Design and development system multi criteria program accreditation dashboard information

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Abstract

In the evolving landscape of higher education, the emergence of Independent Accreditation Institutions has significantly impacted how study programs approach the accreditation process. This shift necessitates a dynamic adaptation by educational institutions, especially in aligning with diverse accreditation standards and instruments set by these bodies. The presence of Accreditation Institutions Independent requires a study program adapt in the accreditation process. Every Accreditation Body Independent has instrument different accreditations. Previously Lots developed system information for makes it easier management document study program accreditation. With the existence of an Accreditation Institution Independent, then need developed previous system use instrument accreditation from BAN-PT, now must customized with instrument Accreditation Agency accreditation Independent. Therefore, that's it, it's designed something system that can modify or add instrument accreditation of the system by users without requiring hard coding. Method used in development system information This using the System Development Life Cycle (SDLC). SDLC consists of investigation initial, analysis system, design system, development system, implementation system, and maintenance system. From the results testing system, the system has capable fulfil need in management accreditation with criteria standard that can be customized with need user. The novelty of this research lies in the development of a highly adaptable information system that can seamlessly align with the varied instruments of different Independent Accreditation Bodies.

INTRODUCTION

Accreditation aims to determine the suitability of Study Programs and Higher Education Institutions based on National Higher Education Standards (Rahardja et al, 2020). Higher Education Accreditation is carried out by the National Accreditation Board for Higher Education (BANPT), while Study Program accreditation is carried out by the Independent Accreditation Institute (LAM). LAM can be established by the Government or the Community and must be recognized by the Government based on recommendations from the National Accreditation Board for Higher Education (Khairuddin & Hadijaya, 2023). LAM is established based on scientific fields and/or branches of science and can be based on geographical areas (Lam-Gordillo et al, 2020)

The moment there is six Accreditation Institutions Independent namely the Accreditation Agency Independent Engineering (LAM Teknik), Accreditation Body Independent Knowledge Natural Sciences and Formal Sciences (LAMSAMA), Accreditation Institution Independent Economics, Management, Business and Accounting (LAMEMBA), Accreditation Institute Independent Informatics (LAMEMBA) (Hamdan, FZZ, & SH, M. 2022). and Science Computers (LAM Infokom), LAM Education (LAMDIK), and the Accreditation Body Independent College of Health Sciences in Indonesia (LAM-PTKes). Accreditation agency This is managed by a group of study programs. Expected standard accreditation in accordance with each study program the (Fauzi, 2021). With Thus , guarantee quality relevant with standards required by the professional world and not add burden administrative accreditation (Cahyono et al., 2023)

LAM-PTKes is institution accreditation independent college tall field Health Sciences (Khairuddin & Hadijaya, 2023). LAM-PTKes has stand since 2014, first LAM This founded by 14 associations organization science and profession in the field education medicine, nursing, midwifery, nutrition, pharmacy, health society, Indonesian Doctors Association, Unity Indonesian National Nurse, Indonesian Midwives Association, Indonesian Nutrition Association, Indonesian Pharmacists Association, and Indonesian Public Health Association (World Health Organization. Regional Office for South-East Asia, 2024) .

LAMDIK is institution accreditation independent in the field of Education (Sri et al., 2021). LAMDIK was designed in 2019 by the association science education and associations organizer of educational programs, which is facilitated by the Ministry of Education and Culture (Kemendikbud) and BAN-PT (National Accreditation Board for Higher Education). This LAMDIK own many study programs so that give rise to challenge in matter lack assessor. Apart from that, this LAMDIK accommodate various programs (Susilawati et al., 2023).

LAMEMBA is institution accreditation independent in the field economics, management, business, and accounting (Andie & Hasanuddin, 2023). LAMEMBA was founded by the Indonesian Economic Scholars Association (ISEI), Ikatan Indonesian Accountants (IAI), and the Association Indonesian Faculty of Economics and Business (AFEBI). LAMEMBA now Already Ready For do program accreditation, though Still face challenge like lack assessor, limitations time For assessors , and some programs that have not in accordance with standard LAMEMBA accreditation (Khalilah, 2022).

Various studies have attempted to develop accreditation document management applications (Pani et al., 2019). In the Computer Science Study Program, Faculty of Computer Science, Singaperbangsa University, an application was built using object-based analysis and a web-based approach. The application is designed to meet 7 study program accreditation standards (Taber et al., 2020).

