Optimization of Practicum Guidelines for Biomedic and Epidemiological Laboratories Based On Information Systems

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Abstract. With the covid-19 pandemic, which requires changes in the teaching and learning process of practicum in the laboratory, it requires changes in the teaching system. The learning mechanism from face to face to an online system requires the laboratory to prepare a method of delivering teaching materials in the form of electronic modules so that it is easy to download by students and laboratory users. The development of practicum teaching materials in this research is to integrate teaching materials that are currently in the form of files that have not been properly archived into digital files that are uploaded through the laboratory web with the address https://silabkemas.ikm.unnes.ac.id. The silabkemas web-based laboratory practicum guide makes it easier for users in the laboratory service process. 85% of respondents stated that the silabkemas web appearance was good and could be easily operationalized (Userfriendly), and 95% of respondents had used online learning module services in the form of SOPs and guidelines for using laboratory equipment. The silabkemas have been put to good use by students of the IKM FIK UNNES Department, but it is necessary to develop another platform so that it can accommodate large files and practicum instructions in the form of videos.

Keywords: Laboratory, guide material, information system

1 Introduction

Strengthening the function of the laboratory is carried out by optimizing the function of the laboratory as a support for the activities of the Tri Dharma of Higher Education including teaching / learning laboratories, research and community service. Meanwhile, the expansion of laboratory functions is carried out by accelerating the distribution of knowledge to the public through programmed scientific activities. Currently, the use of learning media in the form of softcopy or modules does not reflect the conservation spirit carried out by UNNES. The spirit of conservation which is reflected in the vision of UNNES to become an international standard conservation-minded university. This is because the use of modules must use paper. Current technological developments facilitate the distribution of lecture materials using the help of the web. So that the module printing

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process can be reduced. With this research, researchers will compile SOP for lectures, SOP for inspection, safety standards and handling of materials and tools into learning media which is uploaded through the silabkemas.ikm.unnes.ac.id website which is currently used by the IKM laboratory for laboratory management. The use and development of web-based e-modules can be used as material in learning in the form of multimedia and can increase the achievement of students' knowledge competencies [1].

The laboratory of the IKM FIK UNNES department has 9 laboratories, including an epidemiology laboratory and a biomedical laboratory. These two laboratories have a fairly dense practicum usage schedule, from the IKM laboratory data, in the odd semester of 2019/2020, there were 4 subjects using the epidemiology laboratory and 3 courses in the biomedical laboratory. The use of laboratories and IKM laboratory practicum activities must be in accordance with applicable standard procedures. So far, laboratory users are given practicum material in the form of files which are then copied as many as practicum members. This is considered ineffective in supporting lectures in the laboratory so that the development of teaching materials is needed.

In laboratory development, reference material is needed in practicum implementation, this reference material is needed as a basis for preparation and implementation of lecture activities in the laboratory. The development of practicum reference materials must develop following technological developments. This relates to changes in test methods and the basic basis of SOPs in handling materials and tools. Handling of materials and tools is very important, in order to avoid work accidents during practicum. However, the most important thing is the realization of a practicum that is in accordance with the implementation standards that are recognized in the world through ISO 17025.

The development of practicum teaching materials in this research is to integrate teaching materials that are currently in the form of files that have not been properly archived into digital files that are uploaded through the existing IKM FIK UNNES web laboratory. The IKM FIK UNNES laboratory has a silabkemas.com website which has been used to assist in managerial lending of laboratory materials and equipment. Later by integrating lecture material, practicum SOPs into downloadable file materials on the web will greatly facilitate laboratory users in preparing practicum besides that file storage by uploading via the web is considered safer from file damage and makes it easier to search for files.

