Design and Quality Test of OMDIS (Online MeSH & DDC Integrated System) Application for Librarians to Determine DDC Classification Numbers and MeSH-Based Subject Headings

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ABSTRACT

The OMDIS (Online MeSH & DDC Integrated System) application is an application designed to facilitate librarians in determining DDC classification numbers and MeSH subject headings in an integrated manner within a network. DDC (Dewey Decimal Classification) is a guideline for the placement/arrangement and retrieval of collections, while MeSH (Medical Subject Headings) is a collection of controlled vocabulary that is organized hierarchically for indexing, cataloging, and searching biomedical and health-related information. **Purpose Research.** The purpose of this study is to provide an application that can assist librarians, particularly those working in the Indonesian Ministry of Health, in the process of processing library materials, namely to determine MeSH subject headings and DDC classification notations in a single database in accordance with the provisions of Indonesian Minister of Health Regulation Number. 68 of 2016. **Research Methods.** The OMDIS application was developed using the Research and Development Method at Level 4, which involves creating a new product while testing its effectiveness based on ISO 9126-1 standards and measured using the Likert Scale, where the research sample consisted of librarians from the Malang Health Polytechnic (Poltekkes) of the Indonesian Ministry of Health. resulting in an application that can assist librarians, accessible via https://omdis.web.id/. **Result.** The result of this research is application that can assist librarians, accessible via https://omdis.bibliothee.web.id/. **Conclusion.** The OMDIS application is available to assist librarians to facilitate the processing of library materials, especially within the Ministry of Health RI. According to ISO 9126-1, which include Functionality Aspect, Reliability Aspect, Usability Aspect, Efficiency Aspect, Maintainability Aspect, Portability Aspect of OMDIS application, the results of which were tested approaching the VERY AGREE area with an average score of 46.42 with an error rate of 1%

Keywords: OMDIS; MeSH; DDC; Subject Headings; Library

A. INTRODUCTION

Law No. 43/2007 on Libraries states that a library must be equipped with information technology (IT)-oriented facilities and infrastructure. The level of IT implementation can measure the development of today's libraries to support

their activities, the number and type of collections available, and the number of users, both direct and indirect (Eka, 2020).
Therefore, the research entitled 'OMDIS (Online MeSH & DDC Integrated System) Application: Network Integrated MeSH & DDC System to Facilitate Librarians within the Ministry of Health of the Republic of Indonesia to Determine DDC Classification Numbers and MeSH-Based Subject Headings' is a form of application of IT in supporting library activities. The existence of the OMDIS application can increase the library's role in implementing knowledge management and supporting the new work culture of the Ministry of Health of the Republic of Indonesia.

The background for the creation and development of the OMDIS application is (1) Following up on the Regulation of the Minister of Health of the Republic of Indonesia Number 68 of 2016 concerning the Processing of Library Materials within the Ministry of Health, which states on page 22 that one of the stages in the process of processing library materials is to determine the subject heading of the collection using MeSH (Medical Subject Headings) and the classification number of the collection using DDC (Dewey Decimal Classification). (2) Currently, the use of MeSH and DDC is still done separately, which certainly makes it difficult for librarians and requires a considerable amount of time, including significant costs, for example, for the procurement of expensive DDC guidebooks (around 7-14 million rupiah). Therefore, an application that integrates DDC and MeSH subject headings is needed.

The creation and development of the OMDIS application used the Research and Development (or Design and Development Research) method, specifically Level 4, in which research is conducted to create a new product while testing the effectiveness of that product (in this case, the OMDIS application) through the following stages: formulation of potential and problems, product design, design validation, design revision, product creation, limited testing, first product revision, main field testing, second product revision, operational field testing, third product revision, dissemination, and implementation (Sugiyono, Research and Development Methods, 2019).

Once the product is complete, testing is necessary to determine its effectiveness/usefulness. The indicators used to measure this product are based on ISO 9126-1: Functionality, Reliability, Usability, Efficiency, Maintainability, and Portability. ISO 9126 is an international standard for evaluating software. The standards are grouped into four parts according to their subject, namely quality models, external metrics, internal metrics, and quality in usage metrics. ISO 9126 Part 1 (ISO 9126-1) refers to ISO 9126, which presents software characteristics for software quality control, software quality assurance, and software processes (Kusmayadi, Software Study, 2019). Measurement techniques using questionnaires based on the Likert Scale to measure the perceptions, attitudes, or opinions of an individual or group regarding an event or social phenomenon, based on operational definitions established by the researcher. The Likert scale is a tool for measuring (collecting data by "measuring-weighing") whose "items" (questions) contain (include) graded options (Sugiyono, Research and Development Methods, 2019).