Development of monitoring of accreditation documents is also carried out in the UNIKOM Computer Science Study Program (Syukur et al., 2020). This system is used to monitor and compare actual performance with accreditation standards (Chapetta et al., 2021). Apart from that, the system can also be used to detect deviations, evaluate and prepare accreditation documents. This data can

be used for consideration and evaluation of improvements to study program accreditation documents. The application built includes documents related to standards 2 to 7 (Park et al., 2020)

System Information Web Based Study Program Accreditation Academic Activities were developed in the Management Study Program Water Resources Institute Bogor Agriculture. Application used for document report completeness accreditation. Application This expected can makes it easier team accreditation in the search process information, preparation, and creation form accreditation (form 3A). Entered data in application can printed in hard copy format, Nurmiati & Munandar (Ratno & Fanani, 2023).

Nadiya and her team have developed an accreditation program dashboard version 4.0 uses the Laravel framework. Application This designed for three users: admin, validator, and rater. Test result show very good results in matter Power attractiveness, clarity, efficiency, accuracy, stimulation, and novelty (Nadiya et al., 2021). Sulaiman and his friends also took similar steps who develops system information study program accreditation (Sulaiman et al, 2022). Their system get up be equipped with a form template accreditation, schedule charging, simulation calculation score, examination plagiarism, review process, uploading documents, and systems form guarantee internal quality.

In previous research, an information system for managing study program accreditation documents at the Open University was developed to manage study program accreditation documents. This study program accreditation document management application helps in collecting and retrieving accreditation documents. The system is adapted to the 4.0 study program accreditation instrument which consists of 9 criteria (Widiyanto & Wahyuningsih, 2022).

Likewise, with _ Application Simulation Evaluation Instrument Accreditation Standardized Web Based for LAMEMBA. Application This designed special for manage document accreditation related instrument LAMEMBA accreditation. Application This developed with method Waterfall development and use for doing simulation of the study program accreditation process Management and Accounting (Simulasi et al., 2023).

Purwandari has also develop system repository accreditation document web- based at the Institute of Business and Informatics Kosgoro 1957. System This designed special using IBI-K57. System designed with two types of accounts: admin and user. Admin is used by committees, institutions guarantee quality for manage profile, filler, standards, committee, and files uploaded by filler. Meanwhile, the user level is used by the dean, head of the study program, and members for upload document (Purwandari & Firmansyah, 2023).

In its development, there have been five LAMs Approved For do Study Program Accreditation is appropriate with the Decree of the Minister of Education, Culture, Research and Technology Number 186/M/2021. Approved LAM including Accreditation Institutions _ _ Independent Engineering Study Program (LAM Teknik), Accreditation Institution Independent Education Study Program (LAM Education), Accreditation Institution Independent Informatics and Computer Study Program (LAM Infokom), Accreditation Institution Independent Informatics and Computer Study Program (LAM Infokom), Accreditation Institution Independent Informatics Engineering Study Program (LAM Infokom), and Accreditation Institution Independent Informatics Study Program (LAM Infokom). Science Study Program Natural Sciences and Formal Sciences (LAMSAMA), and Accreditation Institutions Independent Economics, Management, Business and Accounting Study Program (LAMEMBA). Study Program Accreditation has been achieved redirected from BANPT to LAM. Starting March 31, 2022, proposals Study Program Accreditation does not Again submitted to BAN-PT instead must submitted to LAM (BAN-PT Regulation Number 9 of 2020).

With this LAM, the accreditation instruments used in each LAM are different, as are the instruments from BANPT which are widely used. Therefore, applications that have been developed

based on BANPT instruments, both standards 7 and 9, need to be improved to meet the needs and differences in these accreditation instruments. Therefore, in this research an application was designed that allows users to directly add and modify accreditation instruments without the need for programming through hard coding.

