table 4.15**  
**Interactive Media Assessment Data by Student at Fourth Grade Islamic Global School Malang**

No	Statement	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	x	xi	Percent (%)	Validity criteria	Description
1.	Interactive media can facilitate learning	4	4	4	12	15	80%	Valid	No Revision
2.	The use of interactive media can encourage learning	4	5	5	14	15	93%	Valid	No Revision
3.	Easy-to-understand material on interactive media	4	5	5	14	15	93%	Valid	No Revision
4.	The questions in this interactive media are easy	5	4	5	14	15	93%	Valid	No Revision
5.	Typeface and font size contained in interactive media is easy to read	5	5	5	15	15	100%	Valid	No Revision
6.	Students do not find difficult words when learning this interactive media	5	5	5	15	15	100%	Valid	No Revision
7.	The instructions in this interactive media are easy to understand.	4	4	5	13	15	87%	Valid	No Revision
8.	The language used in interactive media is easy to understand	4	5	4	13	15	87%	Valid	No Revision
9.	The questions are easy to understand	4	4	4	12	15	80%	Valid	No Revision
10.	This interactive media help to practice saving energy at home	5	5	5	15	15	100%	Valid	No Revision
<b>TOTAL</b>		<b>44</b>	<b>46</b>	<b>47</b>	<b>137</b>	<b>150</b>	<b>91%</b>	<b>Valid</b>	<b>No Revision</b>

Table 4.15 showed that the results of assessment of student at fourth grade Islamic Global School Malang to the interactive media are good, with the percentage of valid 91,00%. Overall, this media do not need revision. The following is an analysis of each question.

- 1) According to students in fourth grade about number 1 on interactive media can facilitate learning with a valid percentage of 80 %.
- 2) According to students in fourth grade about number 2 on the use of interactive media can encourage in learning with a valid percentage of 93 %.
- 3) According to students in fourth grade about number 3 on easy-to-understand material on interactive media with a valid percentage of 93 %.
- 4) According to students in fourth grade about number 4 on the questions in this interactive media is easy with a valid percentage of 93 %.
- 5) According to students in fourth grade about number 5 on typeface and font size contained in interactive media is easy to read with a valid percentage of 100 %.
- 6) According to students in fourth grade about number 6 on students do not find difficult words when learning this interactive media with a valid percentage of 100 %.
- 7) According to students in fourth grade about number 7 on the instructions in this interactive media is easy to understand with a valid percentage of 87 %.



- 8) According to students in fourth grade about number 8 on the language used in interactive media is easy to understand with a valid percentage of 87 %.
- 9) According to students in fourth grade about number 9 on questions are easy to understand with a valid percentage of 80 %.
- 10) According to students in fourth grade about number 10 on this interactive media helps to practice saving energy at home with a valid percentage of 100 %.

b. Qualitative data

Qualitative data from the results of validation by the student can be seen in table 4.16

**Table 4.16**  
**Criticism and suggestions by student of interactive media**

No	Name of student	Criticism and suggestions
1.	Adinda Azalea Firdaus	Quite Good. The color is good and colorful.
2.	Wildan Loanda Eldama	It is very interesting.
3.	Achmad Rifaldi Sonaini	I love it because make me interesting.

Interactive media are evaluated as quite well as the learning process using this interactive media. Students look very enthusiastic in learning process. Students seem more interested in learning. This is because students use media that has been close to them, namely the computer. But there has been no media that support learning and more centered on the teacher.

Based on observations and interviews of researchers, students looked enthusiastic and respond well to this interactive media. Students are more active in learning. They followed the instructions correctly. Teacher is more easily guiding students to explain the material.

c. Product revision

Based on the results of individual trials with percentage of 91,00 %. Interactive media does not need to have a revision. However, the comments and suggestions of the respondents on the trials of individuals in open-ended question will be considered to refining the learning media. So the resulting interactive media will be getting better. On the development of phase III, the resulting draft IV media.

**4. Result of development of phase IV**

a. Data and data analysis

On the development of the phase IV individual test was conducted in the second phase. The subject of trials consisted of 6 students, namely Satrio, Dewa, Dea, Tri Nazwa, Rahma, and Sela that represent students who are well-capable, medium, and low on the advice of teachers of fourth grade. Quantitative data from result of development of phase IV as In table 4.17.

No	Statement	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	x	xi	Percent (%)	Valid Criteria	Description
1.	Interactive media can facilitate learning	5	5	5	5	5	5	30	30	100%	Valid	No revision
2.	The use of interactive media can encourage learning	5	5	5	5	5	5	30	30	100%	Valid	No revision
3.	Easy-to-understand material on interactive media	5	5	5	5	5	5	30	30	100%	Valid	No revision
4.	The questions in this interactive media are easy	4	5	4	5	5	5	28	30	93%	Valid	No revision
5.	Typeface and font size contained in interactive media is easy to read	5	5	5	5	5	5	30	30	100%	Valid	No revision
6.	Students do not find difficult words when learning this interactive media	4	5	5	4	5	4	27	30	90%	Valid	No revision
7.	The instructions in this interactive media are easy to understand.	5	5	4	5	5	5	29	30	97%	Valid	No revision
8.	The language used in interactive media is easy to understand	5	5	5	5	5	5	30	30	100%	Valid	No revision
9.	The questions are easy to understand	5	5	5	5	5	5	30	30	100%	Valid	No revision
10.	This interactive media helps to practice saving energy at home	5	5	5	5	5	5	30	30	100%	Valid	No revision
<b>TOTAL</b>		<b>48</b>	<b>50</b>	<b>48</b>	<b>49</b>	<b>50</b>	<b>49</b>	<b>294</b>	<b>300</b>	<b>98%</b>	<b>Valid</b>	<b>No Revision</b>

**Table 4.17**  
**Interactive Media Assessment data by student in fourth grade Islamic Global School Malang**

After getting quantitative data from the results of the assessment of individual trials second phase can be seen in table 4.17, the next step is to analyze the data. Table 4.17 showed that the results of assessment of student at fourth grade Islamic Global School Malang of the interactive media are good, with the percentage of valid 98,00%. Overall, this media does not need revision. The following is an analysis of each question.

- 1) According to students in fourth grade about number 1 on interactive media can facilitate learning with a valid percentage of 100 %.
- 2) According to students in fourth grade about number 2 on the use of interactive media can encourage in learning with a valid percentage of 100 %.
- 3) According to students in fourth grade about number 3 on easy-to-understand material on interactive media with a valid percentage of 100 %.
- 4) According to students in fourth grade about number 4 on the questions in this interactive media is easy with a valid percentage of 93 %.
- 5) According to students in fourth grade about number 5 on typeface and font size contained in interactive media is easy to read with a valid percentage of 100 %.
- 6) According to students in fourth grade about number 6 on students do not find difficult words when learning this interactive media with a valid percentage of 90 %.

- 7) According to students in fourth grade about number 7 on the instructions in this interactive media is easy to understand with a valid percentage of 97 %.
- 8) According to students in fourth grade about number 8 on the language used in interactive media is easy to understand with a valid percentage of 100 %.
- 9) According to students in fourth grade about number 9 on questions are easy to understand with a valid percentage of 100 %.
- 10) According to students in fourth grade about number 10 on this interactive media helps to practice saving energy at home with a valid percentage of 100 %.
- b. Qualitative data

Qualitative data from the results of validation by the student can be seen in Table 4.18

**Table 4.18**  
**Criticism and suggestions by student of interactive media**

No	Name of student	Criticism and suggestions
1.	Satrio Bagus Setyawan	Help to study and I feel very easy to understand about the material
2.	Putra Rachel Dewa	The image is good, make me enthusiastic to study.
3.	Dea Ramadhany Putri	I know how to save energy
4.	Tri Nazwa Livia	I love this interactive media. The game is very good
5.	Rahmatul Istiqomah	It was very good. I love the color. It is colorful.
6.	Sela Garneta Iana	This interactive media is very help me to understand about least common multiple.

Based on the results of individual trials with percentage of 98,00%. Interactive media does not need to have a revision. However, the comments and suggestions of the respondents on the trials of individuals in open-ended question will be considered to refining the learning media. So the resulting interactive media will be getting better.

c. Product revision

Based on the data analysis of individual trials second phase, then draft IV media does not need to be revised again. Draft IV media is the end product of this development.

### C. Presenting data pre-test and post test

The table shows student's score from pre-test and post-test that obtained from students in fourth grade in Islamic Global School Malang when trial field.

**Table 4.19**  
**The result trial field from pre test and post test**

No	Name	Pre-test	Post-test
1	Adinda Azalea Firdaus	90	100
2	Wildan Loanda Eldama	74	92
3	Achmad Rifaldi Sonaini	64	85
4	Satrio Bagus Setyawan	88	88
5	Putra Rachel Dewa	82	85
6	Dea Ramadhany Putri	78	95
7	Tri Nazwa Livia	76	92
8	Rahmatul Istiqomah	68	80
9	Sela Garneta Iana	64	90
<b>Average</b>		76	89,67

The table shows that the average pre-test score was 76 and the average post-test score was 89.67

It indicates that the average post-test (89,67) is larger than the average pre-test (76). The interactive media proved to be significantly effective to improve the understanding of the material on theme energy saving at fourth grade students in Islamic Global School Malang.

Data pre-test and post-test is analyzed by Paired Sample T Test. This analytical technique used to determine the effect on the object of research groups. It is an indicator of the influence, if there is a difference between cognitive understanding of learners before and after use the media.

Solution:

$H_0$  = There are no differences in cognitive understanding of learners before and after use the media.

$H_a$  = There are differences in the cognitive understanding of learners before and after use media.

