Mathematics Education and Graph Theory

Proceedings of International Seminar
on Mathematics Education and Graph Theory
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Editors:
Mustangin
Abdul Halim Fathani

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PREFACE

These proceedings contain the full text of papers and talks presented in the International Seminar on Mathematics Education and Graph Theory. This seminar was held in conjunction with the International Workshop on Graph Masters. The workshop was held on June 7–8, 2014, while the seminar was on June 9, 2014. These events were organized by Islamic University of Malang (Unisma) in cooperation with Indonesian Combinatorial Society (InaCombS).

The workshop and the seminar would not have been possible without the time and energy put forth by the invited speakers. The invited speakers of the workshop were: **Mirka Miller**, University of Newcastle, Australia; **Joseph Miret**, Universitat de Lleida, Spain; **Christian Mauduit**, Institut de Mathematiques de Luminy, France; **Edy T. Baskoro**, Bandung Institute of Technology, Indonesia; **Surahmat Supangken**, Islamic University of Malang, Indonesia; **Tri Atmojo**, State University of Semarang, Indonesia; and **Purwanto**, State University of Malang, Indonesia.

The invited speakers of the seminar were: **Juddy Anne Osborn,** University of Newcastle, Australia and **Abdur Rahman As'ari**, State University of Malang, Indonesia. The seminar was held on the area of mathematics education and graph theory. The main themes of the mathematics education seminar include topics within the following areas (but not limited to): philosophy of mathematics education, curriculum development, learning methods and strategies, learning media, development of teaching material, and assessment and evaluation of learning. The main themes covered in graph theory seminar include topics within the following areas (but not limited to): degree (diameter) problems, ramsey numbers, cycles in graphs, graph labeling, dimensions of graphs, graph coloring, algorithmic graph theory, and applications of graph theory in various fields.

We would like to thank you to the invited speakers and all presenters who have submitted papers, for their valuable and inspiring presentation. A special appreciation goes to: **Surahmat Supangken**, Rector of Unisma and **Kiki Ariyanti Sugeng,** the President of InaCombS, who have made a lot of efforts to prepare this seminar.

We also do not forget to express our gratitude to Islamic University of Malang (Unisma) for providing financial support, and to the Indonesian Combinatorial Society (InaCombS) for the support. We hope that you had a great time and valuable experience during the seminar in Malang.

Malang, July 22, 2014

Editors

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DEVELOPING A MATHEMATICS MODULE WITH CONTEXTUAL APPROACH AND ISLAMIC VALUES USING ADOBE FLASH CS3 AS A MATHEMATICS LEARNING RESOURCE FOR STUDENTS IN SMP/MTS

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Abstract

The aim of the research is to develop a mathematics module in compact disk (CD) with contextual approach and Islamic values using Adobe Flash CS3 that is qualified as a learning resource for students in SMP/MTs. The research method used was ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The research used Analysis, Design, Development, and Evaluation aspects. Analysis aspect covered curricula analysis, teachers and students needs assessment. Design aspect covered reference collecting and module design drafting. Development aspect covered module manufacturing, expert validation and revision, layout design and module programming manufacturing. Evaluation aspect covered modul evaluation and data analysis. Product of the research is a mathematics module in compact disk (CD) developed using Adobe Flash CS3 and provides operational instruction, preface, and well-known figures to give motivation to students, content, and assessment. Every material is initiated with contextual problems and Islamic values which will be learn by students. The module was developed through Analysis, Design, Development, and Evaluation process. The module developed in the research has a very good quality in appearance and content aspects. There it can be used in mathematics learning process in social arithmetic material.

Keywords: *Mathematics Module, Contextual Approach, Islamic Value, Adobe Flash CS3, Learning Resource*

INTRODUCTION

Nowadays, the development of technology runs quickly and affects all areas of life including education area. Computer and internet utilization as information sources is not a special thing anymore. Even this has been applied in learning activities. Capital utilization supported by optimum utilization of technology will give the great impact in developing science.

It also happens in education area. The use of technology is expected to support learning process. Not only printed book, but also teachers are expected to use the technology in learning process in order to achieve a learning goal optimally and intact.

The quality of education in Indonesia should be improved continually in order to create a smart young generation, both cognitive and affective. As written in the academic paper "Indonesian development can be achieved through good education. A variety of efforts to improve the quality of education is expected to raise the dignity of Indonesian people. To achieve that, the renewal of education in Indonesia needs to do to create a sustainable education" (Puskur, 2006).

Education is a dynamic force in everybody's life and it affects the physical development, soul (mind, sense, and will), social, and moral. In addition, education is a dynamic force which influences the personality's ability and individuals' life in meeting and interaction with God (Sumitro, 2006:16).

Mathematics is a basic science for calculating at all education's levels. It requires teachers to improve the quality of the learning process in order to achieve the goal of learning mathematics specifically and to improve the quality of education generally.

To overcome this problem, teachers had tried to use a cooperative method that engages students in the learning process. However, it is still not considered as a maximum result. Teachers still have to determine the instructional materials and learning resources for students which are more practical and efficient so that the teaching materials and the methods are applied in balance.

Based on interviews with mathematics SMP/MTs' teachers, it showed that the teachers are still lack in developing a module, especially mathematic module in compact disk (CD). In learning process, teachers still use printed school textbooks as the primary teaching materials and worksheets as supplementary teaching materials. However, students' understanding as a result is still not maximal. The media developed is just limited to simple paper model in certain materials, such as square and rectangular model.

The module is a set of self-instructional materials that are presented systematically to enable the students learn independently or limited guidance from the teacher/facilitator if necessary (Depdiknas, 2004:4). Learning using modules is a self-learning approach that focuses on competencies understanding to materials in specific time in accordance with the potential and condition.

The teacher has five main tasks, i.e. to plan learning, to implement learning, to evaluate learning outcomes, to follow-up results of learning, and to do guidance and counseling. Information and Communication Technology (ICT) may contribute to the five basic tasks. ICT enables learning to do by a variety of learning modalities, audio, visual, and kinesthetic. ICT enables learning delivered in interactive and simulative way so that students learn actively.

A module with a contextual approach concept and using real examples related to daily life will give students the actual condition and it makes mathematic become no longer abstract subjects. Using ICT, the real problems can be illustrated with animations and sound effects to make it look more attractive.

