DESIGN OF A MULTIMEDIA LEARNING SOFTWARE 
FOR FUNCTIONAL LITERACY

Putu Ashintya Widhiartha*, Yuni Ekawati†, Im Sodiawati†
Information and Communication Technology Study Group
Out of School Education and Youth Development Center (BPPLSP) Region IV
Jalan Gembang Putih 10 Sukolilo-Surabaya 60117
Eastern Java, Indonesia
[widhiartha,yuni_eka,imso@yahoo.com]

ABSTRACT

Recently, Multimedia has of late taken the world by storm, both in education and entertainment. Through multimedia, education and entertainment can be combined to create an enjoyable type of education, called edutainment.

One of Indonesian non-formal education aspect is literacy program. The new model of literacy program, named Functional Literacy (Keaksaraan Fungsional/KF) based on a participatory action learning approach is a major change from the book-based, centrally-managed Package “A” program which was previously used. The Functional Literacy is focused in the problem how the student will gain benefit from their reading, writing, and math skills.

In this paper, we propose a three dimension (3D) simulation software which can be used as a computer based learning (CBL) media for KF students in order to maintain their reading skill and introducing information technology simultaneously.

Keywords: multimedia learning, computer-based learning, literacy, non-formal education

1. INTRODUCTION

The growing role of information and knowledge has led to a new rationale for the function of information and communication technologies (ICTs) in diverse societies. Before, ICTs were considered only for the wealthy and well-educated people. In fact, in the past few years ICTs have developed to become a tool for progressive social change, the strengthening of human intellectual capacity, and most importantly become a tool that help individuals expand their consciousness and capacity for empowering themselves.

The use of ICT ideally should increase access to a greater variety information and lead to possible ways to improve the quality of life. If people know how to use ICT, they can tap into information and services that will help empower them to initiate development activities in their communities [1].

Multimedia learning as part of ICTs provides the potential for students to learn on their own, at their own pace and in their own sequence. Teacher or tutor can present material in a multiplicity of ways with a number of alternative accounts or views of the material, and the students can choose the format and account that they like best. They can take control of their own learning, and can view the materials supplied as personal learning resources.

Storing explanations and other educational aids on digital media permits students to repeat a teaching sequence if they so choose. Tutor may be able to show students things that are difficult to illustrate in text, such as the sequence of boarding into airplane, and multiple perspectives of three dimensional objects. We can provide experiments or what-if scenarios, such as simulated visiting into museum or library for learning by ‘experience’. All this, when backed up by an experienced instructor who focuses on the specific learning problems of the student, can make multimedia a very effective educational resource [2].

On the other hand the Dakar Convention refers to “the attainment of a 50 percent increase in adult literacy, particularly in women, by the year 2015”. Since Indonesia’s literacy rate had reached about 89.51 percent in 2002, the target had been modified to become “the attainment of a 50 percent decrease in adult illiteracy aged 15 and above by in 2015”. 
That means the target in 2015 was 5.0 percent illiteracy rate. However, the new Government insists this country to fasten the decrease of adult illiteracy rate from 10.12 percent in 2003 to become 5.0 percent in 2009. The Government believes that literacy plays an essential role in improving the lives of individuals by enabling economic security and good health and enriches societies by building human capital, fostering cultural identity and tolerance, and promoting civic participation.

Increasing adult literacy rate is a way to increase the quality of Indonesia’s human resources which internationally can be measured by human development index (HDI). Even though HDI of Indonesia had increased from 0.619 in 1990 to 0.692 in 2002, it is still lower compared to what other neighboring counties had achieved. By increasing adult literacy rate to become 95 percent in 2009, Indonesia’s HDI will increase significantly. In 2002 Indonesia’s adult literacy rate was remained at with 87.9 percent which was lower compared to what had been achieved by Thailand, Malaysia, Philippine, and Vietnam can be seen in figure1.

The new literacy program named Functional Literacy (Keaksaraan Fungsional/KF) was designed to cover Indonesian need for both a literacy and post-literacy program. Current educational statistics indicate that there are still approximately 6.9 million illiterates between the ages of ten and forty-four. In addition, there are many citizens with minimal education who do not have the functional literacy competencies they need for solving problems in daily life. Approximately 75% of the learners in current learning groups fall into this category. The other 25% are pure illiterates.

The authors are from an educational institution which has responsibilities to develop learning tools for nonformal education in Indonesia. Our motivations are to provide a computer-based learning (CBL) tool for maintaining the skill of KF students and at the same time introduce multimedia learning (ICTs) for them.

2. OVERVIEW OF FUNCTIONAL LITERACY

As mentioned above, Functional Literacy is different from the conventional literacy program. Functional Literacy is based on a participatory action learning approach and the program also gives focus to how students can apply their reading, writing, and math skill in daily life.

The new functional literacy programs developed through a bottom-up strategy based on the following principles [4]:

a. Local Context. The definition of “functional” depends on what kind of reading and writing skills
are commonly needed in the learners’ community. People living in cities and working in factories and offices clearly need an information and literacy skills than people living in remote villages. Therefore, each group needs their own definition of functional literacy.

b. Local Design. Each learning group makes it own learning plan based on the learners’ needs and interests. The tutors receive training on how to assess the learners’ literacy skills, knowledge, needs and interests; how to design their own learning activities and curriculum; how to make their own learning materials; and how to network with local organization in order to find learning materials and resources;

c. Participatory Processes. The learners are involved in all aspects of the learning group. They develop their functional capabilities by making decisions and plans for their own learning activities. They also participate in finding and making their own learning materials.

d. Action Outcomes. Results are measured in term of the learners’ ability to use their reading, writing and math skills for practical purposes in daily life, for learning by doing, is the focus of every reading, writing and math activity from the very beginning of the program

In order to meet the needs of multilevel groups, the functional literacy programme distinguishes three levels of literacy development: Basic Skills (Pemberantasan), Guided Learning (Pembinaan), and Self-Learning (Pelestarian). Basic Skills activities focus on the needs of those individuals who do not have basic reading, writing and math skills. Guided Learning activities provide an opportunity for learners to develop functional competencies for using their literacy skills in daily life. Self-Learning activities focus on helping learners develop the capacity to meet their own learning needs through finding their own reading materials, joining community development programmes, planning their own income generating activities, and so forth [4].