**Table 4.19**  
Statistics on the results of the pre-test and post-test

No	Name	Score		$X_1 - X_2$	D	$d^2$
		Pre-test	Post-test			
1	Adinda Azalea Firdaus	90	100	-10	10	100
2	Wildan Loanda Eldama	74	92	-8	8	64
3	Achmad Rifaldi Sonaini	64	85	-21	21	441
4	Satrio Bagus Setyawan	88	88	0	0	0
5	Putra Rachel Dewa	82	85	-3	3	9
6	Dea Ramadhany Putri	78	95	-17	17	289
7	Tri Nazwa Livia	76	92	-16	16	256
8	Rahmatul Istiqomah	68	80	-12	12	144
9	Sela Garneta Iana	64	90	-26	26	676
n = 9				d = 113		$d^2 = 1979$

$$a = \frac{\sum a}{n} = \frac{113}{9} = 12,5$$

$$s = \frac{\sqrt{n \sum d^2 - (\sum d)^2}}{n(n-1)}$$

$$= \frac{\sqrt{9 \times 1979 - (113)^2}}{9(9-1)}$$

$$= \frac{\sqrt{17811 - 12769}}{9 \times 8}$$

$$= \frac{\sqrt{5042}}{72}$$

$$= \sqrt{70,02}$$

$$= 8,37$$

$$t = \frac{\bar{d}}{s/\sqrt{n}}$$

$$= \frac{12,5}{\frac{8,37}{\sqrt{9}}}$$

$$= \frac{12,5 \times \sqrt{9}}{8,37}$$

$$= 4,48$$

TTestCriteria:

- If the value of count is greater than table, then significant means  $H_0$  is rejected and  $H_a$  is accepted.
- If the value of  $t_{count}$  is smaller than  $t_{table}$ , then significant means  $H_0$  is accepted and  $H_a$  is rejected.

$$T_{table} = t_{\alpha; db}$$

$$Db = n-1$$

$$= 9-1$$

$$= 8$$

$$\text{So, } t_{table} = t_{0,05; 8} = 1,860 \quad t_{count} (4,48) > t_{table} (1,860)$$

It means significantly that  $H_a$  is accepted and  $H_0$  is rejected.



Because  $t_{count} = 4,48 > t_{table} = 1,860$  then  $H_a$  is accepted and  $H_0$  is rejected. The conclusion is that there are very significant differences between the value of the final (post-test) with the initial value (pre-test). Furthermore, from the average is known  $\bar{X}_{289.67} > \bar{X}_{176}$ , means that the value of the post-test better than the pre-test. So there are significant differences in cognitive understanding of students on media development have been developed.



## CHAPTER V

### DISCUSSION

Interactive media development theme energy saving at fourth grade in Islamic Global School Malang is based on the fact that there has been no interactive media to support the implementation of the curriculum of 2013, especially in thematic learning at fourth grade. Thus the results of this development to add interactive media and to help students to understand about the material with valid, practical, and effective. This interactive media can also achieve the education has been established in the curriculum. The researcher chooses interactive media as a learning tool students because interactive media fully serve the needs of student learning. In some ways the media learning can replace the function of teachers as a learning resource.<sup>60</sup>

The develop interactive media on theme energy saving at fourth grade students in Islamic Global School Malang that valid, practical, and effective. It will be proven when researcher do interaction with teacher and students.

#### A. Valid

Procedural models developed for this product are the adaptation model by Alessi and trollip. There are 10 stages (1) determine objectives and needs, (2) collect reference materials, (3) learn content, (4) brainstorming, (5) design learning, (6) create a flowchart, (7) create storyboards, (8) program material, (9) create support material, and (10) evaluation and revision.

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<sup>60</sup>Yudhi Munadi, *Media Pembelajaran Sebuah Pendekatan Baru* (Jakarta: Gaung Persada Press, 2012), hal 152

Interactive media development has been conducted repair gradually such as evaluations from material expert, design expert, linguist, teacher class, and test by student at fourth grade in Islamic Global School Malang as the target users of interactive media development. Aspects are used as a reference point to do the revision include completeness, appropriateness, the accuracy of content based on the curriculum 2013, effectiveness and conspicuousness. The results of the evaluation and revision is used as improvements to interactive media for testing in the field.

Validation results are converted on a percentage scale based on the level of valid and as a basis for decision making to revise interactive media and use the following assessment criteria as in Table 5.1.

**Table 5.1**  
**Level of Valid**

<b>Percent (%)</b>	<b>Valid</b>	<b>Description</b>
80 – 100	Valid	No Revision
60 – 79	Valid	No Revision
40 – 59	Less Valid	Need revision
0 – 39	Very less Valid	Need revision total

Based on a conversion scale specified in the product assessment questionnaire, as follows:

- a. Score 1 for very inappropriate, very less readable, very less accurate, very poorly organized, very ugly, very poor, very less substantial
- b. Score 2 for less appropriate, less readable, less accurate, less regular, less excellent, less capable, and less substantial

- c. Score 4 for appropriate, readable, accurate, regular, excellent, capable, and substantial
- d. Score 5 for very appropriate, very readable, very accurate, very regular, very excellent, very capable, and very substantial

Based on the development process and results analysis 1) data consultation with material expert, design expert, linguist, 2) data consultation with teacher class in fourth grade islamic global school, 3) trial results data by individuals in question form, interviews, and documentation of interactive media theme energy saving at fourth grade islamic global school. Validation and revision is used to create a quality medium and customize the needs of students. Validation is also used to make interactive media is becoming a valid and viable medium.

Results of consultations with material expert, design expert, linguists, and teacher class 4 indicates that all components are validated is feasible. This is proved data consultation by material expert with the percentage of 81,25%, data consultation with design expert with the percentage of 98,00%, data consultation by linguist with the percentage of 100%, data consultation with teacher class with the percentage of 89,57%. This indicates that interactive media is ready to be used by students and teachers in learning.

Individual test results indicate that they are very happy with this interactive media because it looks interesting, nice, colorful, and easy to understand. This is proved by individual test phase I with the percentage of 91% and individual test phase II with the percentage of 98%.

Based on the results of validation, interactive media theme energy saving at fourth grade in Islamic global school Malang shows good or valid. In general the development of interactive media has complied with the eligibility and don't need revision. However, the suggestions and comments by the validator in open-ended questions, trying to be released so that interactive media the better. This reinforces the theory that a media development was declared effective and efficient if it has been proven in the field, not just theoretical.<sup>61</sup>

### **B. Practical**

Interactive media theme energy saving is used as a reference for teachers and students in the process of learning the theme energy saving. Interactive media are packaged with a very attractive look and invite the students to understand the concept clearly. This is similar to the theory of Constructivism is that a process of creation of knowledge by students with active activities, active thinking, forming concepts and give meaning to something that is learned.<sup>62</sup>

Students feel more happy and excited in learning with this interactive media. Especially when this interactive media play on their own handphones. They look more enthusiastic. This reinforces the theory that learning media use in the process of teaching and learning can foster a desire, interest, motivation and stimulation of learning activities, and provide psychological influences to the students. It also strengthened the effective function of learning media that appropriate learning media can enhance the admission of students to a particular

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<sup>61</sup>Arif, *op.cit.* hal 182

<sup>62</sup>Warsita,*op.cit.*, hal 78

stimulus. If it is continuously conducted, students do the assessment and appreciation of values or norms that have been obtained.<sup>63</sup>

This is in accordance with the theory of Constructivism that learning strategies emphasize on the use of knowledge is meaningful. The study follows the students ability and emphasis on process. Learning activities in the context of real, not follow the textbook. It is reinforced by results of interview by developers with one of the subjects of field trials.

“The media are great. I like. It looks colorful.”

“I feel very good when studying. If every day is like this, I am so passion when learning. I won't be sleepy”

So the interview subject validation are Satrio and Dea when developers ask about their opinion about the learning in the classroom using interactive media theme energy saving.

An early appearance of the interactive media opens with slide opening and then students are invited to pray before the study. This is getting students to always pray in any case. Interactive media is designed with the look colorful to make it different each material being studied. Each display is provided the menu to return to the home page, direction, evaluation, and exit buttons if they want it at any time. Students more easily understand the material because it is supported by a sound. This supports the theory in communication, psychology that when we pay attention to certain stimuli while disposing of other stimuli. Appropriate learning media are learning media that capable to attract and focus the attention of

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<sup>63</sup>Yudhi, *op.cit*, hal 44

the students. Learning media can improve the attention of students of the material.<sup>64</sup>

### C. Effective

Learning materials in this product is the thematic learning themes energy saving. The goal is that students can be easier to understand the concept of a material. In addition, students can also apply materials to save energy, according the example given in the media and can take advantage of useless things. This reinforces the theory that the person who has learned to have a change in behavior within them. The behavior changes such as change in cognitive, psychomotor or affective.<sup>65</sup> The learning process occurs because there is interaction of individuals with their environment. The learning process can happen anytime and anywhere even though there is a teaching or not.<sup>66</sup>

The interactive media proved to be significantly effective to improve the understanding of the material on theme energy saving at fourth grade students in Islamic Global School Malang. Because  $t_{count} 4,48 > t_{table} 1,860$  then  $H_a$  is accepted and  $H_0$  is rejected. The conclusion is that there are very significant differences between the value of the final (post-test) with the initial value (pre-test). Furthermore, from the average is known  $X_2 289,67 > X_1 176$ , means that the value of the post-test better than the pre-test. So there are significant differences in cognitive understanding of students on media development have been developed. It means that interactive media development can add to the diversity of thematic media on

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<sup>64</sup> *Ibid*, hal 43

<sup>65</sup> Arief S. Sadiman, *Media Pembelajaran* (Jakarta: PT Raja Grafindo), hal 2

<sup>66</sup> *Ibid*. hal 1

curriculum 2013. This media can be used as a reference for teachers and students in the process of learning the theme energy saving. Media education as a learning resource that can deliver messages. Media can solve issues such as differences in learning styles, interests, intelligence, sense of power limitation, disability or geographical distance, time.<sup>67</sup>

This interactive media development has advantages and disadvantages. The advantages of this interactive media are 1) students more easily understand the material on the theme energy saving because the material presented as attractive as possible with animation, 2) the main purpose of this interactive medium is to help students and teacher in the learning process to enhance student's understanding of the themes energy saving, 3) this interactive media can be used by teachers to support the learning process. The teacher only guides and assist students in using this media, 4) interactive media is very applicable to the environment students. Students not only learn about the material on the three subjects, but students also can apply the material in everyday life. Because the developers give examples of problems around their environment. It supports cognitive function of learning media that the more object is seen, so the more thoughts and ideas that are owned or are getting rich and extensive nature of their cognitive, 5) this interactive media can be used in your computer using an LCD, besides students and teachers can also use this media to a Mobile device. So, whenever they want to learn, unlimited by time and place. As long as there is

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<sup>67</sup>*Ibid*, hal 14



a supervisor when studying this media, 6) the media could also be in Bluetooth on any Android phone.