Boring and scary in learning mathematics will not happen anymore because mathematics can be learnt alone by using a module provided by the teacher. Some mathematical concepts, such as straight line equation, the volume of the rotary, statistics, the concept of limit and geometry, can be studied independently and explained easily by using software because the module uses real examples in daily life.

Social arithmetic is one of math subjects in SMP/MTs. Social arithmetic discusses trading, interest, savings, discounts, rebates, and net, and gross. The material is very important because the social arithmetic will be used in the daily life. In daily life, students often find the process of trading, discounts when buying in the mall, the net posts on food wrappers, and interest when saving in the bank.

Nowadays, math learning process is still on the cognitive aspects only. Affective aspects is not discussed optimally, especially Islamic values. As a result, learning becomes monotonous and without variation. In mathematics, there are a lot of materials related to the moral and religious values. Math teaches consistency, honesty, creativity and obeys to the principle.

At this time, the term Islamic economics and Islamic banks are often discussed. Islamic economic system is expected to overcome the crisis caused by the liberal economic system. Islamic banks are expected to provide an alternative way for people to save and get loans in accordance with Islamic values and avoid usury. Conventional banks implement usury system both the savings and credit and it is forbidden in Islam.

Understanding on the importance of Islamic economic system needs to do since students at school. Students need to be informed that the Islamic economic system is more profitable than the liberal economic system. It can be done when students learn math. By providing a direct experience of how to calculate profit using sharia system, students are expected to understand the mathematics concepts as well as Islamic economic system.

One of the ICT products that can be used in the learning process is Adobe Flash CS3 (formerly Macromedia Flash Professional 8). With this software we don't only make a presentation, but we can also develop interactive learning which enables students learn math using it. To support the teaching methods which are more effective and independent, as well as increase the interest and ability of the students, teaching materials (modules) that are packed with contextual approach in teaching media using Adobe Flash CS3 software is needed to be made.

Those are the reasons to develop mathematics module with the contextual approach and Islamic values using Adobe Flash CS3 as a learning resource for material social arithmetic for students in SMP/MTs.

The formulation studied in this research is how mathematics module with contextual approach and Islamic values using Adobe Flash CS3 as a mathematics learning resource viable for students in SMP/MTs.

The aim of the research is to develop a mathematics module in compact disk (CD) with contextual approach and Islamic values using Adobe Flash CS3 that is qualified as a learning resource for students in SMP/MTs and to know the quality of module.

LITERATURE REVIEW

Mathematic Module

The module is a book written to make student learn independently with or without teacher's guidance. So that, the module contains at least about (Depdiknas, 2004:25-26):

a. Instructions (for student and teacher)
b. Competencies to achieve
c. Supporting information
d. The exercises
e. Work instructions, it can be a worksheet
f. Evaluation

The module is the smallest and complete unit of instruction and includes a series of learning activities planned systematically, learning objectives are formulated explicitly and specifically, and the realization of individual recognition, which allows for

students to learn independently. The formulation of specific teaching objectives in the module can be changed into test items to evaluate student learning outcomes. It can determine what should be understood by students when they have finished the module (Vembriarto, 1985:12). In Indonesia, the term of module for the first was recognized in a forum of 8 School Development Pilot Project in Cibulan, Bogor in February 1974 (Vembriarto, 1985:20). Module developed at that time was a booklet.

Module has some specific characteristics: (Depdiknas, 2004:28-29):

1) Shaped in the smallest and complete teaching unit
2) Contains a series of learning activities designed systematically
3) Contains learning objectives are clearly defined and specific
4) Allows students to learn independently

Modules can be considered as a teaching package consisting of components that contain learning objectives, learning materials, learning methods, devices or media, the source of learning and evaluation system.

According to Nana Sudjana and Rivai Ahmad, module is defined as the smallest unit of teaching and learning and discuss about (Depdiknas, 2004:40):

1) The standard of competence and basic competences that will be achieved
2) Learning materials
3) Position the module functions in a unified and broader program
4) The role of the teacher in the learning process
5) The tools and resources that will be used
6) Learning activities to be done and understood by students
7) Worksheets to fill
8) The evaluation program to do

A module can be categorized as a good and interesting media if it contains these (Depdiknas, 2004: 30):

a. Self Instructional. The module enables students to learn by themselves.

b. Self Contained. A module contains whole materials that are in a unit of competencies or sub-competencies.

c. Stand Alone. A module developed is independent to other media by using modules, students do not have to use other media to learn or solve the questions and tasks in the module.

d. Adaptive. Module should be a sustainable media to the development of science and technology and flexible to use. It should be an up to date media.

e. User Friendly. Module should be easy to use. Instructions and explanations shown should be easy to use. The users should get easiness to respond and access what they need. Language that is used is easy to understand, simple, and uses common term.

A mathematics module developed is expected to connect the material of mathematic to daily life, such as simulations to calculate profit and loss, and compare the interest and profit sharing. Thus modules packaged in a CD can be used by teachers or students as learning resources.

Contextual Approach

Contextual approach is a learning concept that not only helps teachers link among the materials, but also encourage students to make connections between the knowledge and its application in daily life. It involves seven major components of productive learning, such as constructivism, finding, asking, community learning, modeling, reflection, and actual assessment (Filiayuk, 2009:13-14).

Contextual approach is a concept of learning that helps teachers to connect the content of teaching material with real situations and its application as family members, citizens, and workers. It enables students actively participate in learning activities required in the lesson.

Thus, the contextual approach enables teachers implement the concept of learning and make it is easily accepted by students. By connecting material and daily life, it may encourage students to make connection between its knowledge and its application

in their everyday lives as members of society.

In contextual-based learning, there are five elements of constructivist learning, namely (Trianto, 2009:110):

1) Knowledge activating. It enables activate existing knowledge.
2) Knowledge acquiring.
3) Understanding knowledge
4) Applying knowledge
5) Reflecting knowledge on the development strategy of knowledge.

The learning process using contextual learning has these characteristics: 1) co-operation; 2) supporting each other; 3) fun and not boring; 4) learning with passionate; 5) integrated learning; 6) using a variety of sources; 7) activing students; 8) sharing with friends; 9) enabling students be critical and teachers creative; 10) classroom walls and hallways filled with students' work (maps, images, articles); 11) reports given to parents are the students' work, the results of lab reports, students writing, and others (Rusman, 2010: 189).