METHOD

This system design applies the information system development life cycle (SLDC) method. SLDC has six phases namely; initial investigation, system analysis, system design, system development, system implementation and system maintenance. Williams & Sawyer, 2007 (Setiawan et al., 2023)
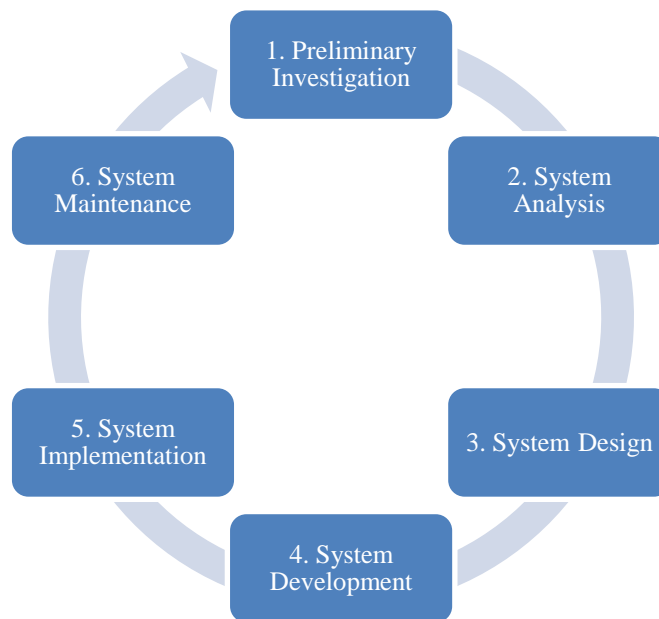
Figure 1. System Development Life Cycle (SDLC)

SDLC phase

The initial investigation includes initial analysis, proposing alternative solutions, explaining costs and benefits, and submitting an initial plan. System Analysis includes data collection, data analysis, and report writing. System design includes making initial designs, making detailed designs, and writing reports. System Development includes software development, hardware acquisition, and system testing. System implementation includes conversion to a new system and user training. System maintenance aims to keep the system running by conducting regular audits and evaluations.

Software Testing

Software testing is an important part of the software development process (Jayanti, WE, & Hendini, A. 2021). Software testing aims to ensure the system quality is as expected. The most important aspects in choosing a testing methodology are effectiveness and economy. Effectiveness factor means that the designed test can reveal the maximum number of errors present in the software. Economic factors relate to the amount of time and resources involved in testing (Wahyuningrum, T. 2021).

One type of software testing is defect testing (Hasibuan, AN, & Dirgahayu, T. 2021). Defect testing aims to determine the existence of latent defects in the software. This testing is different from validation testing which aims to show that the system meets its specifications. Disclosure of defects in the system is carried out by entering test data that causes deviations.

Functional testing or black-box testing is a testing approach where testing is derived from program or component specifications (Siregar, L. 2020). This test is only used to determine the functionality of the software. Testing is carried out by entering test data on the component or system, then checking the resulting output. If the output is as expected, then the test is considered successful to find errors in the software.