Interactive media development also has some disadvantages. The disadvantage is 1) only one study on the theme energy saving subtheme energy utilization fourth learning, 2) this interactive media does not increase the value of students drastically because the goal of the developer is to do, understand the concept of material in the theme energy saving, 3) sound in interactive media sometimes do not match with a slide that is being opened, 4) interactive media can only be used on a computer or a mobile phone that has a specification.

The process of learning to develop activity and creativity of students through a variety of interactions and learning experience. Activity and creativity of students became important, as it affects the success of the learning in the classroom and as an effort of learning in everyday life. Implementation of interactive media theme energy saving needs patience and planning according to the needs of students. Because interactive media is a new product so students need guidance from teachers. However, when using interactive media in the process of learning, students seem very enthusiastic and very interested. Students think more organized and focused. This is because in the interactive media students are invited to think it's easy to difficult. It can help students to find his own without any compulsion from the teacher. This strengthens the theory in the book of Prof. Azhar that audio visual materials can provide many benefits as long as the teacher

plays an active role in the learning process. The relationship of teachers and students is the most important element in the system of modern education.<sup>68</sup>

Interactive media theme energy saving subtema 2 learning 4 has been declared valid, effective and efficient because it has gone through various phases. This development results reinforce earlier studies. Previous study is a thesis on teacher education of Islamic elementary school UIN Malang, written by ChoerulAnwar Badru Tamam entitled "Learning Media Development Math Multiplication Material Computer-assisted Integers to Fourth Grade SD/MI."<sup>69</sup> This research resulted in the media about learning mathematics has good quality and suitable for students. Based on the results of the field trials concluded that computer-assisted mathematics learning media have been already effective, efficient, and attractive to use basic multiplication memorization drills.

The second study is a thesis on teacher education of Islamic elementary school UIN Malang, written by Aulia Rohmawati, entitled "Development of Multimedia Interactive Learning in order to Improve the Effectiveness of Learning Material on Natural History, Appearance, and Ethnic Diversity at Fourth Grade MI Miftahul Ulum Batu city".<sup>70</sup> This research resulted in interactive multimedia learning shows that this interactive multimedia development research proved to be able to improve the effectiveness of the study on standards of competence to understand the history, natural appearance and ethnic diversity.

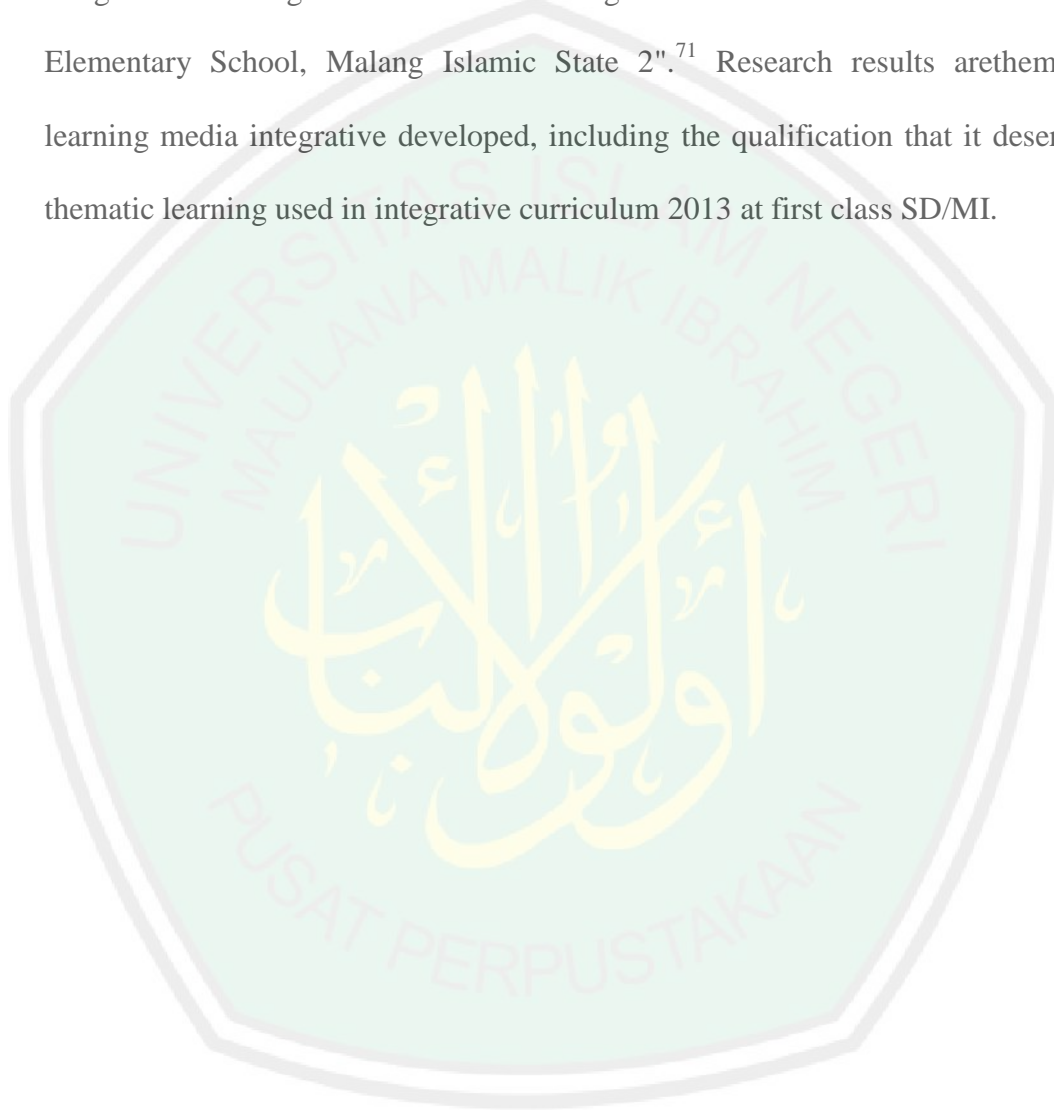
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<sup>68</sup> Azhar. *op.cit* hal 23

<sup>69</sup> Choerul, *op.cit*,..

<sup>70</sup> Aulia, *op.cit*,..

A third study is a thesis on teacher education of islamic elementary school UIN Malang, written by Najib anshori, entitled "The Development of Integrated Learning Thematic Media Using Adobe Flash Cs4 for First Grade of Elementary School, Malang Islamic State 2".<sup>71</sup> Research results are thematic learning media integrative developed, including the qualification that it deserves thematic learning used in integrative curriculum 2013 at first class SD/MI.



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<sup>71</sup> Najib, op.cit.,..

## CHAPTER VI

### CONCLUSION AND SUGGESTION

This chapter will describe the two main ideas are a) conclusion the development of interactive media and b) suggestions such as the utilization of products, dissemination products, and continuation of the development of interactive media.

#### A. Conclusion the development of interactive media

Based on the process of the development and assessment of the results of the interactive media can be explained. This interactive media development through several stages, namely 1) determine objectives and needs such as purpose, content, and materials studies; 2) reference materials collected include thematic lesson books for students and teachers; 3) learn reference materials have been collected; 4) developer develops media from reference material that has been characteristics; 5) Developer make design media; 6) flowchart of interactive media only made in outline; 7) Create a storyboard is the process of creating the appearance of the paper to be "transferred" to the computer screen; 8) developer uses the power point program that was changed to flash player through the software i-spring; 9) supporting material includes the operating instructions and specifications of computers and smartphones; 10) conduct evaluation and revision, which include consultation, assessment, and revision of interactive media. Based on the steps that have been made, the developer produces interactive media with a valid, practical and efficient.

This interactive media development has produced interactive media theme energy saving subtheme utilization energy learning 4. These products have filled the component as interactive media is good. The results of this development add to the diversity of the media, especially interactive media related to curriculum 2013 to provide a reference for teachers and students in thematic learning fourth grades.

#### **1. Valid**

The results of the assessment of interactive media development theme energy saving fourth grade had a valid and interesting level are high. Based on the results of validation and assessment of response from experts and trial. The results obtained are 1) according to material expert about the result of interactive media theme energy saving is good with a valid percentage of 81,25%; 2) according to design expert about the result of interactive media theme energy saving is good with a valid percentage of 98,00%; 3) according to linguist about the result of interactive media theme energy saving is good with a valid percentage of 100,00%; 4) according to teacher class about the result of interactive media theme energy saving is good with a valid percentage of 89,57%; 5) according to three student in individual test about the result of interactive media theme energy saving is good with a valid percentage of 91,00%; 6) according to six student in individual test about the result of interactive media theme energy saving is good with a valid percentage of 98,00%.

## 2. Practical

Learning use interactive media more enjoyable for students. The colorful designs and more interactive to make students more excited in the lesson. The student's ability to complete evaluation can be measured clearly. Students are able to solve problems and be able to understand the material quickly through the interactive media.

Learning media is used in the process of teaching and learning can foster a desire, interest, motivation and stimulation of learning activities, and provide psychological influences to the students.

## 3. Effective

The interactive media proved to be significantly effective to improve the understanding of the material on theme energy saving at fourth grade students in Islamic Global School Malang. Because  $t_{count} 4,48 > t_{table} 1,860$  then  $H_a$  is accepted and  $H_0$  is rejected. There are very significant differences between the value of the final (post-test) with the initial value (pre-test). Furthermore, from the average is known  $X_2 289.67 > X_1 76$ , means that the value of the post-test better than the pre-test.

There are significant differences in cognitive understanding of students on media development have been developed. It means that interactive media development can add to the diversity of thematic media on curriculum 2013. This media can be used as a reference for teachers and students in the process of learning the theme energy saving. Media education as a learning resource that can deliver messages.

## **B. Suggestions**

Suggestions include product utilization, dissemination of products, and sustainability of the development. In detail the suggestions can be explained as follows:

### **1. Suggestion for Product Utilization**

- a. Interactive media theme energy saving at fourth grade should be used as an alternative thematic learning themes energy saving subtheme 2 utilization of energy learning 4 in fourth grade.
- b. Interactive media theme energy saving at fourth grade should be used with the guidance of a teacher. Because of this, interactive media only as facilities to support learning. So it takes guidance from the teacher.
- c. Interactive media theme energy saving at fourth grade should be guided by teachers who have the ability in operating computer and mobile phone. When students have a problem in the operation of the computer, the teacher can solve it.
- d. Interactive media theme energy saving at fourth grade should be used by students who can operate computers and mobile phones.

