

OPERATING SYSTEM DEVELOPMENT BASED ON OPEN SOURCE SOFTWARE IN OLINE LEARNING SYSTEM-A REVIEW

G.TAMILSELVAN

ASSISTANT PROFESSOR-DEPARTMENT OF COMPUTER APPLICATION
CHRIST COLLEGE OF ARTS AND SCIENCE-KILACHERY

tamilselvan12345@gmail.com

CONTACT-944449498

ABSTRACT

During the Corona pandemic, all learning activities were carried out online. Many learning media and software are used in online learning. One of them is the Open Source Operating System which is currently widely used in online learning systems. This makes the operating system much attention by the world and india education, researchers, government organizations, individuals, even large software companies such as Google, Microsoft, hp, others who are very interested in developing Open Source software, especially the Linux Operating System. Linux operating sytem is very secure to use This makes the authors interested in knowing how to develop an operating system based on open source software in online learning systems and disseminate the use of open source software to the public.

Keywords: *Open Source, Linux Operating System, Covid-19 pandemic,*

INTRODUCTION

The operating system at this time continue b erkembang by leaps and bounds . K hususnya the Linux operating system is open source that is widely used by companies and education. However, there are still many people who hesitate to use the Linux operating system, and still choose to stick to Microsoft (Windows) because they are more familiar with the OS . P adahal they are not aware if they're using the OS is pirated. They are reluctant to use Linux because the Linux application installation process must be connected to an internet connection . By using pirated software, of course it is very contrary to the campaign for HAKI (Intellectual Property Rights) Law No. 19 of 2002 oncopyright, SE Bareskrim Polri No.B / 2/08 / XI / 2008 will be subject to a 5 year prison sentence or a fine of 500 million if using pirated software and the statement of the MUI fatwa No.1 / Munas VII / MUI / 15/2005, explaining that piracy is haram[1].

It is therefore necessary legal operating system and application installation without having to connect the connection i nternet. P device may open source software does not simply replace the software licenses are expensive but also legal . This software is also very helpful for users to innovate program codes , so that they can be developed into various applications according to user needs . Currently, a number of activists and enthusiasts of open source gathered in the Free / Open Source Software (FOSS) Conference and Training Camp Asia Source II and produced 6 ready-to-use solutions that can be used by the public for free. The six solutions include solutions for small and medium enterprises (SMEs), non-governmental organizations (NGOs), security systems, audio video processing,

open publishing for public journalism, and campuses for managing training [2]. In December 2006, a desktop application based on the open source "IGOS Nusantara 2006" was launched . IGOS Nusantara 2006 is a Linux Fedora Core 5 derivative software equipped with open office office applications, GIMP graphics management

OSS software is currently also often used in the world of education for online learning in the era of the Covid-19 pandemic. Online learning is carried out using a computer device or Gadg et. So, communication or the learning process can still run between students and lecturers or students and teachers. The use of information technology is expected to be able to overcome the teaching and learning process so that it can continue to run well even though it is currently in the middle of the Corona Covid- 19 Virus pandemic . As a result of this online learning, internet users in Indonesia increased by around 17 percent or 25 million users . And today there beber what information technology can be used as a learning medium d iantaranya with menggunakane-learning. E-learning is an innovation that can be utilized in the pro ses learning, not only in penyam toachieving pembelajaran material but also a change in the ability of the various competencies dime ta learners. Through e-learning, learners are not only men listen to a description of material from the pen of students but also actively observe, perform, demonstrate, and so on. Teaching materials can be virtualized in various forms so that they are more interesting and more dynamic so that they can motivate students to be further in the learning process. Based on the above explanation, the authors aimed to determine (1) c ara operating system development based on open source software in the online learning system and (2) to disseminate the use of open source software to the community[4].

WHAT IS AN OPEN-SOURCE OPERATING SYSTEM?

The term "**open source**" refers to computer software or applications where the owners or copyright holders enable the users or third parties to use, see, and edit the product's source code. The source code of an open-source OS is publicly visible and editable. The usually operating systems such as Apple's iOS, Microsoft's Windows, and Apple's Mac OS are closed operating systems. Open-Source Software is licensed in such a way that it is permissible to produce as many copies as you want and to use them wherever you like. It generally uses fewer resources than its commercial counterpart because it lacks any code for licensing, promoting other products, authentication, attaching advertisements, etc.

The open-source operating system allows the use of code that is freely distributed and available to anyone and for commercial purposes. Being an open-source application or program, the program source code of an open-source OS is available. The user may modify or change those codes and develop new applications according to the user requirement. Some basic examples of the open-source operating systems are **Linux, Open Solaris, Free RTOS, Open BDS, Free BSD, Minix**, etc.