This software is targeting for the KF students at the Pelestarian level. Since they have higher abilities and capabilities to read and study.

3. DESIGN OF THE SOFTWARE

In order to make this software a useful media for KF students, the authors composed several principles which had been used as guidance for the requirement analysis and design of the software.

a. The software must be lowcost

Commonly KF students come from poor family. They will not be able to spend their money for buying a new generation of computer. Therefore the software is designed to be used in a Pentium II Processor computer with low resources. The authors expect that the software will be used in the Community Learning Center (Pusat Kegiatan Belajar Masyarakat/ PKBM). PKBM usually organizes and runs nonformal education at the district level and many PKBMs own personal computers now.

b. The topics must be suitable

There is a tendency for some researcher and academics to adopt the attitude: "Multimedia is great! I’m going to convert my lectures to the computer and see how much better my teaching will be.” This has led to a plethora of low quality courseware. The key question to ask before starting any project is: "Can this be done in a book?" If a CBL program consists of a linear sequence of screens containing words and pictures, then it can probably be better done in print. Books are cheaper and more familiar to the user. Educationally powerful CBL needs to move away from the passive, book-like or lecture-like format which characterizes much of the present offerings[5].

The power of CBL is in its interactivity where students can construct their own knowledge by active participation. The media must be able to encourage the student to visualize information via simulations and animations, rather than just to read it. However, it is very difficult to throw off the ingrained habits of many years of preparing linear educational material [5].

Therefore, authors selected the sequence of bill payment at the bank, a simple daily life topic, which will give the students opportunity to practice their functional skill by using this interactive software.

The environment simulation will put the user in the situation like she just enters a bank for paying her monthly bill. The officer will ask what kind of bill she wants to pay and then give the direction for her. The software then will generate a form, similar to a bank form, and she must fill the form before
she can continue to the next step.

c. The information flow is hierarchical
It seems that interactive multimedia is particularly applicable to the following two general areas.

Knowledge Base Information Flow
In many fields, the student has to learn many different factual pieces of information, which may need to be put in the context of other similar pieces of information. This area is well suited to interactive multimedia learning because the information exists in chunks, and students can construct their own knowledge by making their own links between facts. We then have a multidimensional knowledge base, through which the student navigates (Figure 2). However, some topics are simply not suitable for this approach.

The danger of this sort of approach is that the student may become lost in hyperspace, and unable to put any structure on the information available. The design of appropriate navigation strategies is the focus of much current research.

Figure 2 Knowledge Base Flow

Hierarchical Flow
The second option is a hierarchical structure leading to short linear sequences of information (Figure 3). Considering the educational level and the characteristic of the KF students we select this form of information flow which is simpler and we believe has a higher level of interactivity.

Figure 3 Hierarchical Information Flow

d. The software must be joyful for learning
As mentioned above, our expectation is also including how to introduce ICTs to KF students. Introducing ICT’s to the people with the characteristics like the KF students is extremely challenging. The facts that they are not well-educated and come from poor families, which spend their daily life to fulfil their basic needs rather than studying have explained how difficult this goal will be accomplished.

Therefore, this software must be easy to use and joyful but still useful for encouraging people to study about ICT’s in advance.

Our efforts include using funny characters, bright and various colours, and attractive sound which will help this software to fulfil our expectations.

e. The scenario and code must be easy to change and maintain
Creating scenario and coding for interactive multimedia package is different from traditional programming because it is much harder to design a complete system on paper before programming it. Interactive multimedia is a new medium, and no consensus has yet been reached on what the form of this medium is and how one interacts with it. It is more complex than traditional media because it involves a number of mediatypes [5].

It is also harder to come to terms with educationally. One has more options than just to move linearly through the information and the communication is visual and aural, as well as written. Considering KF Students, we found that
content experts had difficulty in making the transition from the traditional, linear form of presenting information to which they were accustomed.

As designer and programmer we found it difficult to present information in different ways, and when we did, it was hard to keep track of the complex interlinking of information. Learning by experience, we altered the structure to make it more educationally effective. The graphical design elements of a project also led to change. While there are some well-known techniques, a powerful graphic design will be different for each set of content, and for each way it is structured. Thanks to some 3D software such as Swift, it gives many helps when we have to deal with 3D environment.

Few user interface designs work on their first try. It is necessary to revise the design, to let the work as a whole communicate with the user. Given these arguments, it is almost axiomatic that interactive multimedia projects will change as they are being developed, and they will go through several incarnations. It is therefore important design for anticipating change. One aspect of this is to do as much designing on paper as possible, and as our experience increases, this is becoming easier and easier. The second important aspect here is to produce code which is easy to revise and maintain.

4. CONCLUSION AND FUTURE WORK

At this moment, we are still working on the programming phase, simultaneously now we are creating and rendering the simulation environment (Figure 4).

We are also designing the characters for the software and working for finishing the user interfaces (Figure 5).

REFERENCES

[1] “Information and Communication Technologies (ICTs) for Community Empowerment through Non Formal Education”, UNESCO, Bangkok, 2005