### **2. Suggestion for Dissemination of Products**

- a. Interactive media theme energy saving at fourth grade should be gradually used. First, Interactive Media theme energy saving at fourth is used for individual learning and then used in class.
- b. Interactive media theme energy saving at fourth grade it can be used and duplicated more broadly if its use is effective and efficient.

### 3. Suggestion for Continuation of The Development

This interactive media theme energy saving at fourth grade still has some disadvantages. Therefore, it is recommended for interested development to solve these disadvantages.

- a. It is recommended to teachers of SD/SDI especially teacher class in fourth grade use this interactive media in learning to implement Curriculum 2013 optimally.
- b. It is recommended to teachers of SD/SDI specifically teacher class in fourth grade to try to develop interactive media in accordance with the conditions of the school
- c. This interactive media theme energy saving sub theme utilization, energy learning 4 in fourth grade has limited material. Therefore need to be developed interactive media that contain more than one learning. So that students can learn together in one subtema or one theme directly.
- d. Development of interactive media can only be used in a school that has a computer. Therefore, schools should think about the use of computers for the effectiveness of the learning process.
- e. This interactive media development aims to find out valid, practical, and effective. Therefore, this interactive media need to develop to be able to increase the score of students in learning.



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No	Date of Consultation	Consultation Material	Signature
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12.	February 2, 2015	All Chapter	
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Tematik **SD4** Tema 2 : Selalu Berhemat Energi

# Subtema 2

## Pemanfaatan energi

Pembelajaran 4



MULAI

UIN MAULANA MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 **SD4**

### DOA BELAJAR

رَبِّي زِدْنِي عِلْمًا  
وَأَزِدْ قُنِي فَهْمًا

Ya Allah ...  
tambahkanilah daku **ILMU**  
dan kurniakan daku  
**KEFAHAMAN**



UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

Bilangan prima

Faktor

Faktorisasi Prima

KPK

Menylesaikan Masalah KPK

Meronce

Profil

Ayo belajar sambil bermain! Di sini kamu akan mempelajari tentang pemanfaatan energi dalam materi faktor prima, KPK, dan lainnya. Klik materi yang akan kamu pelajari.

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Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

Permainan

Definisi

Contoh

Profil

Di sini kamu akan mempelajari tentang pemanfaatan energi dalam materi faktor prima, KPK, dan lainnya. Klik materi yang akan kamu pelajari.

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Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

## Bilangan Prima

Permainan

Mari kita mencari bilangan prima. Gambarlah tabel bilangan seperti tabel selanjutnya. Lakukan seperti petunjuk yang diberikan.

- Beri tanda X pada semua bilangan kelipatan 2 selain 2
- Beri tanda  $\Delta$  pada semua bilangan kelipatan 3 selain 3
- Beri tanda O pada semua bilangan kelipatan 5 selain 5
- Beri tanda  $\square$  pada semua bilangan kelipatan 7 selain 7

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### Lakukan sesuai petunjuk!

Permainan

	1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20	
21	22	23	24	25	26	27	28	29	30	
31	32	33	34	35	36	37	38	39	40	
41	42	43	44	45	46	47	48	49	50	
51	52	53	54	55	56	57	58	59	60	
61	62	63	64	65	66	67	68	69	70	
71	72	73	74	75	76	77	78	79	80	
81	82	83	84	85	86	87	88	89	90	
91	92	93	94	95	96	97	98	99	100	

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### Hasil Permainan, cocokkanlah!

Permainan

	1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20	
21	22	23	24	25	26	27	28	29	30	
31	32	33	34	35	36	37	38	39	40	
41	42	43	44	45	46	47	48	49	50	
51	52	53	54	55	56	57	58	59	60	
61	62	63	64	65	66	67	68	69	70	
71	72	73	74	75	76	77	78	79	80	
81	82	83	84	85	86	87	88	89	90	
91	92	93	94	95	96	97	98	99	100	

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### Marilah kita buktikan

Bilangan 6 BUKAN bilangan prima

Permainan

- Sediakan 6 buah lingkaran
- Kelompokkan lah lingkaran tersebut

dibagi menjadi 2 kelompok      dibagi menjadi 3 kelompok

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## Marilah kita buktikan

Bilangan 7 adalah bilangan prima

Permainan

1. Sediakan 7 buah lingkaran
2. Kelompokkan lah lingkaran tersebut
3. 7 buah lingkaran tidak bisa dikelompokkan. Jadi, bilangan 7 termasuk bilangan prima



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## Jadi, bilangan prima itu ....

Definisi

- Bilangan prima adalah bilangan yang mempunyai dua faktor, yaitu bilangan 1 dan bilangan itu sendiri.
- 2 adalah satu-satunya bilangan prima genap. Selain 2, semua bilangan prima adalah bilangan ganjil.

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## Bilangan Prima

Contoh

Contoh bilangan prima adalah  
2, 3, 5, 7, 11, 13, 17, ....

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## Faktor

Definisi

Faktor adalah semua bilangan asli yang berfungsi sebagai pembagi / hasil bagi suatu bilangan yang menghasilkan sisa nol. (bilangan yang bisa dikalikan untuk mendapatkan bilangan lain)

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## Faktor

Faktor Prima

Faktor Prima adalah faktor dari suatu bilangan yang berupa bilangan prima

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## Faktor

Contoh

Bilangan	Faktor Bilangan	Banyak faktor
1	1	1
2	1, 2	2
3	1, 3	2
4	1, 2, 4	3
5	1, 5	2
6	1, 2, 3, 6	4
7	1, 7	2
8	1, 2, 4, 8	4
9	1, 3, 9	3
10	1, 2, 5	3

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## Faktor

Contoh

Banyak faktor masing-masing bilangan tersebut berbeda.

1. Bilangan yang hanya mempunyai satu faktor adalah satu
2. Bilangan yang mempunyai dua faktor adalah 2,3,5,7
3. Bilangan yang mempunyai lebih dari 2 faktor adalah 4,6,8,9,10

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## Faktor

Contoh

Mari kita perhatikan bilangan 20 dan 50

Faktor dari bilangan 20 adalah 1,2,4,5,10,20

Faktor prima dari 20 adalah 2 dan 5

Faktor dari bilangan 50 adalah 1,2,5,10,25,50

Faktor prima dari 50 adalah 2 dan 5

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Definisi

Contoh

Pohon Faktor

Profil

Di dalam Meteri Faktorisasi Prima kamu bisa bermain sambil belajar. Kita materi yang akan kamu pelajari

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Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

## Faktorisasi Prima

Definisi

Bentuk perkalian faktor - faktor prima dari suatu bilangan

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Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

## Faktorisasi Prima

Contoh

$$2 \times 3 = 6$$

Faktor      Faktor

2 dan 3 adalah faktor dari 6

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Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

## Faktorisasi Prima

Contoh

12			60		
1	X	12	1	X	60
2	X	6	2	X	30
3	X	4	3	X	20
			4	x	15
			5	x	12
			6	x	10

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## Faktorisasi Prima

Pohon Faktor

Faktorisasi bilangan 12 dan 60  
Untuk menuliskan faktorisasi kedua bilangan itu, kita gunakan *pohon faktor*, seperti di bawah ini.

```

    graph TD
      12((12)) --- 2((2))
      12 --- 6((6))
      6 --- 2((2))
      6 --- 3((3))
      60((60)) --- 4((4))
      60 --- 15((15))
      4 --- 2((2))
      4 --- 2((2))
      15 --- 3((3))
      15 --- 5((5))
    
```

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## Faktorisasi Prima

Pohon Faktor

Bilangan akhir pada pohon faktor *harus bilangan prima*.  
Lingkari setiap bilangan prima.

Jawab:  
Faktorisasi dari 12 =  $2 \times 2 \times 3$   
Faktorisasi dari 60 =  $2 \times 2 \times 3 \times 5$

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Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

Kelipatan Bilangan

Kelipatan Persekutuan

Cara Menentukan KPK

Contoh

Profil

Dalam Materi Kelipatan Persekutuan Terkecil kamu bisa bermain sambil belajar. Klik materi yang akan kamu pelajari

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Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

## Kelipatan Persekutuan terKecil

Kelipatan Bilangan

### Kelipatan Bilangan

Menentukan kelipatan suatu bilangan dapat dilakukan dengan menggunakan garis bilangan seperti di bawah ini.

Bilangan loncat 2 yang ditunjukkan tanda panah pada garis bilangan di atas: 2, 4, 6, 8, 10, dan seterusnya.

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Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

### Dari manakah bilangan-bilangan tersebut diperoleh?

Kelipatan Bilangan

Mari kita selidiki bersama-sama.

$$2 = 2 = 1 \times 2$$

$$4 = 2 + 2 = 2 \times 2$$

$$6 = 4 + 2 = 2 + 2 + 2 = 3 \times 2$$

$$8 = 6 + 2 = 2 + 2 + 2 + 2 = 4 \times 2$$

$$10 = 8 + 2 = 2 + 2 + 2 + 2 + 2 = 5 \times 2$$

dan seterusnya

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**Dari manakah bilangan-bilangan tersebut diperoleh?**

Kelipatan Bilangan

Ternyata bilangan-bilangan tersebut diperoleh dengan menambahkan 2 dari bilangan sebelumnya atau mengalikan 2 dengan bilangan 1, 2, 3, 4, 5, dan seterusnya.

Bilangan-bilangan seperti ini disebut bilangan kelipatan 2.

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Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD 4

**Dari manakah bilangan-bilangan tersebut diperoleh?**

Kelipatan Bilangan

Dengan cara yang sama dapat kita cari bilangan kelipatan 5 sebagai berikut.

$5 \times 1 = 5$   
 $5 \times 2 = 10$   
 $5 \times 3 = 15$   
 $5 \times 4 = 20$   
 $5 \times 5 = 25$   
 dan seterusnya

Jadi, kelipatan 5 adalah 5, 10, 15, 20, 25, dan seterusnya.

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Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD 4

**Dari manakah bilangan-bilangan tersebut diperoleh?**

Kelipatan Bilangan

Perhatikan garis bilangan di bawah ini.