Contextual learning as an approach has seven major components. They become a basic the implementation of the learning process.

a. Constructivism

Constructivism is a developmental process of new knowledge in the students' cognitive structure based on the experience (Sanjaya, 2008: 264). According to Rusman, constructivism is a basic of the contextual thinking. Knowledge is not a set of facts, concepts or rules that are ready to be picked up and remembered. Man must build the knowledge and give real meaning through experience (Rusman, 2010: 193).

Therefore, in a contextual learning strategy, connecting concept and reality is the preferred element compared with an emphasis on how much knowledge to be remembered by the students.

Learning will be meaningful if it is related to the daily condition. Therefore every teacher should have an extensive knowledge so he will easily illustrate, using learning resources and media that enable students actively seek and find the link between the concepts learned and experience. So, the experience will

facilitate the student's ability to apply to other problem having similarities. (Rusman, 2010: 194).

Contextual learning is basically encouraging the students to be able to construct knowledge through a process of observation and experience. Knowledge will be functional if it is built by individuals. Students are encouraged to be able to construct their own knowledge through real experiences (Sanjaya, 2008: 264).

b. Inquiry

It is a main point in the contextual teaching. It emphasizes knowledge, skill, and others are not the result of remember but they are the result of finding. Learning activities that directs students to find, is a learning system that helps students, both individually and collectively, learn to discover based on experiences. So the result will be more durable remembered by students than compared to teaching by teachers.

c. Questioning

Learning is essentially asking and answering questions. Asking can be viewed as a reflection of each individual's curiosity. Answering the question reflects a person's ability to think. In the process of contextual learning, the teacher doesn't only deliver information, but also makes the students can find information themselves. So, questioning is very important. By this way, teacher can guide students discover any material learned.

d. Learning community

The definition of learning communities is familiarizing students to collaborate and utilize learning resources learning from their friends. As suggested in the study group, learning outcomes are gained from cooperation with others through sharing experiences. Through this way, students are accustomed to giving and receiving.

Habits of the application and develop learning communities within contextual learning is very likely done outside the classroom. Each student is guided and directed to develop their curiosity through

the using of learning resources outside the class, family, and community. If students is familiarized giving the experience to others, it will make them get more from others.

e. Modelling

Modeling is the process of learning by demonstrating something as an example that can be emulated by every student. For example, the teacher gives examples how to operate a tool, or how to pronounce a foreign language, a sport teacher gives an example of how to throw a ball, an art teacher gave an example of how to play musical instruments, etc.

The process is not limited to teachers only, but can also take advantage from the student considered have the capability. For instance, student who ever been a winner of poetry competition does show in front of his friends. So, the student is considered as a model. Modeling is an important aspect in contextual learning. Through modeling, students can be avoided from theoretical-abstract learning.

f. Reflection

Reflection is a way of thinking about what had happened or had just learned. In other words, the reflection is thinking about what is already done in the past, students focus on new knowledge as a new structure which is the enrichment or revision of previous knowledge. At the time of reflection, students are given the opportunity to plan, weigh, compare, appreciate, and held discussions in himself (learning to be).

Meaningful knowledge is gained from meaningful process, through acceptance, management and precipitation, and then it can be relied upon in response. Through contextual learning, a learning experience doesn't just occur in the classroom, but it is much more important if it's applied to outside of class. The ability to apply knowledge, attitudes, and skills in the real world will be easy and it is the importance of reflection in learning process.

g. Authentic Assessment

The last stage of contextual learning is assessement. Assessment is an essential

part of learning in order to obtain information about the quality of the process and the learning outcomes. Assessment is the process of collecting various data and information of students' learning experience. By gathering a variety of data and complete information as the embodiment of the adoption of the assessment, it will be more accurate to the understanding of teacher to the process and results of the learning experience of each student.

1. Learning Media

The purpose of the teaching-learning process can be achieved if it is supported by several factors, such as learning media. It takes an important role because it helps teacher in transferring knowledge. It will make learning process be efficiency and the result will have good quality (Rivai and Sudjana, 2001:64).

The word of media comes from the Latin which is the plural of medium. Literally media is "intermediate" or "introduction". Association or education and Communication Technology (AECT), in Suparni and Ibrahim, defines media as all forms used for information distribution process. The media also means the channel of communication between an information source and receiver. While Educaton Association (NEA) defines media as an objects that can be manipulated, seen, heard, read, or discussed along with the instruments that are used by both the teaching and learning activities, influence the effectiveness of learning programs (Ibrahim and Suparni, 2008:115).

One of learning media characteristic is that the media contains and carries the message or information to students as recipients. Media can deliver simple or complex messages. However, the most important of media is the utilization for meeting student's needs in learning and to take a role in learning process. So, it is needed to design and develop interactive learning to meet individual learning using effective media (Azhar, 2002:79).

Arsyad distinguished media by the development of technology, i.e. a) printing technology, b) audio-visual technology, c)

computer-based technology, and d) the combined technologies. (Azhar, 2002:29-32)

According to Nana Sudjana and Rivai, benefits of media in learning process are (Azhar, 2002:25):
a. Teaching will be of more interest to students so the motivation of learning will gain
b. Teaching material will be clear and it can be understood by students and enables them to achieve teaching objectives.
c. Teaching method will be more varied and it is not monotonous and using verbal only.
d. Students will do more activities because they don't only listen the teaching, but also do other activities, such as observing, doing, demonstrating, and others.

Utilization of instructional media can't be separated from the function of learning media. At first the media only serves as a tool in the learning process, which is a visual tool that can provide the students in order to encourage students' motivation, clarify and simplify complex conceptual and abstract becomes more simple, concrete and easy to understand (Usman, 2001: 20 -21). Thus the media can serve to enhance students understanding to a subject matter.

2. Interactive Multimedia

According Mccormick, multimedia is a combination of three elements, namely sound, images and text or multimedia is the use of computers to create and combine text, graphics, audio, moving images, (video and animation) by combining links and tools that enable users to navigate, interact, create, and communicate. While interactive is the ability of users to control or determine the order of the subject matter in accordance with the needs of the user.

So, interactive multimedia is a combination of two or more media (audio, text, graphics, images, animation, and video). It can be manipulated by user to control or command a presentation. Nowadays more people have started utilizing these teaching materials. It allows

users in studying a particular field. Usually teaching multimedia materials is designed completely, ranging from manual to use ratings.