In **1997**, the first Open-Source software was released. Despite the industry, there are now Open-Source alternatives for every Software program. Thanks to technological developments and innovations, many Open-Source Operating Systems have been developed since the dawn of the **21st** century.

HOW DOES OPEN-SOURCE OPERATING SYSTEM WORK

It works similarly to a closed operating system, except that the user may modify the source code of the program or application. There may be a difference in function even if there is no difference in performance.

For instance, the information is packed and stored in a proprietary (closed) operating system. In open-source, the same thing happens. However, because the source code is visible to you, you may better understand the process and change how data is processed.

While the former operating system is secure and hassle-free, and the latter requires some technical knowledge, you may customize these and increase performance. There is no specific way or framework for working on the open-source OS, but it may be customized on the user requirements.

ADVANTAGES

1. RELIABLE AND EFFICIENT

The open-source operating systems are most reliable and efficient. Thousands of eyes monitor these because the source code is public. As a result, if there are any bugs or errors, they are fixed by the best developers worldwide.

2. COST-EFFICIENT

Most of the open-source operating systems are free. And some of them are far less expensive than commercially closed products.

3. FLEXIBILITY

The great advantage is you may customize it as per your requirement. And there is creative freedom.

DISADVANTAGES

1. COMPLICATED

It is not as user-friendly as the ones that are closed. To use this software, you must have a basic understanding of technology.

2, SECURITY RISK

Despite the defects having been detected, there is a risk of assaults because the attackers have access to the source code.

3. NO SUPPORT

If you run across an issue, there is no customer support available to assist you.

WIDELY USED OPEN-SOURCE SOFTWARE

Open-source software projects are built and maintained by a network of programmers, who may often be volunteers, and are widely used in free as well as commercial products.^[38] Prime examples of open-source products are the Apache HTTP Server, the e-commerce platform osCommerce, internet browsers Mozilla Firefox and Chromium (the project where the vast majority of development of the freeware Google Chrome is done) and the full office suite LibreOffice. One of the most successful open-source products is the Linux operating system, an open-source Unix-like operating system, and its derivative Android, an operating system for mobile devices.^{[85][86]} In some industries, open-source software is common. Several widely-used Python libraries are free and open-source software. These include TensorFlow, PyTorch, scikit-learn, NLTK, OpenCV.

Practical uses.

Because open-source software generally allows for technology to be more affordable, digital solutions become accessible even in unanticipated fields such as precision agriculture

IMPLICATION S FOR EDUCATION

Successful open source software for education will need to share these characteristics; it should consist of well-designed, highly functional packages that can serve diverse needs. Small applications that are easily replicated such as a simple function grapher will not take off. Highly specialized software, even if well designed and highly functional, will fail as open source because of the limited audience willing to provide support.

There is already one example of an open source educational application that fits this profile. It fills a huge need, provides substantial functionality, and is well designed.

OpenACS—an online course platform—started at MIT, morphed into a product called Ars Digita that attracted considerable funding in the late 1990's, went bust, and reemerged as open source called dotLRN. OpenACS is a sub-set of dotLRN that is used by growing group of universities worldwide and supported by a community of companies.⁸ OpenACS solves a problem faced by almost every university worldwide and many other institutions, namely what technology to use for online courses. We started offering online courses a decade ago, first using Web pages, then waiting for a university based package that never was completed, then using Learning Space, which was later discontinued by IBM, and finally shifting to Blackboard. Every one of these platforms, and many others that we have investigated, has limitations that restrict the educational

value of the materials delivered to students. Only when we shifted to OpenACS were we able to access the source code and make the upgrades that we needed. In so doing,

we were doing just what is needed to help create a viable open source community: contributing new functionality that anyone can use, not because we felt generous, but because making these improvements were in our own self-interest.

RESEARCH METHODS

In this study, it was carried out through a two-stage approach, namely the observation approach and literature study. This is done for data collection, in order to complete the study, while the research methods used in

OBSERVATION METHODS

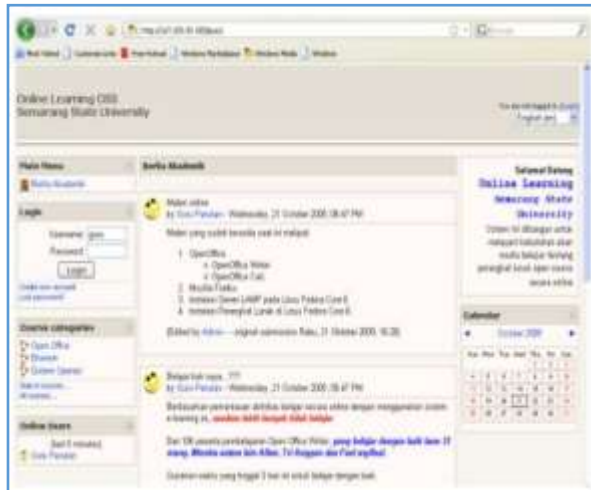
The author studies the problems that exist in the field that are closely related to the object under study, namely the use of information technology in online learning through questionnaires to obtain data so that it can be processed in the discussion of this study.