RESULTS AND DISCUSSION

Flow diagram System Information

The accreditation process for study programs in higher education involves several units such as the Quality Assurance Unit, Study Program, Reviewers and Leadership. The accreditation process starts from the quality assurance unit. The quality assurance unit can monitor study programs whose accreditation period will expire or must be extended. From this data, the quality assurance unit can input the accreditation period. The next process is that the Study Program Accreditation Team inputs the accreditation form. From the data and accreditation documents that are input and uploaded, a reviewer will then carry out a review. From the results of the review, the Study Program Accreditation Team can correct deficiencies according to reviewer input. The results of the improvements can be reviewed again by the reviewer. If the form is deemed sufficient, then the study program is considered ready to apply for accreditation. From each stage, leaders can see the progress of files and uploaded data. Based on the data and reviewer assessments, simulations and predictions of assessment scores can be seen (Figure 2).
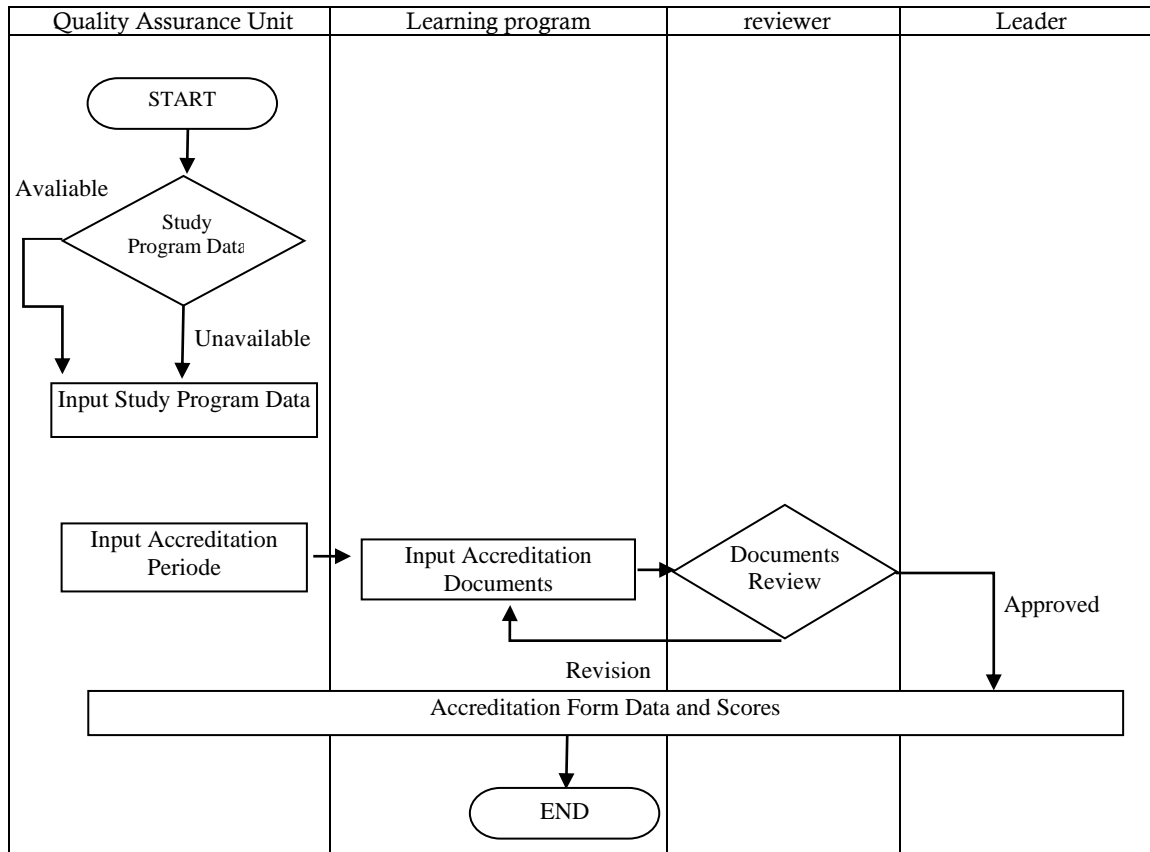
Figure 2. Accreditation Information System Flowchart

Data flow diagram

From the flowchart that has been designed it can then be developed into a Data Flow Diagram design. Administrator is one of the users of the Quality Assurance Unit. This user can manage study program data, accreditation instrument data and user data. The head of the study program can validate the data entered by the accreditation team. The Accreditation Team is the user who inputs data and documents supporting accreditation. Reviewer accounts can assess documents input by the Accreditation Team. Meanwhile, the leader account can view documents and progress data as well as documents and assessments (Figure 3).
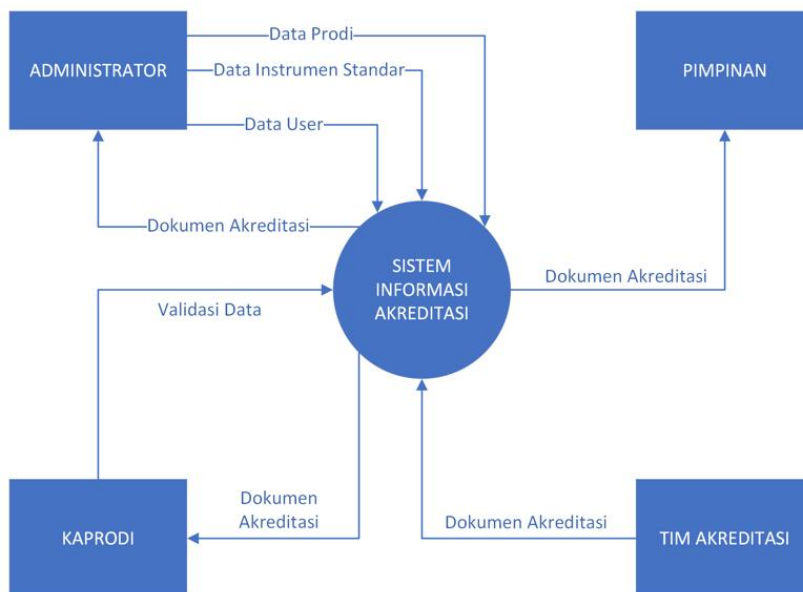
Figure 3. Accreditation Information System Data Flow Diagram