In this study, the sample consisted of librarians from the Malang Ministry of Health Polytechnic (Poltekkes) to represent the entire population of librarians at the Indonesian Ministry of Health, combined with qualitative analysis. Therefore, from the 10 (ten) librarians at the Malang Ministry of Health Polytechnic (Poltekkes), all 10 (ten) were selected as respondents, resulting in a margin of error or error rate of 1% (Sugiyono, 2019). The measurement results were described in a table and then analyzed in the form of interpretations with sentences containing conclusions from the study that would show the level of effectiveness/usefulness of the OMDIS application product. The scope of this research is limited to classification notations taken from the Dewey Decimal Classification DDC 2021 (DDC 24) Volume 3 of 4 notations 610–618.978 pages 7–161 (note that notation 619 has not been used since DDC Edition 21).

B. METHODS

This OMDIS application has been built and developed using the Research and Development Method (R&D or Design and Development Research), which is at level 4, namely research and development to create new products while testing the effectiveness of these products.

Based on Level 4 research and development, which is the creation of new products, there are six data analysis activities, namely data analysis in stages 1 to 6, as follows: (1) Determining the research theme and product to be developed, in this case, the OMDIS (Online MeSH & DDC Integrated System) application. (2) Data analysis in stage 1 is based on finding problems and potential, so that it can be used as consideration for developing products. In stage 1, the researcher formulated the problems and potential of the OMDIS application research and development, namely that there is no application to assist the library material processing that integrates MeSH with DDC. (3) Data analysis in stage 2 is based on the research results to determine what products must be developed to overcome problems and improve performance in the object being studied. In stage 2, it was determined that the OMDIS application was developed in order to overcome the difficulties faced by librarians in the Ministry of Health environment in determining subject headings and classification numbers for library materials. (4) Data analysis in stage 3 is based on testing/validation of product design. This internal testing is carried out by experts and/or practitioners on product designs created by researchers. In stage 3, internal testing was conducted in the library of one of the PSDKU (Study Programs Outside the Main Campus), namely Campus VI Ponorogo. (5) Data analysis in stage 4 is data analysis obtained from preliminary field testing. The results of stage 4 analysis are used for product improvement. The improved product is then tested in the main field (main field testing). In this stage 4, testing is carried out on librarian representatives in the Malang Ministry of Health Polytechnic environment, consisting of Campus III Blitar and Campus IV Kediri. (6) Data analysis in stage 5 is analysis based on data obtained from the main field testing. The analysis results are then used for product improvement to be tested operationally in the field. In stage 5, internal testing will be carried out. (7) Data analysis in stage 6 is an analysis of data obtained from operational field testing. In

stage 6, application testing is conducted online via the internet per ISO 9126-1, and the software quality model is built by six quality characteristics. In this sixth stage, testing will be conducted on all librarians at the Malang Ministry of Health Polytechnic. In this sixth stage, application testing will be conducted online via the internet per ISO 9126-1.

The software quality model is built on six main quality characteristics: Functionality, Reliability, Usability, Efficiency, Maintainability, and Portability, resulting in a thoroughly tested application. The measurement technique uses a questionnaire based on the Likert Scale, where the respondents are all librarians at the Malang Ministry of Health Polytechnic, consisting of the Main Campus in Malang, Campus I in Jember, Campus II in Lawang, Campus III in Blitar, Campus IV in Kediri, and Campus V in Trenggalek. From the 10 (ten) librarians at the Malang Ministry of Health Polytechnic (Poltekkes Kemenkes Malang), all 10 (ten) were selected as respondents, resulting in a margin of error or error rate of 1%. The measurement results are described in tabular form and then analysed in interpretation with sentences containing conclusions from the research, which will show the effectiveness/usefulness of the OMDIS application product.