Bilangan-bilangan kelipatan 2 adalah 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, ...  
 Bilangan-bilangan kelipatan 5 adalah 5, 10, 15, 20, ...  
 Bilangan-bilangan yang sama dari kelipatan kedua bilangan tersebut adalah 10, 20, ...  
 Bilangan-bilangan 10, 20, ... disebut kelipatan persekutuan dari 2 dan 5.

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Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD 4

### Mari kita cari kelipatan persekutuan dari bilangan 4 dan 6

**Kelipatan Persekutuan**

Kelipatan 4 adalah 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 48, ...  
 Kelipatan 6 adalah 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, ...  
 Kelipatan persekutuan dari 4 dan 6 adalah 12, 24, 36, 48, ...  
 Berapakah kelipatan persekutuan dari 4 dan 6 yang paling kecil?  
 Bilangan itulah yang disebut KPK dari 4 dan 6.  
 Jadi, diperoleh KPK dari 4 dan 6 adalah 12.

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Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD 4

### Mari kita cari kelipatan persekutuan dari bilangan 4 dan 6

**Kelipatan Persekutuan**

*Kelipatan persekutuan* dari dua bilangan adalah kelipatan-kelipatan dari dua bilangan tersebut yang bernilai sama.  
*Kelipatan persekutuan terkecil (KPK)* dari dua bilangan adalah kelipatan persekutuan bilangan-bilangan tersebut yang nilainya paling kecil.

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Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD 4

### Cara Menentukan KPK

**Cara Menentukan KPK**

1. Tulislah bilangan - bilangan itu dalam bentuk perkalian faktor prima (faktorisasi)
2. Ambil semua faktor yang sama dan tidak sama, dari bilangan - bilangan itu.
3. Jika faktor yang sama dari setiap bilangan, tetapi banyaknya berbeda, ambillah faktor yang paling banyak atau dari pangkat yang terbesar.

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### KPK dari 12 dan 15 adalah ....

Contoh

Kelipatan 12: 12, 24, 36, 48, 60, 72, 84, 96, 108, 120, 132, ...  
 Kelipatan 15: 15, 30, 45, 60, 75, 90, 105, 120, 135, 150, 165, ...  
 Kelipatan dari 12 dan 15 yang sama diatas adalah 60, 120, dst.  
 Karena kita mencari yang terkecil, maka KPK dari 12 dan 15 adalah 60.

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### KPK dari 12 dan 15 adalah ....

Contoh

Apabila angka yang akan dicari KPK-nya besar, maka cara diatas sulit dipakai.  
 Ada cara yang lebih mudah lagi dibandingkan cara diatas, yaitu dengan cara menggunakan faktorisasi prima yang telah kita pelajari sebelumnya.

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### Kelipatan Persekutuan terKecil

Contoh

- 1) Carilah KPK dari 18 dan 24  
 Jawab:  
 $18 = 2 \times 3 \times 3 = 2 \times 3^2$   
 $24 = 2 \times 2 \times 2 \times 3 = 2^3 \times 3$   
 KPK dari 18 dan 24 =  $2 \times 2 \times 2 \times 3 \times 3 = 2^3 \times 3^2 = 72$
- 2) Carilah KPK dari 24, 36, dan 40  
 Jawab:  
 $24 = 2 \times 2 \times 2 \times 3 = 2^3 \times 3$   
 $36 = 2 \times 2 \times 3 \times 3 = 2^2 \times 3^2$   
 $40 = 2 \times 2 \times 2 \times 5 = 2^3 \times 5$   
 KPK dari 24, 36, dan 40 =  $2 \times 2 \times 2 \times 3 \times 3 \times 5 = 2^3 \times 3^2 \times 5 = 360$

UIN MALIKI MALANG



Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

Kamu akan belajar cara menyelesaikan masalah KPK. Klik materi yang akan kamu pelajari.

Mulai

UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

### Menyelesaikan Masalah KPK

Apa kegunaan KPK?  
Adakah contoh permasalahan yang dapat diselesaikan dengan konsep KPK?  
Mari kita bahas dan pelajari bersama.

UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

### Menyelesaikan Masalah KPK

Raisa dan Tantri sama-sama ikut les matematika. Raisa masuk setiap 4 hari sekali, sedangkan Tantri masuk setiap 6 hari sekali. Jika tanggal 2 Mei 2014 mereka masuk les bersama-sama, tanggal berapa mereka masuk les bersama-sama dalam waktu terdekat?

UIN MALIKI MALANG



**Tema 2** Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD 4

"Pikirkan menggunakan sumber energi baru, dan gambarkan ide-ide tersebut menggunakan sumber energi!"  
(Wahida)



*Laila Anika Design C. nni*

Mei				Juni				
1	2	3	4	1	2	3	4	5
5	6	7	8	6	7	8	9	10
9	10	11	12	11	12	13	14	15
13	14	15	16	16	17	18	19	20
17	18	19	20	20	21	22	23	24
21	22	23	24	24	25	26	27	28
25	26	27	28	28	29	30	31	
29	30	31						

**Bagaimana cara menyelesaikan permasalahan di atas?  
Mari kita selesaikan bersama-sama.**

1. Gambarkan kalender seperti di samping
2. Lingkari tanggal 2 sebagai tanggal Raisa dan Tantri masuk les matematika bersama - sama
3. Carilah kelipatan 4 dari 4
4. Hitunglah berapa hari lagi mereka harus bertemu setelah tanggal 2

**Lihat Jawaban**

UIN MALIKI MALANG

**Tema 2** Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD 4

"Pikirkan menggunakan sumber energi baru, dan gambarkan ide-ide tersebut menggunakan sumber energi!"  
(Wahida)



*Laila Anika Design C. nni*


Mei				Juni				
1	2	3	4	1	2	3	4	5
5	6	7	8	6	7	8	9	10
9	10	11	12	11	12	13	14	15
13	14	15	16	16	17	18	19	20
17	18	19	20	20	21	22	23	24
21	22	23	24	24	25	26	27	28
25	26	27	28	28	29	30	31	
29	30	31						

**Faktorisasi dari 4 dan 6**  
 $4 = 2 \times 2 = 2^2$   
 $6 = 2 \times 3$   
 KPK 4 dan 6 adalah  $2^2 \times 3 = 12$   
 Jadi mereka akan bertemu 12 hari lagi pada tanggal 14 Mei 2014.

UIN MALIKI MALANG

**Tema 2** Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD 4

**Menyelesaikan Masalah KPK**



Jadi, mereka akan kembali masuk les bersama-sama dalam 12 hari lagi dan pada 14 Mei 2014.

**Apa yang dapat kalian simpulkan dari penyelesaian masalah di atas?**  
 Betul, 12 adalah KPK dari 4 dan 6.  
 Jadi, penyelesaian permasalahan di atas menggunakan KPK.

UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4

## Menyelesaikan Masalah KPK

Setiap hari Ai, Ei, dan Dul berangkat ke sekolah dengan bersepeda. Mereka bersepeda supaya sehat dan menghemat energi bahan bakar. Setiap pulang sekolah mereka pergi ke perpustakaan untuk meminjam buku. Ai pergi setiap 2 hari sekali. Ei ke perpustakaan setiap 4 hari sekali. Sedangkan Dul setiap 5 hari sekali. Pada tanggal 4 Juni 2014 mereka pergi bersama-sama. Pada tanggal berapa mereka akan pergi bersama-sama lagi?

UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4

"Pikirkan menggunakan sumber daya alam, dan lingkungan alam itu sendiri menggunakan sumber daya alam" (Wahid)

1. Lakukan seperti contoh sebelumnya
2. Gambarlah kalender seperti di samping
3. Lingkari tanggal 4 sebagai tanggal Ai, Ei, dan Dul pergi bersama-sama.
4. Carilah kelipatan 2, 4, 5
5. Hitunglah berapa hari lagi mereka harus bertemu setelah tanggal 4.

Lihat Jawaban

UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4

"Pikirkan menggunakan sumber daya alam, dan lingkungan alam itu sendiri menggunakan sumber daya alam" (Wahid)

Faktorisasi dari 2, 4, dan 5

$$2 = 2$$

$$4 = 2 \times 2 = 2^2$$


$$5 = 5$$

KPK 2, 4, dan 5 =  $2^2 \times 5 = 20$

Jadi, 20 hari lagi mereka akan pergi bersama-sama yaitu pada tanggal 24 Juni 2014

UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4



Kamu akan belajar meronce untuk memanfaatkan barang-barang yang sudah tak terpakai. Klik materi yang akan kamu pelajari

Mulai

UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

### Ayo meronce!




Ayo kita memanfaatkan barang-barang di sekitar kita dengan meronce 😊


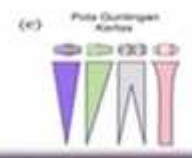
UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

### Ayo meronce!

Siapkan bahan-bahan di bawah ini!

(a)  (b)  (c) 

(d)  (e) 

UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

## Ayo meronce!

Alat dan Bahan:

- ✓ Majalah bekas/Kertas kado bekas
- ✓ Lem
- ✓ Sumpit
- ✓ Penggaris
- ✓ Benang

UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

## Ayo meronce!

Langkah Pengerjaan:







1. Potonglah majalah/kertas kado sesuai pola di atas.
2. Lilitkan pola potongan kertas/majalah pada sumpit hingga membentuk gambar pola.
3. Berikan lem pada ujung lilitan.
4. Ronceilah hasil gulungan sesuai kreasimu sendiri hingga membentuk kalung/gelang.

UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

## Petunjuk

Saat ini kamu sedang berada pada halaman "petunjuk". Halaman ini merupakan halaman petunjuk untuk mempergunakan CD interaktif ini. Bacalah petunjuk ini dengan baik, agar tidak mengalami kesulitan dalam menggunakan program ini.

	Tombol untuk kembali ke menu utama		Tombol untuk keluar
	Tombol untuk kembali ke petunjuk Penggunaan		Tombol untuk ke halaman selanjutnya
	Tombol untuk ke soal-soal latihan		Tombol untuk ke halaman sebelumnya

UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

### Evaluasi

Selamat Datang di Evaluasi Pembelajaran.  
Kamu akan mengerjakan 15 soal.  
Pilihlah jawaban yang tepat!  
Selamat mengerjakan !