In preparing interactive teaching materials needs adequate knowledge and skills, especially in operating equipment such as computers, video cameras, and camera images. Interactive teaching materials are usually presented in the form of compact disc (CD).

The most important characteristic of interactive media is that students not only pay attention to the presentation of the object, but they are forced to interact during the lesson. At the first level students interact with a program, for example, fill in the programmed blank text. The next level, students interact with the machine, such as learning machine, a simulator, a language lab, or computer terminals (Mulyani, 2007:11).

3. Learning Source

Learning is the power source used for teaching and learning process, directly or indirectly, part or whole (Sudjana and Rivai, 1989:76). In education technology term, what includes learning resource are data, people or objects, materials, procedures, techniques, and environments that are used either individually or combined to facilitate the instructional/learning activities. Learning resources can be viewed as components of a system that is designed, selected, and used with a complete teaching system to produce a directed and supervised learning (Sudjana and Rival, 1989:51).

According to Ahmad Rivai and Nana Sudjana, learning resource is everything which can be utilized in order to provide convenience learning (Sudjana and Rival, 1989:77). Students need learning resources to build knowledge in his brain. With good learning resources, learning process will be more meaningful so that students easily understand the concepts and apply it in everyday life. Learning resources should be designed and developed by teachers because teacher know and understand students' condition and intellectual.

In the development of a learning resource consists of two parts, namely:

a. Learning resource by design. It is learning resources that are designed or deliberately used to help the learning process, such as books, encyclopedias, movie, video, LCD

b. Learning resource by utilization. It is learning resources are utilized to provide convenience to study. They can be provided around us. For example museums and state institutions building.

Learning resources can be classified by the types:

1. Message is information that should be distributed by other components. It can be in the form of ideas, facts, insight and data.

2. People are who hold information or distribute information. For example a teacher, student, speaker.

3. Material. It can be a media/software containing the message to be presented through tool. For example transparency, books, pictures.

4. Equipment or device is a media/hardware that distributes messages to be presented, e.g. OHP, projector, TV, camera, whiteboard.

5. Technique/method is a procedure that is prepared in the use of learning materials, equipment, situations, and the person delivering the message.

6. Environment (setting) is about a situation where the message is delivered.

4. Adobe Flash CS3

Adobe Flash CS3 is one of animation software that is very popular and qualified. Completeness of facilities to produce animation make this software is widely used by the flash animators. It can help users accomplish the job, such as animation, presentation, making interactive CD, etc and make the design of easy and fun animation object. Adobe Flash CS3 is a new program, formerly known as Macromedia but now has been replaced with the Adobe term though they are the same meaning (Wirosari, 2008:1).

The Adobe Flash CS3 has some elements (Wirosari, 2008:3-5):
a. Tool panel contains buttons to set and object design.
b. Timeline is a part to control the contents of the document in layers and frames.
c. Layer is the part to set performance image in stages.
d. Frame is part of the layer to control animation.
e. Stage is a worksheet that is used to design object.

5. Sharia bank

There are two types of savings in Islamic banks: the contract Wadi'ah (deposit) and Al-Mudaraba contract. Although conventional types of savings in the sharia bank are same, such as demand deposits, savings and deposits time, but they have fundamental differences.

Customers who open a checking account automatically doing wadi'ah 'surrogate' contract. There are two types of sharia bank. Wadi'ah yadud amanah is a deposit which the receiving custodian (bank) is not required to replace any loss and Wadi'ah yadudh dhamanah deposit which the recipient is responsible to the value (not physical) of money deposited. Basically, this gyro based wadi'ah doesn't give benefit to customers even they have to pay to the bank in order to keep his money. However, the bank could give bonus to customer but it should not be promised because it is different with interest.

There are two kinds of contract undertaken by Islamic banks in the savings, i.e. wadi'ah and mudaraba. Savings which uses wadiah principle enables customers retrieved anytime using ATM card or account book. Saving which uses mudaraba has these benefits:
1) Profit of saving should be shared to customer and bank
2) There is period between saving and profit sharing because to invest and rotate the money needs considerable time.

Deposits in Islamic banks designated as Mudaraba contract. The owner of money is a customer (depositor) and the bank as mudharib. The characteristic of this type is period time, it could be 30, 90 days or so on.

Profit Sharing

Profit sharing is a form of returns (gains return) of an investment contract, periodically, and uncertain and not fixed amount. It depends on the profit got. It can be said that profit sharing is a type of Islamic banking practice.

Profit sharing consists of two systems:
1. Profit Sharing is calculated by reduction of income to management fund. In the Islamic system of this pattern can be used for the distribution of the results of operations of Islamic financial institutions.
2. Revenue Sharing is the result calculated from the total income fund management. In the Islamic system of this pattern can be used for the distribution of the results of operations of Islamic financial institutions.

In general, Islamic banking in using profit sharing system or revenue sharing depends on the policy of each bank to choose one of the existing systems. Islamic banks in Indonesia commonly use revenue sharing to distribute the profit to customer.

Profit sharing concepts are:
1) The customer will invest his fund to Islamic financial institution which is administrator;
2) Islamic financial institution will manage using pool of fund system and then continue by investing into a profit project or business which fulfill sharia concept;
3) Bank and customer do signing a contract providing nominal, ratio, period and its validity.

Differences between Savings in Islamic Banking and Conventional Banks
1) Every contract and transaction in sharia bank should be based on the principle of Islamic law. In conventional bank, opening account is based on agreement that one of them is interest agreement in every money paid.
2) In the reward given, conventional bank uses cost concept to detail profit. It

means that interest promised to customer is paid by bank. It is different with sharia bank that give profit sharing.

3) Credit/financing target. The customers in conventional banks don't care to the money if it is managed based on the or not. In Islamic banks, money is managed based on two Islamic principles and two profit principle.

6. Trading transaction in Islam

Literally, trading transaction means exchange transaction. While the meaning in fiqh (Islamic law) is to exchange an item to another following certain pillars and requirements. After it happens, goods sold belong to the buyer while the buyer paid cash in lieu of the price of goods, become the property of the seller.

