The Development of Open Educational Resources at Universitas Terbuka, Indonesia

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ABSTRACT

Universitas Terbuka (UT) is a higher education institution in Indonesia that implements open and distance education system. This system is conducted by utilizing technology and a variety of learning materials, including Open Educational Resources (OER). For many years, UT has developed 274 OER materials, named UT Open Courseware. One of the materials developed is operations research course, a course that is classified as difficult course. This paper describes the development of UT Open Courseware for operations research and the results of the program have been developed. However, there are some improvements needed to the material, including adding video, audio, and photos.

Key words: open and distance education, open educational resources, UT OpenCourseWare, operations research.

Introduction

For many years, universities worldwide have been investing substantial resources in the production and release of open educational resources (OER). OER become one of the important focuses in the field of education. Increased use of information and communication technologies encourages the widespread use of OER in education, especially in higher education. The knowledge and network society of the twenty-first century is driven by the power of the Internet and digital tools (Caswell, et al., 2008). One of its manifestations is a new approach to the production of teaching and learning materials, enabled by technological developments and participatory media. In addition to the development of the use of information technology, the use of OER is also driven by a view to widen access knowledge without being limited by space and time. It also aims to broaden access to education for every person in need.

Universitas Terbuka (UT) is the only higher education institution in Indonesia that implements a distance and open learning system. This system means there is separation between teachers and students geographically so that the learning process should be carried out independently by the student. To support the implementation of the system, UT developing OER materials that can be accessed by anyone, including students, anytime, and anywhere. OER material developed by the UT can be learned by anyone with access to the website www.ut.ac.id with the name of UT OpenCourseWare.

Until 2013, UT has developed UT OpenCourseWare materials as much as 274 materials (www.ut.ac.id). Distribution of UT OpenCourseWare developed for each faculty at UT as shown in figure 1.
One of the OER material developed by the UT is material for operations research course. As its name implies, operations research involves “research and operation”. Thus, operations research is applied to problems that concern how to conduct and coordinate the operations (i.e. the activities) within an organization (Hillier and Lieberman, 2005). Operations Research is a subject that is classified as difficult subject because all of the materials in the course are quantitative approach and students are required to have the competence to solve problems based on existing theories. The students’ final score of this subject as shown in Figure 2.

As we can see in Figure 2, the most students’ score are in “D”. That’s why we have to help students to provide learning support for this course and UT has developed UT open courseware for operations research subject on the topic of Probability. The aim of this paper is to explain the development of OER at UT with the focus on operations research course.
Open Educational Resources (OER)
UNESCO (2002) defines OER as: technology-enabled, open provision of educational resources for consultation, use and adaptation by a community of users for non-commercial purposes. They are typically made freely available over the Web or the Internet. Their principal use is by teachers and educational institutions support course development, but they can also be used directly by students. Open Educational Resources include learning objects such as lecture material, references and readings, simulations, experiments and demonstrations, as well as syllabi, curricula and teachers’ guides. In addition of OER definition by UNESCO, we believe that everyone or social groups may have their own definition. Another definition of OER was given by Bissel (2009): OER is teaching, learning, and research resources that are in the public domain or have been released under an intellectual-property license that permits their free use or customization by others. Bissell (2009) also stated that OER is digitized materials offered freely and openly for educators, students, and self-learners to use and reuse for teaching, learning and research. They include learning content, software tools to develop, use and distribute content, and implementation resources (such as the open licenses themselves). OER represents the combined international efforts to help equalize access to knowledge and educational opportunities throughout the world (Bissell, 2009).

The use of OER can’t be separated by the use of internet and technology. Access to OER has its own benefits and barriers. Some benefits of OER are as follows. Initially, they can extend access of learning for everyone, including nontraditional groups of students and those from disadvantaged backgrounds, resulting in the widening of participation in higher education. OER can be an efficient way of promoting lifelong learning, bridging the differences between informal and formal learning. Additionally, they can be an asset for expanding education in developing countries. In short, they offer a dramatically new approach to the sharing of knowledge which can lead to economic success of individuals, communities, companies, and, ultimately, entire countries (McDowell, 2010). Kanwar et al (2010) also highlighted typically cited advantages of OER particularly for educational systems in developing countries. These included (1) helping developing countries save course content development time and money, (2) facilitating the sharing of knowledge, (3) addressing the digital divided by providing capacity-building resources for educators, (4) helping to preserve and disseminate indigenous knowledge, and (5) improving educational quality at all levels.