C. RESULT AND DISCUSSION

1. OMDIS Aplication Creation

The OMDIS application has been designed and developed in the following way:

a) Creation of OMDIS metadata by:
   - Converting data from DDC 24 (which is a printed manual) into an Excel file.
   - Converting data from the MeSH website into an Excel file.

b) Metadata containing data from DDC and MeSH, which have become an Excel file, are converted into csv (Comma Separated Values) files, which are used to import or export data into or from the database.

c) Creation of an OMDIS website based on open source software (open source coded application) Senayan Library Management System (SLiMS) version 9 Bulian with some adjustments to the features.

d) The OMDIS website is ready, located on the domain https://omdis.bibliothee.web.id/

e) Import of OMDIS csv data into the website database https://omdis.bibliothee.web.id/

f) Set up the OMDIS database using the PHPMyAdmin feature.

g) Internal testing was carried out by the author to analyse the operation of the website features and the results of the data searches presented, before being tested in limited trials, main field trials and operational field trials.

h) If there is still disagreement, the author makes internal improvements, both in terms of features and data.

i) After the author deems the internal trials sufficient, the OMDIS application is ready to be tested in limited trials, main field trials, and operational field trials as scheduled.

2. OMDIS Application Home Screen

The OMDIS application was built and developed based on the open source software Senayan Library Management System (SLiMS) version 9 Bulian with several adjustments to its features. Furthermore, the OMDIS application can be accessed at https://omdis.bibliothee.web.id/ as shown below:

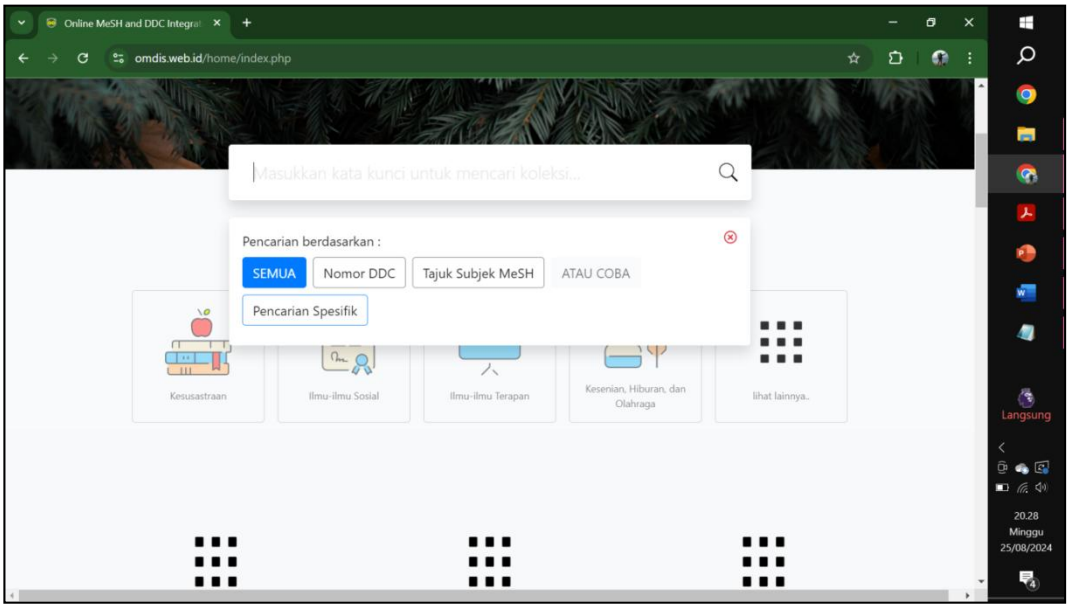


Figure 1: OMDIS website home screen

3. Use of OMDIS Application

The steps for using the OMDIS application to enable librarians to easily determine MeSH Subject Headings and DDC Classification Notations are described below:

a) First, open the website https://omdis.web.id/ (directly accessible from various devices without installation and login);
b) In the box/column provided, enter the keywords of a subject to be searched for MeSH headings and DDC classification notations, just one or two words, for example: obstetric surgery, covid-19, HIV, cancer, infectious diseases, and others.
c) Press the Enter key and the search results will be displayed. There may be more than one result.
d) When the search results match what you are looking for, click on the search result. It will display information including:
   - DDC source;
   - MeSH source;
   - DDC Classification Notation;
   - MeSH subject headings;
   - Explanation/instruction (if any).

e) Librarians can simply copy and paste the required DDC number and MeSH subject heading from the search results. The DDC and MeSH sources are displayed to reinforce the fact that the OMDIS database is compiled from credible sources.
f) With the OMDIS application, librarians can easily determine MeSH subject headings and DDC classification notations because they are in one database.
g) Just to reiterate that the subjects provided in the OMDIS database are specifically related to medicine and health sciences taken from the Dewey Decimal Classification DDC 2021 (DDC 24) Volume 3 of 4 notations 610-618.978 pages 7-161 (note: 619 has not been used since DDC Edition 21).
h) If the keyword searched for is not found, then use another equivalent keyword and repeat the search.
i) However, if the keyword still cannot be found, then the subject is not yet in the OMDIS database.