Based on the background and problem formulation, this research has specific objectives, namely (a) Identifying the potential potential of lecture SOPs, materials and material handling so that they are carried out properly. (b) Arrange the collected documents into a webbase document so that they are easy to download again (c) Improve the IKM laboratory website to make it more familiar among laboratory users

2 Methods

This type of research is descriptive, where the reporting process is a description of the results of using and utilizing the download menu of the silabkemas.ikm.unnes.ac.id web page which contains practicum guidelines on each type of parameter that is in the IKM FIK UNNES laboratory environment. The material that will be used as a module is how to implement practicum according

to standard methods, SOP for the use of equipment, SOP for handling materials and waste, SOP for how to borrow equipment, SOP for periodic maintenance of equipment and materials, legal basis and statutory reference, Threshold Value for inspection parameters. Evaluation of the use and effectiveness of the packaging silabus as online teaching materials using a questionnaire method and interviews with 20 respondents who are students in the IKM FIK UNNES Department. Interviews are used to determine weaknesses and to what extent the silabkemas.ikm.unnes.ac.id can be used by users.

3 Result and Discussion

Specifically, there are six things that support the digestibility level of teaching materials, namely, logical exposure, coherent presentation of material, examples and illustrations that make it easier. According to Rusman (2012) "Web-based learning is a learning activity that utilizes website media that can be used. access via internet network ".

The web-based teaching process has several advantages, According to Rusman (Rusman, 2012: 118) Access is available anytime, anywhere, in the world

1. The operational costs for each student to participate in learning activities are made more affordable
2. Supervision of student development becomes easier
3. Web-based learning design allows personalized learning activities.

3.1 Application of using silabkemas.ikm.unnes.ac.id

With the Covid-19 pandemic, lectures must be conducted online. So that the practicum system cannot be carried out by direct practicum activities in the laboratory. This makes the practicum not optimal. UNNES has facilitated the ELENA system which can be used for online lectures, but in order to improve the convenience of students who will conduct research and practicum, the laboratory has developed silabkemas.ikm.unnes.ac.id.unnes.ac.id so that it can also be accessed as a guide for practicum. This is done by adding the SOP menu embedded in the silabkemas.ikm.unnes.ac.id website.

Laman silabkemas.ikm.unnes.ac.id is a web-based laboratory service system that is operated in the IKM FIK UNNES laboratory environment. The use of the web silabkemas.ikm.unnes.ac.id began in 2017. At first, the silabkemas.ikm.unnes.ac.id were only used as a lending system for equipment used for lectures and research. However, with upgrading and maintenance carried out every year, currently the silabkemas.ikm.unnes.ac.id web has been used to carry out equipment inventories. Including scheduling for equipment maintenance programs, taking stock of laboratory materials available in each laboratory and stored in the warehouse. so that the existence of silabkemas.unnes.ac.id makes it easier in laboratory management. Some of the services that can be facilitated by silabkemas.ikm.unnes.ac.id.ikm.ac.id are:

a. Borrowing laboratory equipment for lectures
b. Laboratory consumables receipts for research and practicum as well as community service
c. Laboratory equipment inventory, including maintenance schedules, user logbooks and realtime conditions
d. Knowing the inventory of consumables in the laboratory and warehouse

e. Inform laboratory room usage schedule
f. As a medium for downloading practicum material.

Silabkemas.unnes.ac.id uses a wordpress-based system which is very easy in operation and maintenance. The silabkemas.ikm.unnes.ac.id page can be opened through all Android, Windows and MC-based browser software. It can even be opened using a cellphone so that it is easily accessible by users.

In terms of web maintenance, it is done by upgrading and backup files every time there is an update from wordpress which is usually once every 3 months. However, file backups are carried out every month. Initially, silabkemas.ikm.unnes.ac.id used a private domain so that it had the web address silabkemas.com, but since 2020 it has used the UNNES domain and server so that the web address has changed to silabkemas.ikm.unnes.ac.id. This migration process is not only for data security purposes but also to simplify system maintenance

From the results of the silabkemas.ikm.unnes.ac.id evaluation carried out by the questionnaire method on 20 IKM FIK UNNES laboratory users, it was found that 85% of the respondents stated that the web display was good, but it was suggested that the display be made more attractive. In the field of easy access, all respondents stated that the silabkemas.ikm.unnes.ac.id were very easy to use. Besides being accessible using an Android-based cellphone, the download file for validation can also be accessed directly and all respondents stated that the silabkemas.ikm.unnes.ac.id made it easier in laboratory services.