Interface design

The menus that can be accessed by administrators are homepage, Master Data and Manage User. The home dashboard contains statistical information on study programs, criteria, number of systems, validated documents, document status and accreditation results. The dashboard home page can be accessed by management and administrator accounts to find out data recaps and accreditation documents (Fig. 4).
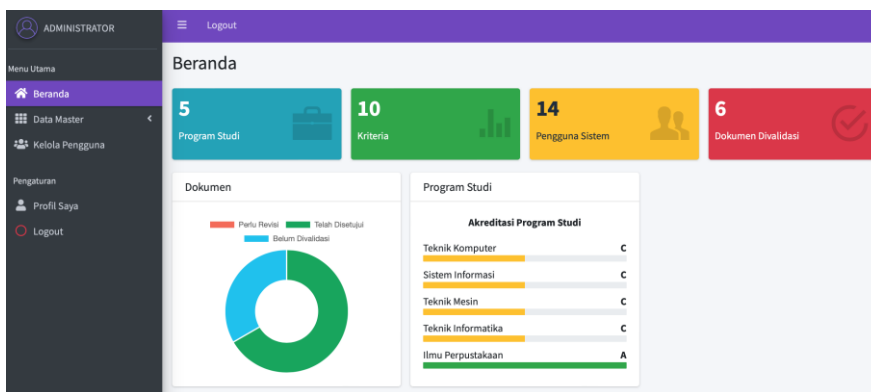

Figure 4. Home Page Dashboard

In the master data administrator menu, there is a sub menu for criteria and Study Program. The Criteria submenu is used to manage accreditation document criteria. The Study Program sub menu is used to manage user accounts. On the criteria page, administrators can add, delete and change criteria names and descriptions. The design of the criteria page can be seen in Figure 5. Adding criteria can be done by entering the criteria name and description as in Figure 6.
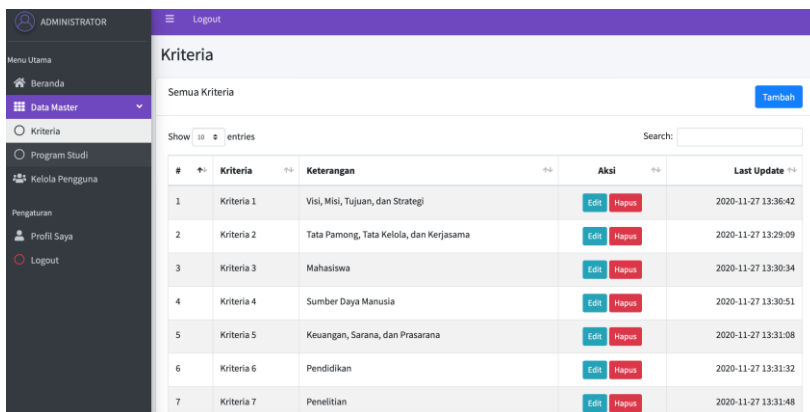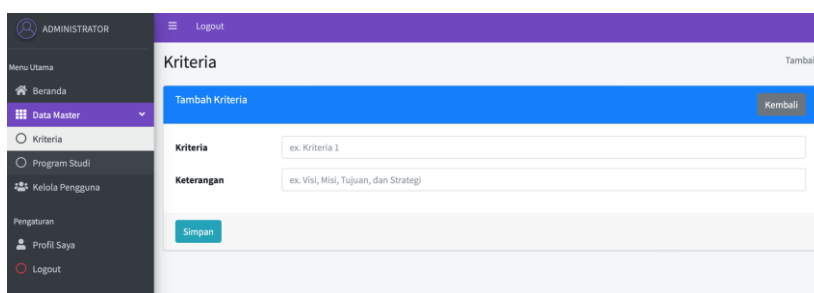
Figure 5. Criteria Page

Figure 6. Add Criteria Form

The difference between the system being built and other systems lies in this feature, where the criteria can be set dynamically by the administrator. If there are changes to the criteria, managers can change them easily. So, you can follow the accreditation standards in accordance with the study program accreditation agency. In contrast to previous research which was specifically used for BAN-PT accreditation instruments, this system can be used for several standard instruments from both BAN-PT and LAM, because managers can add and change criteria in the system without having to hardcode it. research (Simulasi et al., 2023; Widiyanto & Wahyuningsih, 2022).