The following is an illustration of an example search using the keyword obstetric surgery:

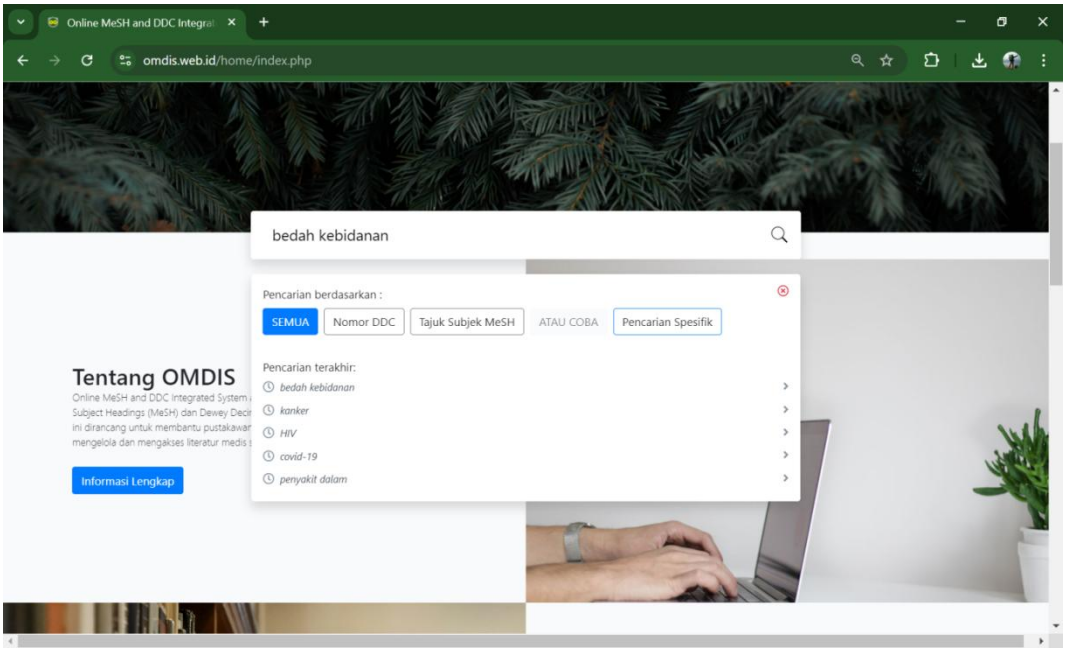


Figure 2: Subject search using OMDIS

The complete search results for the keyword obstetric surgery are as follows:

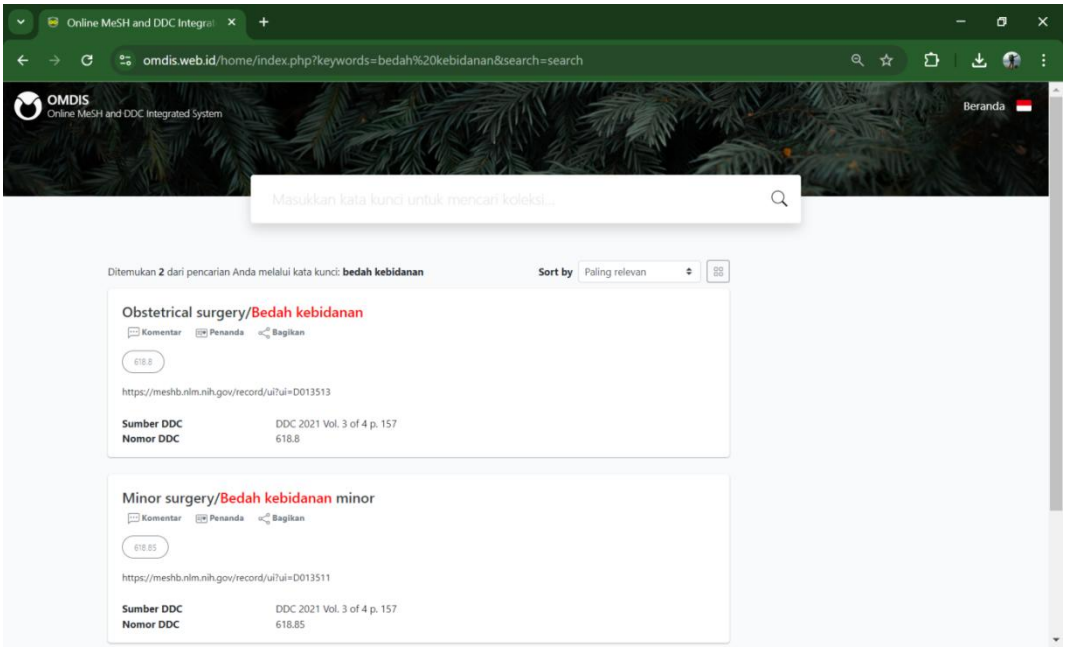


Figure 3: Subject search results with OMDIS

If you click on one of the search results as shown above, e.g. Obstetrical Surgery, you will get the following complete information:

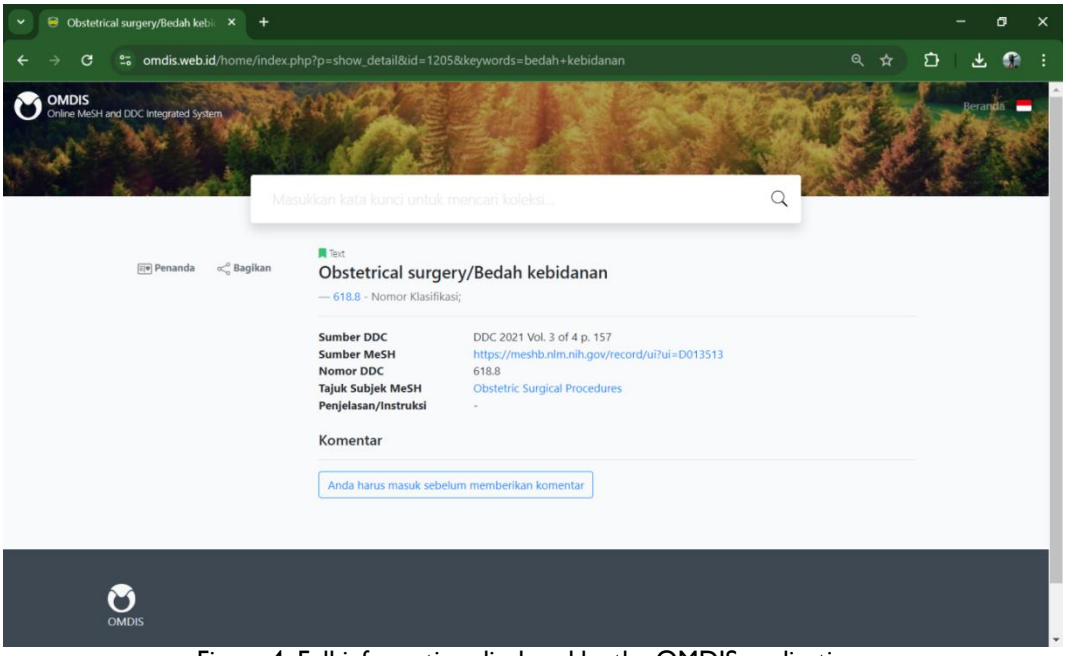


Figure 4: Full information displayed by the OMDIS application

It contains complete information with the following details:

Obstetrical surgery books:

DDC source	*: DDC 2021 Vol. 3 of 4 p. 157*
MeSH source	*: https://meshb.nlm.nih.gov/record/ui?ui=D013513*
DDC number	*: 618.8*
Subject heading MeSH	*: Obstetric Surgical Procedures*
instruction	*: -*

4. Test Result Using Likert Scale

Per the chronology table of activities for creating and developing the OMDIS application (in Table 1), testing was carried out using a Likert Scale on October 26, 2024. So, from six respondents who are librarians of the Health Polytechnic (Poltekkes) Malang, the results were obtained with the following diagram:

1) Functionality aspect:
   - For the Functionality Aspect question related to the suitability of the OMDIS application with Minister of Health Regulation Number 68 of 2016, out of 10 respondents who answered Strongly Agree as many as 7 respondents (70%), answered Agree 3 respondents (30%), answered Undecided 0 respondents (0%), answered Disagree 0 respondents (0%), and answered Strongly Disagree 0 respondents (0%).
   - For the question of the functionality aspect related to whether the OMDIS application is informative, out of 10 respondents who answered Strongly Agree as many as 6 respondents (60%), answered Agree 4 respondents (40%), answered Undecided 0 respondents (0%), answered Disagree 0 respondents (0%), and answered Strongly Disagree 0 respondents (0%).
   - For the question of the functionality aspect related to whether the OMDIS application looks attractive, out of 10 respondents who answered Strongly Agree as many as 6 respondents (60%), answered Agree 4 respondents (40%), answered Undecided 0 respondents (0%), answered Disagree 0 respondents (0%), and answered Strongly Disagree 0 respondents (0%).
   - For the functionality aspect question related to whether the OMDIS application is easy to use, out of 10 respondents who answered Strongly Agree as many as 7 respondents (70%), answered Agree 3 respondents (30%), answered Undecided 0 respondents (0%), answered Disagree 0 respondents (0%), and answered Strongly Disagree 0 respondents (0%).
2) Reliability aspect:
   - For the reliability aspect question related to the security of the OMDIS application against spam, viruses and other dangerous Internet disruptions, out of 10 respondents who answered Strongly Agree, as many as 3 respondents (30%), Agree 7 respondents (70%), Undecided 0 respondents (0%), Disagree 0 respondents (0%), and Strongly Disagree 0 respondents (0%).

3) Usability aspect:
   - For the Usability Aspect question related to whether the information provided by the OMDIS application is easy to understand, out of 10 respondents who answered Strongly Agree as many as 7 respondents (70%), answered Agree 3 respondents (30%), answered Undecided 0 respondents (0%), answered Disagree 0 respondents (0%), and answered Strongly Disagree 0 respondents (0%).
   - For the Usability Aspect question related to whether the MeSH subject headings provided by the OMDIS application are accurate, out of 10 respondents who answered Strongly Agree as many as 7 respondents (70%), answered Agree 3 respondents (30%), answered Undecided 0 respondents (0%), answered Disagree 0 respondents (0%), and answered Strongly Disagree 0 respondents (0%).
   - For the Usability Aspect question related to whether the DDC notation provided by the OMDIS application is accurate, out of 10 respondents who answered Strongly Agree as many as 7 respondents (70%), answered Agree 3 respondents (30%), answered Undecided 0 respondents (0%), answered Disagree 0 respondents (0%), and answered Strongly Disagree 0 respondents (0%).
4) Efficiency aspect:
   - For the Efficiency Aspect question related to whether the OMDIS application saves costs that the library should incur for procuring MeSH subject heading guidelines and DDC books, out of 10 respondents who answered Strongly Agree as many as 7 respondents (70%), Agree 3 respondents (30%), Undecided 0 respondents (0%), Disagree 0 respondents (0%), and Strongly Disagree 0 respondents (0%).
   - Regarding the efficiency aspect, i.e. whether the OMDIS application saves time instead of using MeSH subject headings and manual DDC books, out of 10 respondents who answered Strongly Agree, 6 respondents (60%) answered Agree, 4 respondents (40%) answered Undecided 0 respondents (0%), answered Disagree 0 respondents (0%), and answered Strongly Disagree 0 respondents (0%).
5) Maintainability aspect:
   - For the question of the Maintability aspect related to whether the maintenance of the OMDIS application is easy and uncomplicated, out of 10 respondents who answered Strongly Agree as many as 7 respondents (70%), answered Agree 3 respondents (30%), answered Undecided 0 respondents (0%), answered Disagree 0 respondents (0%), and answered Strongly Disagree 0 respondents (0%).
6) Portability aspect:
   - For the reliability aspect question related to the security of the OMDIS application against spam, viruses and other dangerous Internet disruptions, out of 10 respondents who answered Strongly Agree, as many as 3 respondents (30%), Agree 7 respondents (70%),

Undecided 0 respondents (0%), Disagree 0 respondents (0%), and Strongly Disagree 0 respondents (0%).