The types of silabkemas.ikm.unnes.ac.id used by the respondents, all of the 20 respondents, used the silabkemas.ikm.unnes.ac.id in the process of arranging a tool borrowing permit, but it is not mentioned here in the research process or in practicum. From other data, it was also obtained that only 20% of syllabic users took advantage of the space use menu. This is because not all students see the room schedule, only the class coordinator takes advantage of the space use menu. 95% of respondents have used online SOPs. This shows that the SOP menu and practicum instructions have been put to good use by students. Only 1 person did not use the packaging silabus to download the SOP because the respondent was included in the specialization and there was no practicum course in the curriculum.

Table 1. assessment of appearance of web silabkemas.ikm.unnes.ac.id

Very good	70 %
good	15 %
sufficient	15 %

Table 2. Use of the web

Borrowing equipment	70
Download SOP	15
Room Schedule	4
Use equipment	20

3.2 Module Teaching materials for practicum and SOP

SOP and practicum guide that can be downloaded on the silabkemas.ikm.unnes.ac.id page. Files uploaded on the web are in PDF format, apart from having a small resolution, PDF files will not change format when downloaded using a browser. Unlike the MS Word file with the .doc format, which can change format when opened with hardware that has different software. In the laboratory SOP menu, 18 laboratory guide files have been uploaded.
The silabkemas.ikm.unnes.ac.id web development process is a follow-up to laboratory user requests which are always evaluated after the practicum for one semester has been completed. Evaluation is also carried out when students are about to do laboratory free. The advantages and disadvantages of web-based systems

3.3 Wordpress management and web management silabkemas.ikm.unnes.ac.id

The silabkemas.ikm.unnes.ac.id web development process is a follow-up to laboratory user requests which are always evaluated after the practicum for one semester has been completed. Evaluation is also carried out when students will do laboratory free in the graduation registration stage. One of the suggestions from the students is a request to make it easier to borrow laboratory equipment and materials. Another suggestion is that the lending system can be done easily in a system. From that input, a wordpress-based system was chosen.
In the web management process, the first step is to log in using the admin menu. After logging in, you will enter the wordpress management menu. In this menu, the admin can update the package data by adding information on the amount of material, the condition of the equipment, and adding the SOP file. Adding an SOP file can be done by creating a link that has previously been uploaded to the SOP file in pdf format. When the file has been uploaded, file management can be performed by renaming the file so that it is easier to read.

The use of wordpres in the basic silabkemas.ikm.unnes.ac.id.unnes.ac.id has several advantages and disadvantages. However, the use of wordpress is considered the most appropriate when compared to the use of other systems. Some of the advantages are
1. Easy operation, maintenance and data management
2. Can be opened in various types of browsers and various OS, including on Java-based mobile phones, Android and Windows
3. User friendly, the display and menu are very easy to use, even for those who are not familiar with silabkemas.ikm.unnes.ac.id before
4. Save paper usage as laboratory manuals, and save printing costs.
However, the wordpress system also has several drawbacks, but these drawbacks can be covered by the advantages that can be exploited. These drawbacks are:
1. Cannot upload large files. Maximum 2 MB
2. Simple appearance, to enhance your appearance, you need a paid template and theme
3. Difficulty uploading files in the form of videos, but you can use them by providing embed video files from YouTube and other video providers
All of these shortcomings were felt by users where 60% of respondents wanted a platform that could be used to get practicum guides in the form of videos.

4 Conclusion

By using silabkemas.ikm.unnes.ac.id as a web-based information system that is used as a place to download and store practical guides and tool usage SOPs, it can be concluded that Silabkemas.ikm.unnes.ac.id can optimize IKM FIK UNNES laboratory services in terms of equipment management, materials and service systems. Silabkemas.ikm.unnes.ac.id can also be used as web-based information media that can be used for the location of storing SOP files and practicum instructions and most importantly, with the online SOP, laboratory users are more effective in the learning process.