LITERATURE STUDY METHODS

In this case the researcher gets data sources from various sources by collecting supporting references through books, journals, magazines and other sources that support research, this method is used in collecting related data.

RESULT AND ANALYSIS

The open source software online learning system was developed using Moodle's content management system (CMS). While Apache is used as a web server and MySQL as the database. Users of this system include administrators, course creators, teachers, students and guests. The initial view of the system can be seen in Figure



Learning materials that have been developed in this system include Open office writer, Open office calc, mozilla firefox, LAMP server installation and application installation on linux fedora. All materials are developed based on open source. This is done in order to empower and disseminate open source software. All of this is a manifestation of the mandate of the IGOS declaration. The overall implementation of the learning material can be seen in Figure



Open Office Writer is a word processing application that is always needed in making activity proposals, correspondence, scientific articles, etc. The word processing material consists of 7 topics covering introduction, working with text, arranging pages, printing, graphics, tables and mail merges. In addition, it is also completed with pretest and posttest for each topic discussed. A complete view of the material can be seen in Figure



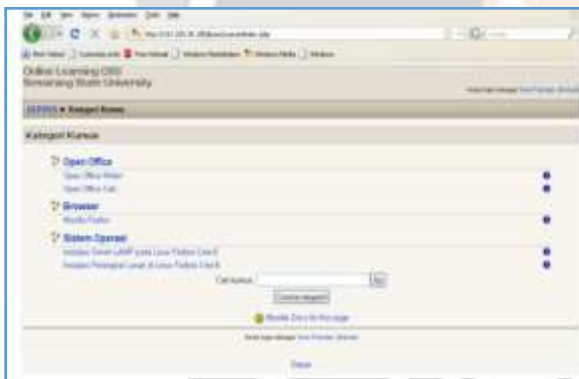
Mozilla firefox is a browser application that is needed in searching for information on the internet. With a browser looking for information on the internet can be done easily, quickly and efficiently. The mozilla firefox material consists of 4 topics which include an introduction; mozilla firefox configuration; access the website; and google search tips. The appearance of this material can be seen in Figure



Installing the LAMP server on fedora core 6 is an installation process to build an apache web server with MySQL database and script processing in the form of PHP on linux fedora core 6. This web server setup is very necessary to support application development using a webbased platform. The material provided consists of 5 topics which include an introduction; preparation of installation; apache web server; MySQL and PHP database servers. The appearance of this material can be seen in Figure

Pokok Topik Kursus	
Instalasi Server LAMP pada Fedora Core 6	
1	Pendahuluan Pendahuluan
2	Persiapan Instalasi Persiapan Instalasi
3	Web Server Apache Web Server Apache
4	Database Server MySQL Database Server MySQL
5	PHP PHP

Installing applications on fedora core 6 is an installation process to place an application program on linux fedora core 6. This installation needs to be done because it meets the application demands required by the user. The material provided in this lesson consists of 7 topics covering the installation method; shell commands; create a local repository; program installation; font installation; installation using RPM and installation using source code.



CONCLUSION

The result of this research is an open source software online learning system. The open source software online learning system was developed on a web basis and has been placed on the Poss Unnes server, so this learning system can be accessed via the internet network and The learning materials developed include Open office Writer, Open Office Calc, Mozilla Firefox, Installing the LAMP server on Linux Fedora, and installing applications on Linux Fedora. Learning materials in this system can be used for empowerment and dissemination of the use of open source software throughout Indonesia. Users of this learning system include administrators, course creators, teachers, and students. Each of them has the authority in accordance with their respective duties. Administrators are tasked with managing the online learning system. The course creator is in charge of creating courses and plotting the teachers who will teach them. The teacher is in charge of constructing the learning content which is their responsibility. Meanwhile students are students who learn using an open source software learning system.

The online learning system developed can handle online learning with open source software. Historical learning activities of students have also been recorded. Thus this system can be developed to be able to display student learning activities visually so that teachers can analyze or diagnose student learning problems. This system can also be developed to motivate students who are learning online, so that learning outcomes can be achieved

more optimally. The final result of the research is to develop online-based learning projects

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