Administrators are authorized to carry out user management, such as adding, changing and deleting user accounts. Each accreditation criterion can also be added to accounts that can access it. So, each criterion can only be managed by the account responsible for that criterion. The design of the account settings page can be seen in Figure 7. Apart from access criteria, administrators can also set the name, position, level, study program and password for each account (Figure 8).
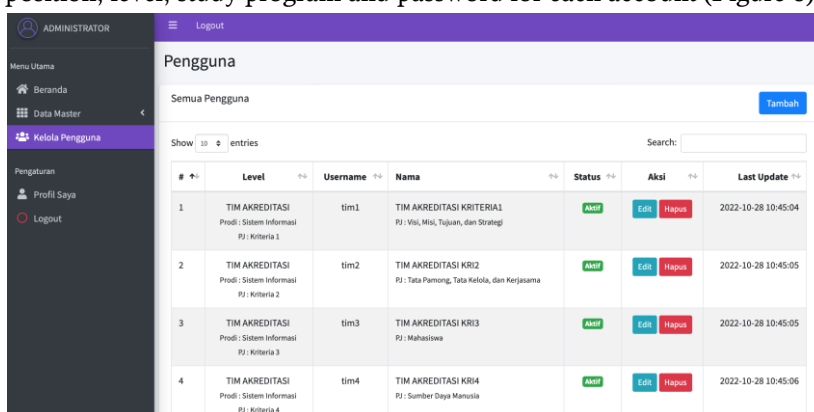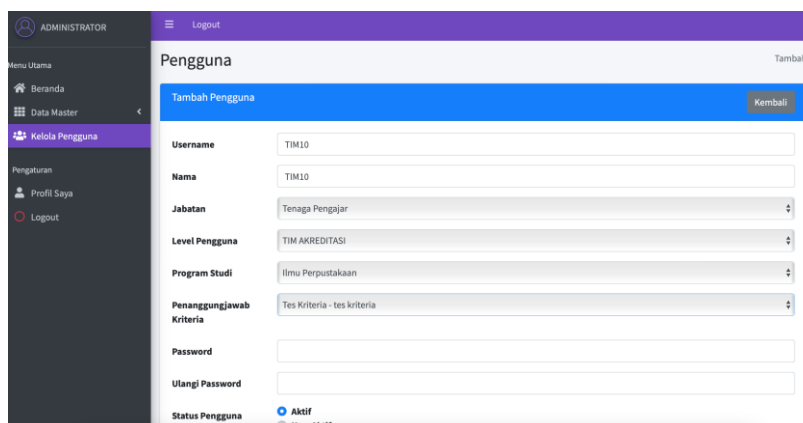
Figure 7. user management

Figure 8. User Settings

In testing the system on the administrator account, all criteria management functions starting from adding, changing and deleting accreditation criteria can run well without any errors. Likewise, user management, testing of the add, change and delete account functions went well and no errors were found.

The accreditation team account homepage design displays the type of position, level of study program, adding documents and viewing documents. Apart from that, there is also information on the validity status of documents that have been uploaded (Fig. 9). The Document Data page contains a table containing the document title, document file, upload account, upload date, document status and options for modifying and deleting the document (Fig. 10).
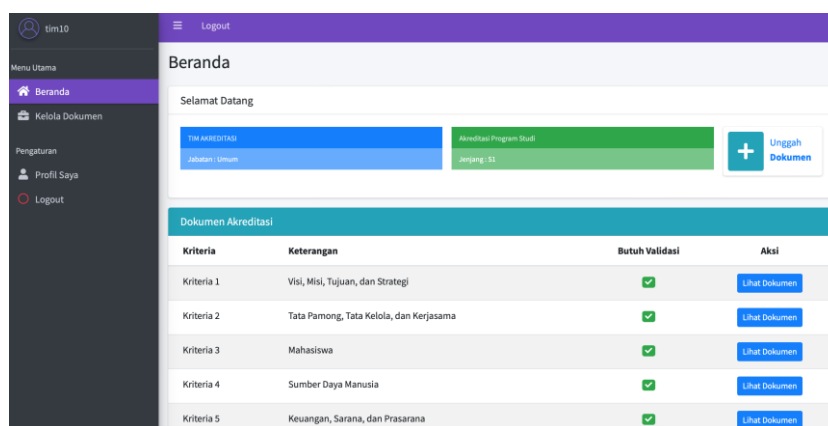