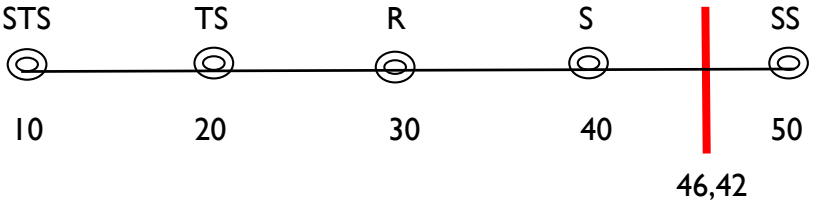
5. Analysis of Test Results

The following is an analysis of the Likert scale results above, if the ideal score of all respondents is 30 (with a percentage of 100%), then the percentage level of approval of each question about the OMDIS application is as shown in the following table:

Table 1: Percentage of acceptance

Statements	Score	Percentage
Functional Aspects related to the suitability of the OMDIS application with Permenkes Number 68 of 2016	47	94%
Functionality Aspects related to whether the OMDIS application is informative	46	92%
Functionality Aspects related to whether the OMDIS application looks attractive	46	92%
Functionality Aspects related to whether the OMDIS application is easy to use	47	94%
Reliability Aspects related to the security of the OMDIS application against spam, viruses and other dangerous Internet interferences.	43	86%
Usability Aspects related to whether the information provided by the OMDIS application is easy to understand.	47	94%
Usability Aspects related to the accuracy of the MeSH subject headings provided by the OMDIS application.	47	94%
Usability Aspects related to whether the DDC notation provided by the OMDIS application is accurate	47	94%
Efficiency Aspect related to whether the OMDIS application saves the library the cost of purchasing MeSH subject heading guidelines and DDC books.	47	94%
Efficiency Aspect related to whether the OMDIS application saves time instead of using MeSH subject headings and manual DDC books.	46	92%
Maintainability Aspect related to whether the maintenance of the OMDIS application is easy and not complicated.	47	94%
Aspek Portability (Portabilitas) terkait apakah aplikasi OMDIS lancar dioperasikan dengan berbagai operating system	47	94%
Average Score	46,42	92,84%

On a continuum, based on the data obtained above from 10 respondents with an ideal score of 50, the level of approval of the OMDIS application approaches the VERY AGREE area with an average score of 46.42 with an error rate of 1% as shown below:



So, based on the results of the research using the Likert scale and the results of the analysis above, it is known that the six aspects of the application test according to ISO 9126-1, including the Functionality Aspect, Reliability Aspect, Usability Aspect, Efficiency Aspect, Maintainability Aspect, Portability Aspect of the OMDIS application are tested with an approval value up to a score of 46.42 or with a percentage of 92.84%.

D. CONCLUSION

The conclusions from the creation and development of the OMDIS application are as follows:

- An application is now available to assist librarians, particularly those working within the Indonesian Ministry of Health, in the process of processing library materials, namely to determine MeSH subject headings and DDC classification notation in a single, easy-to-use database that complies with Indonesian Ministry of Health Regulation No. 68 of 2016. The application can be accessed at https://omdis.bibliothee.web.id/
- OMDIS application is a new breakthrough and has never been created to facilitate the processing of library materials, especially within the Ministry of Health RI.
- OMDIS application, in addition to its novelty, librarians within the Ministry of Health RI will also benefit in the form of effectiveness and efficiency in the process of processing library materials, which may have an impact on improving the overall performance of librarians.
- A Likert scale test was conducted on six aspects according to ISO 9126-1, which include Functionality Aspect, Reliability Aspect, Usability Aspect, Efficiency Aspect, Maintainability Aspect, Portability Aspect of OMDIS application, the results of which were tested approaching the VERY AGREE area with an average score of 46.42 with an error rate of 1%.

Suggestions for the development of the OMDIS application are as follows: For further development, it is necessary to plan the addition of notations outside the classification of 610 medical and health sciences that are still related to health sciences, such as notations 150 psychology, 360 social services, 370 education, 570 biology, etc., so that the OMDIS application can later provide more complete information. It should also be tested on librarians in other the Health Polytechnic (Poltekkes) such as Surabaya, Semarang, Surakarta, Yogyakarta, etc. As the OMDIS application is a breakthrough that facilitates the processing of library materials, it is necessary to immediately socialize and widely apply it to

libraries within the Ministry of Health to achieve the goals and benefits of the OMDIS application. This research is not receive any funding

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