Prophet Muhammad ever been asked by his friend about the good job. He said that the best job is the job done with his own hands and good trading transaction. Trading should be done by traders who understand the fiqh. This is to prevent fraud from both sides. Caliph Umar bin Khattab very concerned about trading in the market. He cast out traders who do not have knowledge of fiqh because he fear if the transaction doesn't follow Islamic law.

Nowadays, trading transaction develops. In supermarket or mall, buyers can choose and take goods needed without having to deal with the seller. Statement of seller (ijab) is presented as price list and statement of buyers (qobul) is presented as paying.

Trading Law

Trading transaction has been used for long time although in different type. It is justified and valid since Prophet Muhammad. It develops till today. Trading that happens in the community are: a) barter, exchange of goods with goods; b) money exchange; c) cash purchase (directly paid in cash); d) sale and purchase using credit; e) transaction using auction (offered to the general public to get the highest price).

All of them should follow Islamic law. Origin law of trading is "mubah" (allowed).

Allah allows the transaction through Al Baqarah: 275, "Allah has allowed trading and forbidden usury."

Trading transaction should not opposite with Islamic law and hurt seller or buyer. It should be based on win-win solution, mutual consent, not compulsion. It is explained in holy Quran in An-Nisa' 29, "O you who believe! Do not devour your property among yourself falsely except that it is trading by your mutual consent"

There are four types of legal law of trading:

1) Mubah (allowed) as an origin law of trading;
2) Wajib (required). Selling is a must for people selling goods to pay the debt;
3) Sunnah (recommended), if selling a goods for people who are in need of goods;
4) Haram (disallowed), if selling a disallowed goods, for immoral, to hurt someone, undermine the market price, and to damage the public.

Pillars of Trading

Buying and selling are considered valid if it meets the pillars and the requirements. If it doesn't meet one of them, the trading is failed. According to most scholar and Ulama, there are four pillars of trading, i.e. a) seller and buyer, b) goods, c) legal medium exchange (money), d) Ijab and Qobul. Ijab is a seller offering word for example "I sell this for Rp. 5.000". Qobul is buyer receiving word for example "I buy this for Rp. 5.000". Imam Nawawi argued that ijab and qobul could not be announced. This happens in nowadays trading. Buyer takes goods, brings and pays in cashier.

Legal Requirement for Trading

Trading is valid if it meets the requirements. This is useful to avoid any dispute between seller and buyer due to the cheating in transaction, such as reducing the scales, mixing good and bad quality goods and sold at a price of good quality goods. Prophet Muhammad forbade the sale that consists of cheating element. Therefore, a trader is required to be honest in selling. The requirements of trading as follows:

a) Buyer and seller
  (1) Trading has to be done by rational people so the cheating can be avoided. Allah through An-Nisaa' 5 states, "And do not give your property which Allah has made for you (means of) support to the weak of understanding, and maintain them out of (the profits of) it, and clothe them and speak to them words of honest advice".
  (2) Trading is made on their own (not forced). In An-Nisaa' 29 stated, "o you who believe! Do not devour your property among yourselves falsely, except that it be trading by your mutual consent; and do not kill you people; surely Allah is merciful to you".
  (3) The goods are bought and sold have benefits (not redundant)
  (4) Sellers and buyers are already balihg or adults, but the children are not yet of legal age allowed to make trading for little value item, for example, selling books and newspapers.
b) Terms of money and goods sold
  (1) The condition of goods is pure or can be purified.
  (2) The goods have benefits.
  (3) Goods sold are the property of the seller or the property of another person entrusted to him for sale. Muhammad said, "trading is illegal except for his own goods"(Reported by Abu Dawud).
  (4) Goods sold can be handed over so there is no fraud in the trading.
  (5) Goods sold can be seen clearly in size, shape, and nature by the seller and the buyer.

c) Ijab qobul
  Ijab is statement of buyer and qobul is statement of seller. So, ijab qobul is agreement between seller and buyer based on mutual consent. It is valid if meet these requirements.
  (1) Qobul is accordance with ijab;
  (2) There's agreement between ijab and qobul for specific goods in size and price;

  (3) The Agreement is not associated with something that has nothing to do with the contract, for example: "I will sell this book to you Rp 10,000.00 if I find money".
  (4) The Agreement shall not long ago because it is still a promise.

  Trading allowed in Islam are:
  a meeting pillars and requirements of trading
  b trading for halal goods
  c trading for pure or purified goods
  d Goods have benefit
  e It is based on mutual consent, not compulsion.
  f Mutually beneficial.

  Disallowed trading in Islam is as follows:
  a Trading for disallowed goods
  b Trading to damage market price
  c Trading stolen goods
  d Trading in certain condition
  e Trading containing cheating aspect
  f trading unclear goods, such as trading fish in the pool
  g trading for goods to dump.

METHOD

Research method

This development research uses descriptive procedural development model. It describes procedural flows to follow in research process to develop a product (Setyosari, 2010:20). One of model that can be used is ADDIE model. Commonly, this model is used to develop a system. This development process has five steps so the product will have a good quality.

Picture 1 ADDIE Model

Development procedure

Procedure in this development follows these stages:

1) Analysis

   What is analyzed is curriculum, teacher and student need assessment.

2) Design

   After doing analysis, the next step is designing a module. The steps undertaken are:

a. Collecting reference material about social Arithmetic and prepare materials to be fabricated in modules.

b. Creating a learning path that is outlined in the chart CD learning.

c. Creating layout of modules on CD media

3) Development

   Module developed is audiovisual media in CD containing social arithmetic material. It is developed using Adobe Flash CS3.

   This stage follows these steps:

a. Making mathematics module based on the learning path, displayed design and content structure (materials) that have produced on stage design.

b. Expert validation. At this stage, instrument that have been created and validated is used to validate the media by media experts and materials experts. This is done by consulting to other lecturers and mathematic teachers who are competent in mathematics and media.

c. Designing and programming use Adobe Flash CS3 and then packaged in the form of a Compact Disc (CD).

4) Implementation

   Media learning modules that have been developed is tested in schools. This testing process is to obtain feedback from teachers and students in developed modules. The implementation process was conducted in order to determine the technical quality and effectiveness of instructional media module media indicated by the results of a post-test to students.

5) Evaluation

   The purpose of this stage is to evaluate developed module based on the result of the result of learning module questionnaire. Based on the result, module characteristic can be found and it is expected to meet appropriateness of learning media.