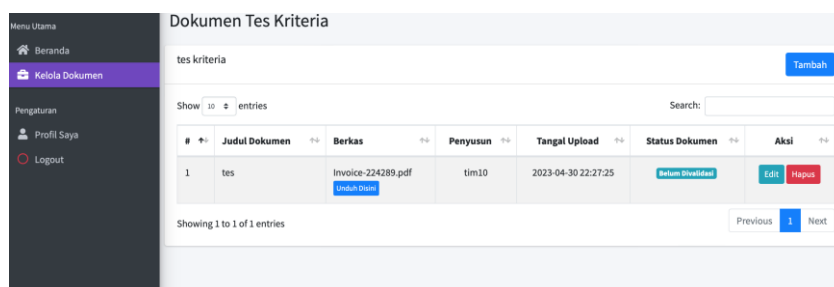**Figure 9.** Home Accreditation Team

Figure 10. Document Data Page

Meanwhile, uploading documents can be done by inputting the document name and selecting the document file. The types of files that can be uploaded to the system are files with the extensions doc, docx, and PDF. The document criteria, uploader name, and study program adjust to the account used, so that users do not need to input data that is already contained in the user's account data (Fig. 11). From the system testing carried out on the features on the accreditation team account, document management, such as the upload, edit and delete document functions, can run well.
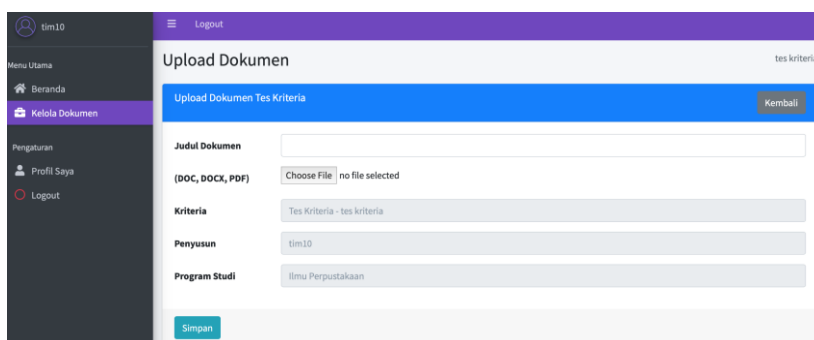

Figure 11. Upload Document Pages

The next process after the documents are uploaded is the document validation process by the head of the study program. If the coconut study program user has logged in, then on the dashboard there is a document validation menu. In this menu there is a description of the number of documents that require validation. On the Document Validation page there is a table containing documents that have been uploaded by the accreditation team. The table contains the criteria name, document title, document file, uploader, upload date, document status and options (Fig. 12).
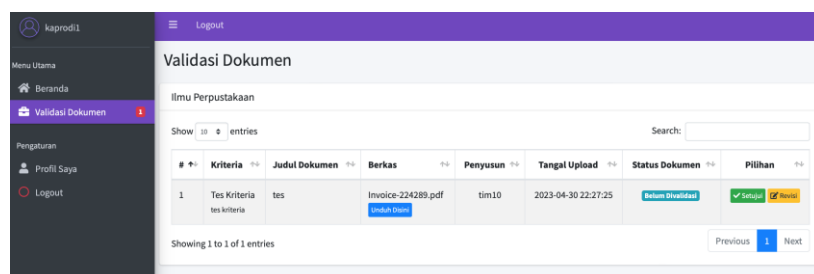