Mulai

UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

### Evaluasi

Evaluasi Subtema 2 Pemanfaatan energi pembelajaran 4

Pertanyaan 1 dari 15 00:58:52

Soal 1 - 10 adalah pilihan ganda. Pilihlah satu jawaban yang benar!  
Faktor dari 18 adalah ...

- a. 1, 2, 3, 6, 9, 18
- b. 1, 2, 3, 6, 18
- c. 2, 3, 6, 9
- d. 2, 9

POIN 1

Sebelumnya Selanjutnya Selesai

UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

### Evaluasi

Evaluasi Subtema 2 Pemanfaatan energi pembelajaran 4

Pertanyaan 2 dari 15 00:58:05

Kelipatan bilangan 3 adalah ...

- a. 0, 3, 6, 9, 12, ...
- b. 1, 3, 6, 9, 12, ...
- c. 3, 6, 9, 12, ...
- d. 3, 6, 8, 12, ...

POIN 1

Sebelumnya Selanjutnya Selesai

UIN MALIKI MALANG

**Tema 2** Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD 4

Evaluasi Subtema 2 Pemanfaatan energi pembelajaran 4

Pertanyaan 2 dari 15 00:58:06

Kelipatan bilangan 3 adalah . . . .

- a. 0, 3, 6, 9, 12, ...
- b. 1, 3, 6, 9, 12, ...
- c. 3, 6, 9, 12, ...
- d. 3, 6, 8, 12, ...

POIN 5 Sebelumnya Selanjutnya Selesai

**Tema 2** Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD 4

Evaluasi Subtema 2 Pemanfaatan energi pembelajaran 4

Pertanyaan 4 dari 15 00:57:44

Bilangan kelipatan 4 yang lebih dari 20 dan kurang dari 40 adalah . . . .

- a. 20, 24, 28, 32, 36, 40
- b. 20, 24, 28, 32, 36
- c. 24, 28, 32, 36, 40
- d. 24, 28, 32, 36

POIN 5 Sebelumnya Selanjutnya Selesai

**Tema 2** Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD 4

Evaluasi Subtema 2 Pemanfaatan energi pembelajaran 4

Pertanyaan 5 dari 15 00:57:17

Kelipatan persekutuan dari 6 dan 8 adalah . . . .

- a. 1, 12, 24, 36, 48, ...
- b. 12, 24, 36, 48, ...
- c. 24, 36, 48, ...
- d. 24, 48, ...

POIN 7 Sebelumnya Selanjutnya Selesai

**Tema 2** Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

Evaluasi

Evaluasi Subtema 2 Pemanfaatan energi pembelajaran 4

Pertanyaan 6 dari 15 00:56:43

Kelipatan 3 antara 20 dan 40 yang habis dibagi 4 adalah . . . .

- a. 3, 24, 36
- b. 24, 36
- c. 36
- d. 40

POIN 5 Sebelumnya Selanjutnya Selesai

UIN MALIKI MALANG

**Tema 2** Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

Evaluasi

Evaluasi Subtema 2 Pemanfaatan energi pembelajaran 4

Pertanyaan 7 dari 15 00:56:26

Yang bukan kelipatan 8 adalah . . . .

- a. 24
- b. 30
- c. 44
- d. 60

POIN 7 Sebelumnya Selanjutnya Selesai

UIN MALIKI MALANG

**Tema 2** Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

Evaluasi

Evaluasi Subtema 2 Pemanfaatan energi pembelajaran 4

Pertanyaan 7 dari 15 00:56:16

Yang bukan kelipatan 8 adalah . . . .

- a. 24
- b. 30
- c. 44
- d. 60

POIN 7 Sebelumnya Selanjutnya Selesai

UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

Evaluasi Sistem 2 Pemanfaatan energi pembelajaran 4

Pertanyaan 6 dari 15 00:56:02

KPK dari 3 dan 5 adalah . . . .

- a. 3
- b. 5
- c. 15
- d. 30

POIN 8

Sebelumnya Selanjutnya Selesai

UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

Evaluasi Sistem 2 Pemanfaatan energi pembelajaran 4

Pertanyaan 8 dari 15 00:58:50

Faktor dari 45 adalah . . . .

- a. 1; 3; 5; 7; 9; 15
- b. 1; 3; 5; 9; 15; 45
- c. 1; 3; 5; 9; 45
- d. 3; 5; 9; 15

POIN 8

Sebelumnya Selanjutnya Selesai

UIN MALIKI MALANG

Tema 2 Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

Evaluasi Sistem 2 Pemanfaatan energi pembelajaran 4

Pertanyaan 10 dari 15 00:59:38

Faktor dari 51 adalah . . . .

- a. 1; 3; 21; 51
- b. 1; 3; 17; 51
- c. 1; 3; 5; 17; 51
- d. 1; 3; 5; 15; 51

POIN 8

Sebelumnya Selanjutnya Selesai

UIN MALIKI MALANG



**Tema 2** Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

Evaluasi

Evaluasi Subtema 2 Pemanfaatan energi pembelajaran 4

Pertanyaan 11 dari 15 00:55:27

Sofi dan Sinta mengikuti kursus renang. Jadwal latihan renang Sofi 5 hari sekali. Sedangkan Sinta latihan renang setiap 7 hari. Hari ini mereka latihan bersama. Berapa hari lagi mereka dapat latihan bersama?

POH 8

Sebelumnya Selanjutnya Selesai

**Tema 2** Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

Evaluasi

Evaluasi Subtema 2 Pemanfaatan energi pembelajaran 4

Pertanyaan 12 dari 15 00:55:15

Sisi dan Digo bermain peluit. Sisi meniup peluit setiap 24 detik, sedangkan Digo meniup peluit setiap 14 detik. Setiap berapa menit mereka berdua meniup peluit secara bersamaan?

POH 10

Sebelumnya Selanjutnya Selesai

**Tema 2** Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD4

Evaluasi

Evaluasi Subtema 2 Pemanfaatan energi pembelajaran 4

Pertanyaan 13 dari 15 00:55:04

Lampu di taman yang berkedip-kedip ada dua jenis warna, yaitu merah dan biru. Lampu merah menyala setiap 6 detik dan lampu biru menyala setiap 10 detik. Setiap berapa detik kedua jenis lampu menyala bersamaan?

POH 8

Sebelumnya Selanjutnya Selesai


**Tema 2** Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD 4

Evaluasi

Evaluasi Subtema 2 Pemanfaatan energi pembelajaran 4

Pertanyaan 14 dari 15 00:54:43

Urutkan langkah-langkah membuat kreasi meronce secara runtut dalam kolom berikut dengan mengklik tombol!

1.  Lisikan pola potongan kertas/majalah pada sumpit hingga membentuk gambar pola.
2.  Potonglah majalah/kertas kado sesuai pola di atas.
3.  Berkan lem pada ujung litan.