   Because of limited time, this research is limited to development stage. The result of this research is a good Mathematics Module with Contextual Approach and Islamic Values that has been validated by three teachers in MTs N lab UIN Yogyakarta and the product is already used in learning process.

Subjects and Research Time

The subject of research is mathematics teachers in MTs Lab. UIN Yogyakarta class VII and class VIII. There are 40 students and 3 math teachers who serve as research subjects. The research was conducted in September-November 2013.

Research Instrument

1) Material Assessment Sheet

   This was conceived and developed based on the math media module assessment learning media design. This assessment sheet was used to determine the suitability of the mathematical aspects of media education modules with education aspect. This assessment sheet will be used by 3 material experts.

2) The Ratings Display

   This was conceived and developed based on the media module assessment. This assessment sheet was used to determine the suitability of the mathematical aspects of media education modules with display program aspect. This assessment sheet will be used by 3 media experts.

3) Teacher Needs Questionnaire

   This questionnaire was given and was developed to collect information on media and learning modules that are used in schools. In addition, a questionnaire was used to obtain information of computer facilities in schools. This information is important so that the CD can be used and developed. This questionnaire is used to determine student needs and to know the module that can make the students motivate to learn.

4) Student Needs Questionnaire

Questionnaire was given and developed to explore how mathematics is taught and to know the condition that makes student enjoy in learning and understanding mathematics. This questionnaire is used to determine student needs and to know the module that can make the students motivate to learn.

5) Interview Guide

The interview guide addressed to mathematics teachers for initial analysis in determining aspects for developing mathematics learning media according to teacher. This guide can be used to know school availability as a place to test the module and students' characteristic. The data from the interview can be used as advice in making media.

Data Analysis Techniques

The data obtained in this study will be analyzed through the following steps:

1) Qualitative data obtained from questionnaires and interviews were analyzed qualitatively.
2) The data obtained through the questionnaire for students and teachers in the form of letters transformed into qualitative values with the following steps:
   a. The type of data captured in the form of qualitative data using a Likert scale is then converted into quantitative terms. It can be seen in Table 1:

Table 1. Scale Provisom Rule

Descriptive	Score
SB (very good)	5
B (good)	4
C (enough)	3
K (poor)	2
SK (very poor)	1

   b. After data obtained, the mean score is determined by this formula:

$$\overline{X} = \frac{\sum X}{N}$$

$\overline{X}$ = The mean score

$\sum X$ = Total Score

N = Number of assessors

   c. Change the value of each aspect of the criteria within each component of mathematics media module into qualitative values in accordance with the criteria of ideal assessment categories. It is done with the provisions in Table 2 (Sudijono, 1987: 161):

Table 2. Criteria of Ideal Assessment Categories

No	Qualitative range score (x)	Qualitative category
1	$x > 80$	Very good
2	$70 < x \leq 80$	Good
3	$60 < x \leq 70$	Enough
4	$50 < x \leq 60$	Poor
5	$x \leq 50$	Very poor

   d. Determine the overall value of the media module math by calculating the average score of the whole subject matter. Then converted into qualitative values according to the criteria of an ideal assessment category on Social Arithmetic Topic.

DISCUSSION
Result

Result of this research is a mathematics module with contextual approach and Islamic values using Adobe Flash CS3 as a mathematics learning resource for students in SMP/MTs.

The module provides material of competent standard "using algebra, one linear variable equation and inequalities, comparison in solving a problem" and basic competency "Using the concept of algebra in solving simple social arithmetic problems" using social arithmetic that covers whole and part of value material, trading price, profit, discount, gross, net.,

and percentage application in daily life (saving, cooperation and tax)

CD was developed based on contextual learning and Islamic values. The CD contains operating instructions, introduction, well-known figures, content, and assessment. The presentation of this material was developed based on contextual learning approach and Islamic value. Contextual approach can be identified from the issues presented before the material and Islamic value in issues related to sharia.

This development process used ADDIE model, analysis, design, development, implementation, evaluation. This research was limited into development stage. Those are explained as follows.

1. Analysis

a. Curriculum analysis

This was done by analyzing the competency standard (SK), basic competency (KD), and indicator of mathematics learning as curriculum 2013. Moreover, material analysis was done in this stage. Moreover, at this stage of analysis is also carried the material to be taught. Analysis of materials adapted to the standards of competence and basic competences which have been determined by considering the scope, depth, and the order of presentation. Based on the analysis of the SK, KD, and indicators, the result of competency analysis was obtained as in table 3.

Table 3
The Result of Competency Analysis

Core Competencies 1	Respect and appreciate the teachings of religion
Core Competencies 2	Respect and appreciate the honest behavior, discipline, responsibility, caring (tolerance, mutual assistance), polite, confident, interacting effectively with the social and natural environment in a range of socially and presence.
Core Competencies 3	Understanding knowledge (factual, conceptual, and procedural) based on his curiosity about science, technology, arts, culture and events related visible phenomena
Core Competencies 4	Trying, processing, and presenting in the realm of concrete (using, parse, compose, modify, and create) and the realm of the abstract (writing, reading, counting, drawing, and fabricated) according to what is learned in schools and other sources in the same viewpoint / theory
Competency Standard	Using the algebra, linear equations and inequalities of one variable, and comparison in solving a problem
Basic competency	Using the concept of algebra in solving simple social arithmetic problems
Indicators	- To determining the value per unit price in the process of trading - To determine overall value in the process of trading - To determine the selling price in the process of trading - To determine the buying price in the process of trading - To determine the benefit of trading - To Determine the legality of trading according to Islam by using the concept of profit - To Determine rebates in a business - To determine gross, Tarra, and net - To determine interest in saving - To choose the Islamic or conventional system in saving - To determine the tax - To determine the advantages of cooperative business - To choosing the cooperative model of sharia

Arithmetic social is a material connected with daily activity. In each presentation, the module covers contextual problems and connected with Islamic value, such as legal and illegal trading, sharia and conventional banking system, and explaining why usury is forbidden. After explaining problems, the module provides material designed to make students find concept and formula. It also provides competency test in the end of material containing interactive questions. It makes students know which are wrong answers and the solutions.