Although the silabkemas.ikm.unnes.ac.id provide convenience in laboratory services, further development is still needed to accommodate some of the deficiencies found in the use of wordpres-based syllabics. Then there is a need for other media so that it can accommodate and upload bear-sized files and can be downloaded easily by laboratory users and the development of the YouTube platform is needed to facilitate video files containing visual practicum guides.

References

[1] Solihudin JH T. Pengembangan E-Modul Berbasis Web Untuk Meningkatkan Pencapaian Kompetensi Pengetahuan Fisika Pada Materi Listrik Statis Dan Dinamis Sma. WaPFi (Wahana Pendidik Fis. 2018;3(2):51.

[2] Fahmi R. Pengembangan E-Modul Berbasis Web Pada Mata Pelajaran Pembuatan Busana Industri. 2020;3(3):508–15.

[3] Suyoso, Nurohman S. Developing web-based electronics modules as physics learning media. J Kependidikan. 2014;44(1):73–82.

[4] Sungkono S. Pengembangan Dan Pemanfaatan Bahan Ajar Modul Dalam Proses Pembelajaran. Maj Ilm Pembelajaran. 2009;5(1).

[5] Rusman. Model-Model Pembelajaran. Rajawali Pers; 2011. 335 p.

[6] Dewa, Yudana M. Pengaruh Model Pembelajaran ARIAS dengan Setting Group Investigation Terhadap motivasi dan Hasil Belajar Geografi Siswa kelas XI IPS SMA Negeri Kuta Kabupatan Badung. E-Jurnal Progr Pascasarj Univ Pendidik Ganesha. 2014;5:2.

[7] Dayunison M. Pengembangan Bahan Ajar Berbasis WEB Untuk Matakuliah Desain Pesan. J Inov dan Teknol Pembelajaran. 2016;1.

[8] Prastowo A. Panduan Kreatif Membuat Bahan Ajar Inovatif. Yogyakarta: DIVA Pers; 2011. 132–133 p.

[9] Wait M, Handayani H. Sistem Informasi Laboratorium Pada Klinik Mulia Medika Berbasis Lan Menggunakan Microsoft Visual Basic 6.0. 2015;1(1).

[10] Nurul mas'ud waqiah. Perancangan Sistem Informasi Laboratorium Fisika (Silabfis) Berbasis Web Menggunakan Program Php Dan Myqsl. Persepsi Masy Terhadap Perawatan Ortod Yang Dilakukan Oleh Pihak Non Prof. 2013;53(9):1689–99.

[11] Pratama M, Komarudin M, Fitriawan H, Teknik J, Lampung EU, Lampung B, et al. Rancang Bangun Sistem Informasi Laboratorium Teknik Elektro Terpadu Universitas Lampung Berbasis Web. ElectricianUnilaAcId [Internet]. 2014;8(3). Available from: http://electrician.unila.ac.id/index.php/ojs/article/view/107

[12] Industries B. PENGEMBANGAN SISTEM INFORMASI LABORATORIUM BERBASIS WEB Balai Besar Kerajinan dan Batik sebagai salah satu unit pelayanan teknis dari Kementerian Perindustrian yang memiliki visi menjadi pusat penelitian , pengembangan serta pelayanan bagi dunia kerajinan. 2013;11–22.

[13] Trisnanto PY, Lala H. Perancangan Sistem Informasi Laboratorium Komputer pada Program Studi D-III PMK Poltekkes Kemenkes Malang. J Pendidik - Teor Penelitian, dan Pengemb. 2016;1(11):2152–7.

[14] Fauzi A. Tata Kelola Dan Tata Laksana Laboratorium Fakultas Teknik Universitas Negeri Semarang. Tata Kelola Dan Tata Laksana Lab Fak Tek Univ Negeri Semarang. 2017;53(9):1689–99.
[15] Muttaqin R, Erna S. N, Mubarok D. Rancang Bangun Sistem Informasi Layanan Analisis Sampel Berbasis Android Pada Laboratorium Fisika Unnes. Indones J Lab. 2018;1(1):29.
[16] Suseno N. Artikel Pembuatan Standar Operasional Prosedur (Sop) Praktikum Untuk Meningkatkan Efesiensi Sri Handayani. 2019;