PODI 8 Sebelumnya Selanjutnya Selesai

**Tema 2** Subtema 2 : Pemanfaatan Energi Pembelajaran 4 SD 4

Evaluasi

Evaluasi Subtema 2 Pemanfaatan energi pembelajaran 4

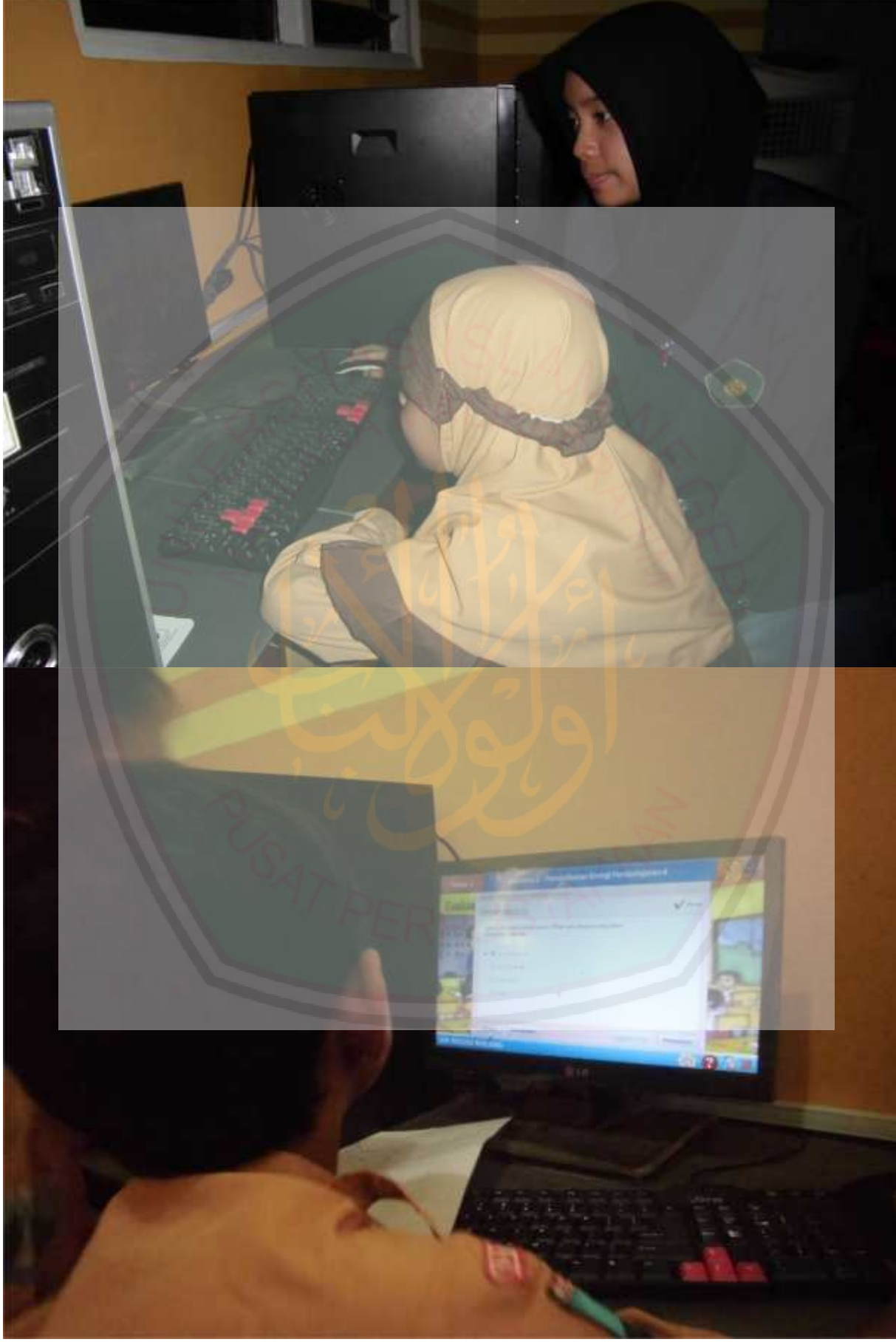
Pertanyaan 15 dari 15 00:54:32

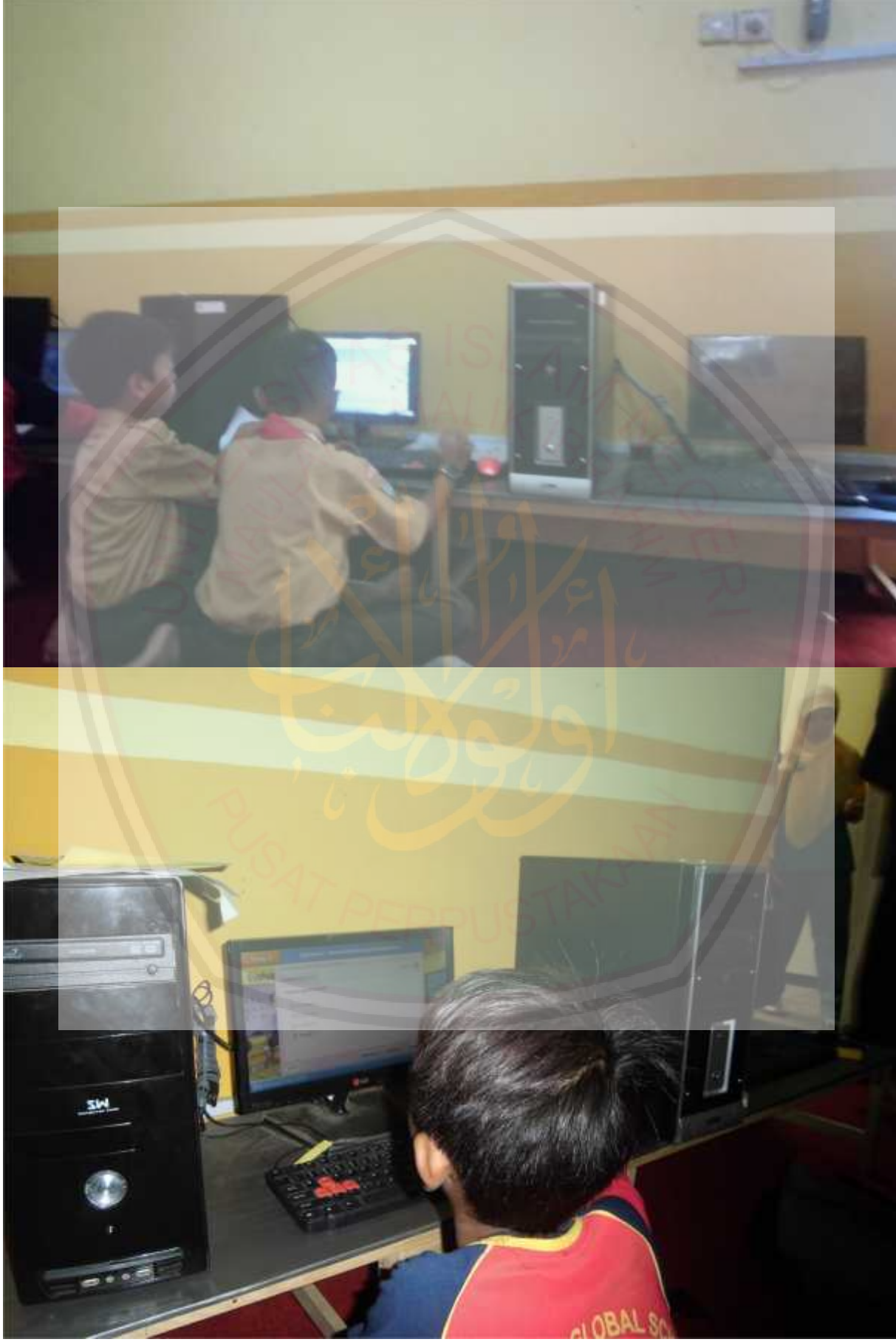
Pilihlah jawaban yang benar. Kamu bisa menjawab dengan lebih dari satu jawaban!  
Alat dan Bahan yang digunakan dalam meronce adalah ....

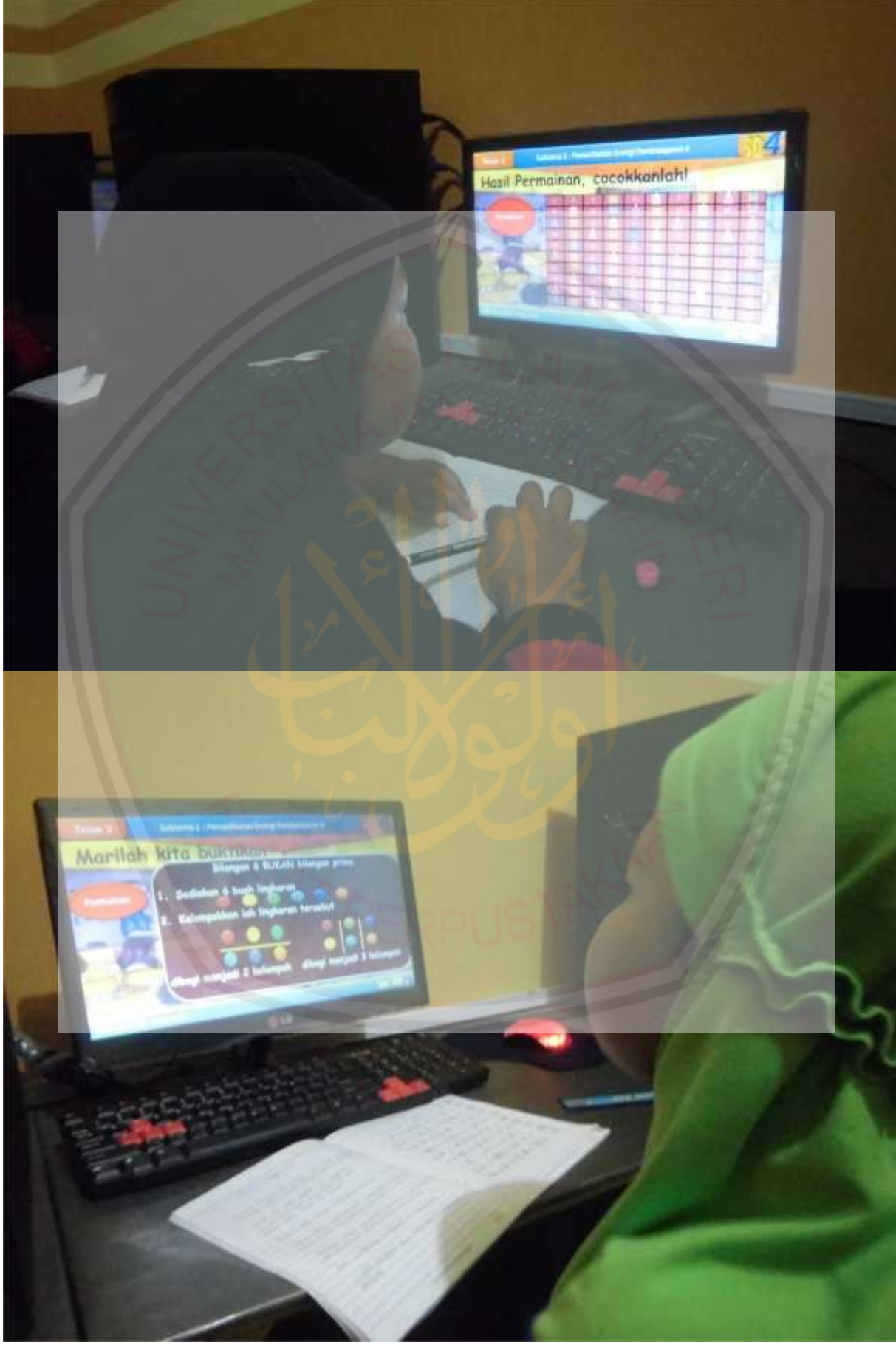
- Majalah bekas/Kertas kado bekas
- Lem
- Bandok
- Jangka
- Punggara

PODI 7 Sebelumnya Selanjutnya Selesai



















### Validator Identity

1. Name : Yeni Tri Asmaningtias, M.Pd  
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Institution : PGMI – FITK – UIN Maliki Malang  
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2. Name : Dr. Muhammad Walid, MA  
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4. Name : Enis Syafa'ati, S.Pd  
NIP : -  
Institution : Islamic Global Schhol Malang  
Education : S1 Pendidikan Guru Sekolah Dasar  
Address : Sidoarjo
5. Name : Akhmad Susanto  
NIP : -  
Institution : Islamic Global School Malang  
Education : English Program  
Address : Jl. Supriadi No 35 Sukun

## Student Identity

1. Name : Adinda Azalea Firdaus  
Class : Fourth Grade  
School : Islamic Global School Malang
2. Name : Wildhan Loanda Eldama  
Class : Fourth Grade  
School : Islamic Global School Malang
3. Name : Achmad Rifaldi Sonaini F  
Class : Fourth Grade  
School : Islamic Global School Malang
4. Name : Satriyo Bagus Setyawan  
Class : Fourth Grade  
School : Islamic Global School Malang
5. Name : Putra Rachel Dewa Soegiharno  
Class : Fourth Grade  
School : Islamic Global School Malang
6. Name : Dea Ramadhany Putri  
Class : Fourth Grade  
School : Islamic Global School Malang
7. Name : Tri Nazwa Livia  
Class : Fourth Grade  
School : Islamic Global School Malang
8. Name : Rahmatul Istiqomah  
Class : Fourth Grade  
School : Islamic Global School Malang
9. Name : Sela Garneta Lana  
Class : Fourth Grade  
School : Islamic Global School Malang

### Student Personal Information



Name : Dian Mustika Anggraini

NIM : 11140011

Place and Date of Birth : Tulungagung ad 30 May 1993

Faculty/ Program : Tarbiyah Science and Teaching Faculty/ Teacher  
Education of Elementary School Program

Address : Jl. Pelabuhan Tanjung Perak No 03 Sukun Malang

Phone Number : 085755077292

## Wawancara dengan guru tentang media interaktif

Dian : Assalamualaikum Bu.