b. Teacher need assessment analysis

It is known by giving questionnaire to three mathematics teacher in MTs N Lab UIN. These are the result:
1) Mathematics is a challenging and interesting subject.
2) Arithmetic social is an easy material but it is difficult to teach because it should use mathematics model.
3) The school has computer lab providing 20 computer units so it is possible to use in teaching the subject.
4) Mathematic teaching has not use computer lab.
5) Teachers has not used learning CD in teaching mathematic because they have not developed it.
6) Islamic value can be embedded in math learning process even though teacher still lack in applying it.
7) Students prefer to learn alone and group in variation.

c. Student need assessment analysis

This was done by giving questionnaire to 40 students of MTs N Lab who are in class VII and VIII. These are the result:
1) Mathematics is an interesting subject but it is difficult one.
2) Social arithmetic is a most difficult subject because it should use model. However, it is an interesting subject.
3) Mathematics learning had not used computer lab.
4) Students prefer to learn alone and group in variation

5) Students need learning media to make easy in learning the subject.
6) Students prefer to learn use computer than other model or media.
7) Teacher had not embedded much Islamic value in teaching. They just started by reading holy-Quran.

The conditions illustrate that teachers and students need learning media to make learning process be easy. The media is a module packaged in CD. In addition, the teacher realized that Islamic value is able to be taught in teaching mathematic. So, the researcher would design a learning CD which not only gives an understanding of the concept of social arithmetic, but also promote Islamic economics for students.

2. Design stage

After doing analysis, the next stage is design module. These are the steps:
1) Collecting and preparing materials
After curriculum analysis, the next step is collecting and preparing social arithmetic materials that is appropriate with curriculum and Islamic value.
2) Design development
In this stage, image selection, display and design selection were done. The applications were used in the math module is adobe flash CS3 software.
3) Design making
In this step, design making was done by collecting animations and making design by using Adobe Flash CS3.

3. Development Stage
These are the steps:
1) Pre-module development
This was a temporary module from design step. Before continue to the next step, the module was discussed by lecturer in Math Education program. The result was followed by revision I. after revision, the researcher prepare arithmetic social material and determine contextual problems and Islamic value.
Module developed used contextual approach. Module presentation came

from contextual problems. From the approach, module was constructed to be questions and they made students were able to answer and conclude the questions by themselves.

2) Packaging

Packaging is done to simplify the technical at the time of assessment by a math teacher at MTs Lab UIN Yogyakarta. Packaging is done by making modules to CD or USB Flash disk. Before it is done, the module was shown to the teacher to get suggestions. Here they are:

Table 4
Suggestions List

Advices aspects	Suggestions
Material aspects	Reduce the use of words in English
	Remarks on the introduction button are replaced with a better introduction.
	In the examples of questions with the settlements, the settlements do not like moving the text books to the computer. Completion of the text should be out per line.
	Bibliography, containing the same BSE
	In the Profit and Loss material, there is no short narrative about the definition of gains and losses in daily life. So you can add a short narrative that students more easily understand.
	Mathematical figures on the page menu can be added so that the figure is not just one character alone to give more understanding about mathematical figures.
	Rebates on material, add exercises about the double discount (example: 50% +20%) to develop the concept.
	In the exercise questions in each of the menus material can be given clues to answer.
Display Aspect	The green writing on the intro less aligned with the background, then it could add the outline.
	The arrows on the title page after the intro to get to the home menu can be animated so that the user can find out where to hit.
	When the media was not clicked or touched until the music stops

playing, the music does not repeat. There should be no vacancy, so it is better to set repeat in playlist.

Cartoon video will be better if it is not in loop mode, give replay button. After cartoon video, give operating procedure in using media clearly.

The buttons on the main menu can be animated so that the user knows which buttons to be pressed first.

In each menu page on instructional media in the first page, the back button should not be there. And in the last page, the next button should not be there.

Videos of purchase price, selling price, profit and loss statement don't have source.

3) Product Revision

It is a development of media based on suggestions. These are the suggestions

Table 5. Suggestion list of material aspect and the actions

Suggestions	Actions
Reduce the use of words in English	A few words on the caption button were replaced with Indonesian
Remarks on the introduction button are replaced with a better introduction.	It was replaced by introduction.
In the examples of questions with the settlements, the settlements do not like moving the text books to the computer. Completion of the text should be out per line.	In the examples of problems were corrected to make it better as suggestion
Bibliography, containing the same BSE	On page bibliography, included different BSE
In the Profit and Loss material, there is no short narrative about the definition of gains and losses in daily life. So you can add a short narrative that students more easily understand.	Profit and Loss on the material were given the short narrative about the profit and loss in daily life.
Mathematical figures on the page menu can be	It was added mathematical

Suggestions	Actions
added so that the figure is not just one character alone to give more understanding about mathematical figures.	figures on the page menu
Rebates on material, add exercises about the double discount (example: 50% +20%) to develop the concept.	It was added exercises with a double discount (example: 50% +20%)
In the exercise questions in each of the menus material can be given clues to answer.	It was added the instructions to answer the questions in the menu-section exercises in the material section.

The results became quantitative data and then they were converted to be data of quality aspects of learning media based on contextual approach and Islamic value.

Table 6. Suggestion list of display aspect and the actions

Suggestions	Actions
The green writing on the intro less aligned with the background, then it could add the outline.	The color green writing on the intro was given an outline.
The arrows on the title page after the intro to get to the home menu can be animated so that the user can find out where to hit.	The arrows can be animated swell-shrink.
When the media was not clicked or touched until the music stops playing, the music does not repeat. There should be no vacancy, so it is better to set repeat in playlist.	The music player was set into play-back type.
Cartoon video will be better if it is not in loop mode, give replay button. After cartoon video, give operating procedure in using media clearly.	Cartoon video was given a replay button and clear direction after the video.
The buttons on the main menu can be animated so that the user knows which buttons to be pressed first.	The buttons on the main menu can be animated swell-shrink.
In each menu page on instructional media in the	In each menu page on instructional

Suggestions	Actions
first page, the back button should not be there. And in the last page, the next button should not be there.	media on the first page, the back button was removed. And next button on the last page was removed.
Videos of purchase price, selling price, profit and loss statement don't have source.	They were given sources.

4. Evaluation Stage

At this stage, the researcher assessed the module. Assessment covered display and material aspects. Display aspects covered coloring, layout, and presentation. The material aspect covered suitability to the basic competencies and indicators, linguistic, material order, Islamic value, contextual problems, and challenging material and motivation. The module was assessed by three mathematics teachers. These are the result.