One of the barriers to significant expansion of OER is the possible loss of intelligence property rights and copyrights. To ease the concern of maintaining copyrights to the material posted on the web, institutions and individuals have turned to Creative Commons and the Open Courseware Consortium (McDowell, 2010). OER can be a valuable resource to students and instructors for many reasons. From the student’s perspective, OER had the following advantages: (1) free materials; (2) continuous access to resources; (3) the ability to pursue a topic thoroughly; (4) the ability to learn for personal knowledge or enjoyment; and (5) easy access to materials (Arendt and Shelton, 2009). According to D’Antoni (2009), there are also several barriers in using OER: (1) technical, such as lack of broadband access; (2) economic, such as inadequate resources to invest in the necessary software and hardware; (3) social, such as a lack of the skills needed to use technology; 4) policy-oriented, such as the lack of academic recognition of the development of OER by teaching staff; and (5) legal, such as the time and expense associated with gaining permission to use third part owned copyrighted materials or its removal from material.
Many universities around the world have been using the internet and other digital technologies to develop and distribute teaching and learning materials. As with any other technology-related initiatives in education, OER is driven by technical, economic, social, policy and legal factors. Some of these factors provide either a favorable environment or a particular handle for bringing about changes and others may hinder a broader uptake of OER initiatives. Recently, OER have gained increased attention for their potential and promise to obviate demographic, economic, and geographic educational boundaries and to promote lifelong learning and personalized learning. From a practical-applied perspective, OER provide teachers and students with: (1) access to global content that can be adapted and localized by teachers and faculties anywhere, anytime to create new courses, modules, or lessons or enhance existing content; (2) more resources and choices for students to supplement their studies with value-added content; and (3) opportunities to create student and faculty learning communities that can bridge cultural, gender, and ethnic differences to promote social inclusion in classrooms, in communities, and in the world (Butcher, 2011).

The Development Of UT OpenCourseWare
UT OpenCourseWare were developed by a team consisting of two groups, the group who responsible for the development of content and the group who responsible for the development of the media. The program was developed and designed to be studied independently by students or anyone in need. Basically, the development of UT Open Courseware program requires cooperation between faculty members and the multimedia center members. UT Open Courseware program development process is shown in Figure 3.

Explanation of development process of UT Open Courseware
Step 1 : Study Program in faculty identifies the courses that will be developed as UT OpenCourseWare. This determination is tailored to the needs of the curriculum materials and printed instructional materials (modules) that are being developed. It needs 1-2 weeks

Step 2 : Screenwriter writes media program outline and manuscript. The screenwriter has 4-5 weeks to finish the manuscript.

Step 3 : Content expert reviews the outline and manuscript material that has been written by the writers. If there are any revisions, the manuscript will be returned to the script writers to be revised (1-2 weeks).

Step 4 : Once reviewer approves the manuscript and the outline, the next step is the review by media expert. This step is intended to adjust the content and the media needed for the content. If there are any revisions from media expert, the manuscript will be returned to the screenwriter to be revised (1-2 weeks).

Step 5 : After media expert approves the manuscript and the outline, the next step is sending the manuscript and the outline to the director and programmer to be developed as a full multimedia program. This step requires time for 2 months.

Step 6 : The screenwriter evaluates the program that has been developed (1 day).

Step 7 : After the evaluation phase, the program that has been approved by the screenwriter will be uploaded to the website.

Based on the steps of developing process of UT OpenCourseWare, the whole process requires time of 3-4 months. All parties to develop the program are from UT with the total cost of development is IDR Rp4,550,000 or US $398.
To develop this program, there are several obstacles faced by developers, such as by the screenwriter. Screenwriters are lecturers who have expertise in a particular knowledge. At the time of writing the script, lecturers not only have to write a script that should be scientifically correct, but also have to set the display on the screen. So in this case the lecturer has a dual...
role, as a screenwriter as well as lay outer. It is difficult for the majority of lecturers because the lecturers didn’t have educational background as lay outer.

Based on the general development of UT OpenCourseWare, the development of operations research material was also following the general process. The topic probability was chosen with consisting of these parts: (1) Instructional objectives; (2) the material, consisting of Definition of Probability, Probability Calculation, Probability Distribution, Binomial Distribution, Distribution and Poison; and (3) Exercise.

The initial view of Operations Research program as in Figure 4.

![Figure 4. Initial View of UT Open Courseware of Operations Research](image)

When students study this program, they can choose the desired menu, e.g. they study the material first or even directly work on exercise. The program is designed to be studied independently so there is no restriction of time or material sequences to be learned by student. Similarly, students can repeat the material they have learned before proceeding to the next material. However, the development of the program still needs to be improved in various ways, including in terms of content and in terms of appearance. Display becomes important in this program because by studying the program, students can have facilities were not obtained from printed material such as audio and video.

Based on the survey to a few students, there are some improvements needed to the program. Narrative audio needs to be added in the program, so when students learn from the program, they feel like they are led by a lecturer. Because operations research is a quantitative subject, the students also need guidance step by step how to solve a problem with a video of lecturer explain the topic. In terms of illustration, they also need video or photos of examples in real world related to the topic. In general, they also stated that the program is good enough in terms of color, text, and pictures.

### Conclusion

UT as the only higher education institution in Indonesia that implements open and distance education always give priority to the development of qualified learning materials, including UT Open Courseware. UT Open Courseware is supporting learning materials that are designed as self-learning materials online. One of UT Open Courseware that has developed is Operations Research course. Operations research is classified as difficult course, that’s why UT has to develop many kind of learning materials. Based on the general development of UT
Open Courseware, the development of operations research was also following the general process. The topic probability was chosen with consisting of these parts: (1) Instructional objectives; (2) the material, consisting of Definition of Probability, Probability Calculation, Probability Distribution, Binomial Distribution, Distribution and Poison; and (3) Exercise. However, the development of the program still needs to be improved in terms of adding audio, video, and photos. Display becomes important in this program because by studying the program, students can have facilities were not obtained from printed material such as audio and video.

REFERENCES