Pak Santo : Wassalamualaikum mbak Dian.

Dian : Mohon maaf mengganggu pak. Saya ingin melakukan wawancara dengan pak Santo mengenai media saya yang kemarin bapak validasi.

Pak Santo : Iya mbak silahkan.

Dian : Menurut Pak Santo, bagaimana media interaktif yang sudah saya kembangkan ini pak?

Pak Santo : Sudah bagus mbak. Dari segi tampilan dan warnanya menarik. Desainnya juga sudah sesuai. Kemarin saya coba saya pakai dengan anak-anak di kelas dengan LCD juga mudah. Saya tinggal mendampingi mereka saja. Anak-anak antusias mbak memakai medianya mbak dian.

Dian : Alhamdulillah. Dari segi materinya bagaimana pak?

Pak Santo : kalau materinya ini mbak Dian tambahi ya karena saya waktu mengajar dengan buku dari dinas itu tidak se detil ini. Jadi lebih memudahkan anak-anak untuk memahami KPK. Jujur saja mbak Dian, kemarin awalnya waktu mengajarkan tema ini anak-anak sedikit mengalami kesulitan, kan ini materi baru di kelas 4 ya. Di kelas 3 mereka masih menghitung operasi perkalian dan di kelas 4 ini mereka diajarkan KPK, meronce, dan bercerita.

Dian : ketika saya uji coba media ini dengan anak-anak memang mereka sangat antusias pak. Menurut Pak Santo, apa saran untuk media saya ke depannya pak ?

Pak Santo : Untuk ke depannya bisa ditambahkan pembelajaran lain mbak. Jadi nanti setiap pembelajaran ada satu media. Ketika pembelajaran akan lebih enak

dan mudah. Guru benar-benar tinggal mengarahkan dan memfasilitasi siswa. siswa juga akan lebih aktif sesuai dengan kurikulum 2013 yang diberlakukan oleh pemerintah. Tidak hanya itu, kata mbak dian media ini juga ada aplikasi android ya. Itu lebih memudahkan siswa untuk belajar di rumah. Jadi, nanti saya minta file nya yang berupa cd dan aplikasi androidnya. Sehingga ketika anak-anak meminta kepada saya, saya sudah punya. Mohon maaf saya tidak bisa lama-lama karena sebentar lagi saya harus pergi menghadiri undangan rapat di gugus.

**Dian** : iya pak tidak apa-apa. Saya mengucapkan terimakasih atas saran dan waktunya pak. Dari awal sampai akhir selalu di bantu oleh Pak Santo dan Bu Enis. Mohon maaf kalau saya selalu merepotkan bapak dan ibu.

**Pak Santo** : tidak mbak. Itu tugas kami sebagai guru juga wajib membantu mahasiswa yang sedang belajar.

## Wawancara dengan siswa kelas 4

### “Adinda kelas 4”

Dian : Selamat Pagi Dinda.

Dinda : Selamat pagi bu.

Dian : Ibu mau wawancara sebentar dengan Dinda, boleh ya?

Dinda : iya bu.

Dian : tadi kan Dinda sudah mencoba belajar dengan komputer ya. Dari media tadi apa yang Dinda suka?

Dinda : Warnanya bu. Menarik. Warna-warni

Dian : Dinda sudah paham dengan materinya?

Dinda : Sudah Bu. Saya paling suka waktu disuruh milih angka-angka yang bilangan prima itu bu.

Dian : ibu rasa cukup. terimakasih dinda.

### “Wildan kelas 4”

Dian : Halo Wildan

Wildhan : iya bu.

Dian : Ibu mengganggu Wildan sebentar ya. Bagaimana menurut wildan belajar menggunakan komputer tadi?

Wildan : Seru.

Dian : Bagian mana yang seru?

Wildan : waktu cari bilangan prima disuruh memberi lingkaran, kotak, sama segitiga.

Dian : Sekarang wildan paham ya apa itu bilangan prima. Coba wildan sebutkan macam-macam bilangan prima

Wildan : 2,5,7,3, 11, banyak bu

Dian : iya sudah itu saja. Wildan pintar. Untuk soal cerita nya bagaimana?

Wildan : bisa bu.

Dian : Wildan sudah pintar. Terimakasih wildan



#### **“Satrio kelas 4”**

Dian : Halo Satrio

Satrio : Iya bu.

Dian : Satrio tadi belajar pakai komputer ya sama teman-teman, gimana rasanya?

Satrio : Iya bu. Senang bu. Jarang belajar kayak gini bu. Bu, katanya bisa di hp juga. saya minta ya.

Dian : iya nanti ibu kasih atau besok Satrio bisa meminta ke Pak Santo atau Bu Enis. Kira-kira Satrio sudah paham sama materinya?

Satrio : Sudah bu. Tadi saya dapat nilai bagus di komputernya.

Dian : Satrio dapat nilai berapa memangnya?

Satrio : 88 bu. Kalau begini terus saya semangat bu. Nggak ngantuk lagi bu.

Dian : Bagus sekali. Selamat ya. Ibu rasa cukup wawancaranya dengan Satrio. Terimakasih.

Satrio : sama- sama bu

#### **“Dea Kelas 4”**

Dian : Assalamualaikum.

Dea : Waalaikumussalam Bu.

Dian : Bagaimana tadi Dea sudah belajar menggunakan media di komputer ya?

Dea : Bagus bu. Saya suka. Warnanya warna-warni bu. Jadi enak dilihat.

Dian : Jika ibu kasih soal ke Dea, Dea sudah bisa jawab belum ?

Dea : Sudah Bu. Kan tadi di komputernya juga ada contoh soalnya. Jadi saya catat di buku terus ketika ngerjakan saya lihat bu. Enak bu, mudah. Terus tadi juga ada contohnya soal-soal cerita juga bu.

Dian : Terimakasih banyak Dea atas waktunya.

## Lampiran wawancara guru kelas IV SD Islamic Global School

- Dian : Assalamualaikum Bu.
- Bu Enis : Wassalamualaikum mbak
- Dian : Ibu saya mau wawancara tentang pembelajaran di kelas 4.
- Bu Enis : Iya mbak silahkan
- Dian : menurut pendapat Bu Enis, Bagaimana pelaksanaan kurikulum 2013 saat ini?
- Bu Enis : Bagus mbak membuat siswa menjadi lebih aktif. Materinya pun juga sesuai dengan kehidupan mereka sehari-hari. Seperti saat ini kita sedang belajar tema selalu berhemat energi.
- Dian : menurut Bu Enis, kurikulum terbaru ini apa ada kesulitan yang ditemukan oleh siswa maupun Bu enis sebagai guru?
- Bu Enis : Ada mbak Dian. Karena ini kurikulum masih baru jadi masih banyak kekurangan juga dalam pelaksanaannya mbak. Seperti anak-anak mengalami kesulitan dalam memahami materi yang kemarin saya ajarkan dalam materi sub tema 2 pembelajaran ke 4. Nilainya anak-anak banyak yang dibawah kkm.
- Dian : lho kok bisa seperti itu bu? Tadi bu enis mengatakan kalau materinya mudah dipahami oleh anak-anak karena menggunakan tema di kehidupan sehari-hari mereka.
- Bu Enis : iya mbak. Memang seperti. Tetapi dalam suatu materi ada tingkat kesulitan yang berbeda-beda. Di materi pembelajaran 4 ini memang hanya ada 3 mata pelajaran yang digabung dan mata pelajaran matematika yang dominan. Materinya tentang KPK. Jadi perlu pemahaman yang ekstra dari anak-anak. Sedangkan di buku dari dinas tidak begitu mendalam. Hanya dasarnya saja. Jadi anak-anak masih pada bingung.
- Dian : apakah tidak ada media yang bisa digunakan untuk mengatasinya bu?
- Bu Enis : kalau media ada mbak tetapi masih ktsp. Yang kurikulum 2013 masih jarang sekali. Saya kemarin menggunakan media seadanya dulu karena saya kesulitan untuk menggabungkan tiga mata pelajaran.
- Dian : tadi saya juga melihat ada LCD di kelas ya bu. Sebenarnya bisa digunakan ya bu?

Bu enis : Iya mbak. Benar. Kita juga ada aboratorium komputer mbak. Tetapi saaya mencari software atau aplikasi yang sesuai dengan materi juga kesulitan mbak.

Dian : Saya rasa cukup bu untuk wawancara kali ini. Terimakasih bu

Bu Enis : iya mbak sama-sama.



### Laporan wawancara dengan beberapa anak kelas 4 observasi

Dian : Halo, Selamat pagi. Assalamualaikum.

Satria : Wassalamualaikum Bu.

Dian : Ibu mau mengganggu sebentar ya. Ibu mau tanya ke Satria, Dea, dan Dewa. Menurut kalian, bagaimana tampilan buku paket yang kalian miliki sekarang yang diberi dari sekolah?

Satria : Bagus Bu, Warna – warni.

Dewa : Banyak latihannya bu.

Dea : Bagus bu. Kita tiap hari mengerjakan soal-soal di buku latihan itu terus.

Dian : Kata Bu Enis, sekarang belajar tentang tema selalu berhemat energi ya?

Satria, Dewa, dan Dea: Iya Bu

Dian : Sampai saat ini, tema berapa yang kalian merasa masih belum paham?

Dewa : Yang kemarin bu, KPK. Sulit bu

Satria : Kalau saya kadang masih lupa bu rumusnya KPK. Kemarin Bu Enis ngasih rumus tapi kadang saya masih lupa.

Dea : Iya bu, yang kemarin itu tetapi Alhamdulillah saya bisa.

Dian : Kan sudah dijelaskan Bu Enis ya, kok masih belum paham?

Dewa : lha dibukunya gak lengkap bu. Gitu-gitu aja

Satria : materinya sulit bu

Dian : terimakasih atas waktunya hari ini.