1) Learning CD assessment result on material aspect.

Table 7. Learning CD assessment result on material aspect

No	Indicators	Assessors		
		1	2	3
1	The material covers appropriate concept and accordance with competency standard and basic competency	5	5	5
2	The material is described clearly	5	4	5
3	The material is arranged in the detailed display	5	3	4
4	The mathematics module contained development of mathematical concepts	4	4	5
5	Questions made were in accordance with the content material of math module	5	4	4
6	Using appropriate Indonesian (EYD)	4	4	5
7	Using communicative language	4	4	5
8	Using language that is easily understood	4	4	5

No	Indicators	Assessors		
		1	**2**	**3**
9	Using standard language	4	4	5
10	Using language which is appropriate with learners intellectual development	4	4	4
11	Math module can motivate learners	5	3	5
12	Math module contains the elements of entertainment	4	4	4
13	Module math help activeness (engagement) of learners	4	4	4
14	Module encourage enjoyment in learning mathematics	5	5	4
15	Math module contains contextual issues	4	4	5
16	Math module contains useful problems for student in future daily life	4	3	5
17	Math module contains the Islamic value, especially trading and usury	4	4	4
18	Mathematics modules embed honest character in trading	4	3	4
19	Math module contains verses of holy Quran which is appropriate with math material	4	5	4
20	Math module makes effectiveness in learning	5	4	5
	Total	87	79	91
	Average score	85,67		
	Score	85,67		
	Category	Very good		

Based on the assessment of three teachers on the material aspects, it was obtained an average score of 85.67 or Very Good.

2) Learning CD assessment result on display aspect.

Table 8. Learning CD assessment result on display aspect

No	Indicators	Assessors		
		1	**2**	**3**
1	Layout is according to the screen display module	4	4	4
2	The combination of	5	4	4

No	Indicators	Assessors		
		1	**2**	**3**
	color with the eyes doesn't make tiring			
3	Clearly legible screen font	4	3	5
4	Module is interactive	4	3	5
5	Math module provide clear instructions	4	3	5
6	Modules made can be used easily	4	4	5
7	Display math module doesn't make boring	4	4	4
8	Menus and buttons work properly	5	4	4
9	The commands in the module is simple and easy to operate	5	4	5
10	Images or illustrations presented in an interesting way and easy to understand	4	4	5
	Total	43	37	48
	Average score	42		
	Score	84		
	Category	Very good		

Based on the assessment of three teachers on the display aspects, it was obtained an average score of 84 or Very Good.

Based on the criteria, then a mathematics module with contextual approach and Islamic values is qualified to use as a source of learning.

Discussion

Based on the description of research, the media development used ADDIE model. Because of limited time, the implementation stage was not executed.

In the analysis stage, the research analyses the curriculum, student need assessment analysis, teacher need assessment analysis. Curriculum analysis was more about the discussion of competencies standards and basic competencies, questionnaire for teachers and students to know the response of media used before. From teacher questionnaire, it was known that learning media used in

school was limited, especially media discussing contextual problem and Islamic values. The result of curriculum analysis showed that educative learning media that can motivate student in social arithmetic was needed to support learning process. And from teacher and student questionnaire, it was known that teacher still had a problem in teaching and motivating student because of lack interesting media.

In design and development stages, learning media and assessment instruments were made. Learning media development was started by collecting material, such as learning sources and illustrations about social arithmetic. The next step was material preparation by need assessment map making, title and sub-title making, and problems related with social arithmetic. Some of sub-material was explained by giving simple illustration connected with daily activity. It used contextual approach and Islamic value. It also used entertainment media, illustrations, music, games, and others. The next step was design preparation. The design was a display in mathematic learning media. Because the media was made using Adobe Flash CS3, the first step was design preparation and what will be displayed. The result provided these parts: opening video, intro, home display (main button and additional buttons, exit button, sound button). The main button provides an operational instruction, preface, math figures, material, and competency test buttons. The additional button provides bibliography, games, profile of media developer buttons. Exit button brings to colleagues page and the media will close by itself. The design was made by researcher concept based on good media criteria.

Based on the researcher analysis, these are the excess and lacks of the product:

a. The excess of the learning media are providing the education games, interesting display, and social arithmetic illustrations about sharia trading and saving.

b. The lacks of the products are exercise questions and competency test questions are not in random, the video illustrations are taken from others and are not made by the researcher.

The mathematics module with contextual approach and Islamic values was qualified because the assessment was in very good category, both in material and display aspects.

CLOSING

Conclusion

Mathematics module with contextual approach and Islamic values was developed using Adobe Flash CS3. It provides preface, mathematic figures to motivate students, detail of material, and competency test. Every material was started by contextual problem and Islamic value. The module which was packaged in CD was developed using analysis, design, development, and evaluation stages.

The product was assessed and got qualification with very good category in display and material aspects. It means that product is qualified to use in social arithmetic learning process.

Suggestions

The research is a mathematics media development research using computer to operate because the product is software to install in computer. These are the suggestions:

a. It needs to examine in schools to get varied result so the utilization of media will achieve the expected purpose, i.e. facilitating students to get better understanding.

b. It should be used in math learning process.

A mathematics module with contextual approach and Islamic values using Adobe Flash CS3 as a mathematics learning resource for students in SMP/MTs can be used, developed, and refined better. It can be used for the next research. It can be used as a learning source in addition to printed book to make teacher be creative and students be active in learning process.

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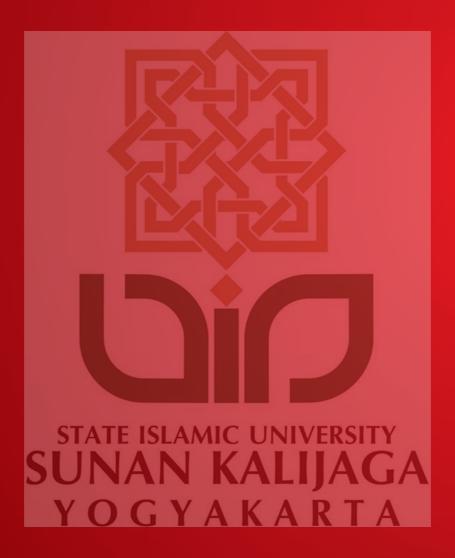
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