Figure 12. Document Validation Page

If there are data errors, documents that are not appropriate, or documents that need to be corrected, the Head of Study Program can change the status of the document to revised and provide notes regarding the revision and the deadline for correcting the document (Fig. 13). If the document is deemed appropriate and valid, the department head can validate the document that has been uploaded by the accreditation team so that the document status becomes approved (Fig. 14). When the document is approved, the validation time will be automatically recorded in the system.
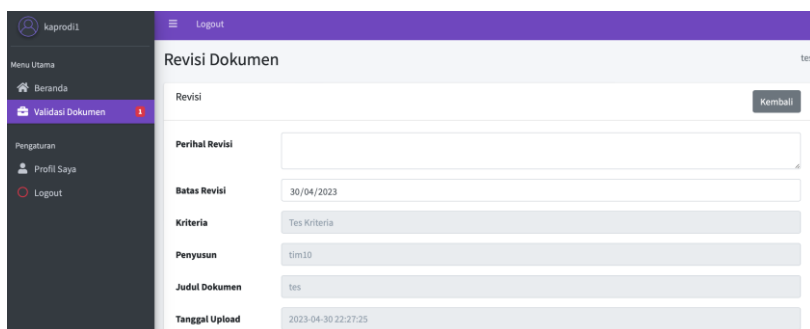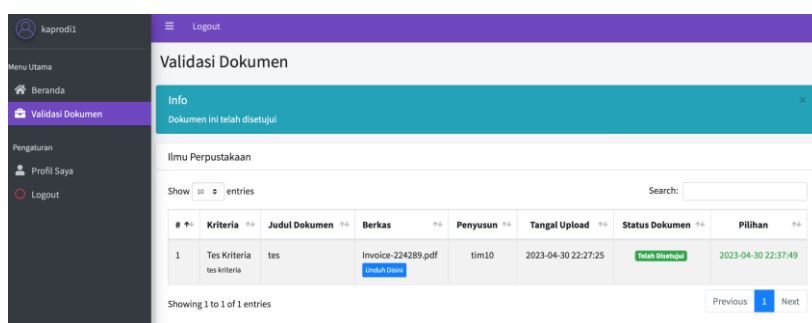
Figure 13. Revision of Document Pages

Figure 14. Document Validation Page

After going through system functional testing, for the study program user, the accreditation document validation feature can run well. So that the process starting from uploading documents, validation and setting up the system has run well and can be used in managing study program accreditation documents.

The limitation of this system is that the accreditation criteria can only be used by one type of accreditation agency. However, this system can be used by several study programs with the same accreditation standards. To use several types of accreditation standards, the system can be installed according to the number of types of accreditation agency criteria required.

CONCLUSION

The study program accreditation information system can be applied in managing accreditation documents. Accreditation standards can be adjusted easily without having to hardcode them. The organizer can determine accreditation criteria dynamically. This makes it easier for the accreditation team to manage documents according to the standard criteria of the specified accreditation institution.

REFERENCE

Andie, A., & Hasanuddin, H. (2023). the Implementation of Accreditation Scoring Calculations in All Web-Based Accreditation Agencies. *Al Ulum: Jurnal Sains Dan Teknologi*, *9*(2), 76. http://dx.doi.org/10.31602/jst.v9i2.11768

Anwar, S., & Setiawan, D. (2020). Suksesi Akreditasi Sebagai Standar Nasional Pendidikan Tinggi. *Jurnal Ilmiah Sosial Teknik*, *2*(2), 88-103. https://doi.org/10.59261/jequi.v2i2.5

Cahyono, D., Triono, T., Yazir, M., Saputra, N. D., Azka, D. A., Lestari, E., & Bayu, M. (2023). Mentoring Instrumen Lamemba untuk Perguruan Tinggi Muhammadiyah Aisiyah secara

Online. *Jurnal Pengabdian Masyarakat Indonesia*, *3*(4), 479–484. https://doi.org/10.52436/1.jpmi.1185

Chapetta, W. A., Das Neves, J. S., & Machado, R. C. S. (2021). Quantitative metrics for performance monitoring of software code analysis accredited testing laboratories. *Sensors*, *21*(11), 1–27. https://doi.org/10.3390/s21113660

Fauzi, I. (2021). Analysis of Ptkin Opportunities: Quality Measurement Through the Malcolm Baldrige Criteria for Using the World Class Universty. *AL-TANZIM: Jurnal Manajemen Pendidikan Islam*, *5*(1), 1–13. https://doi.org/10.33650/al-tanzim.v5i1.1367

Fauzi, M., & Widodo, DA (2017). Sistem Pengolah Data Akreditasi Program Studi Universitas Negeri Semarang. *Jurnal Edu Komputika*, *4* (2), 33–37. https://doi.org/10.15294/edukomputika.v4i2.22492

Hamdan, F. Z. Z., & SH, M. (2022). BAB 2 Isu-Isu Global Serta Dampaknya Pada Pendidikan. *Pendidikan dan Pembelajaran Masa Kini*, 17.

Hasibuan, A. N., & Dirgahayu, T. (2021). Pengujian dengan Unit Testing dan Test case pada Proyek Pengembangan Modul Manajemen Pengguna. *AUTOMATA*, *2*(1).

Jayanti, W. E., & Hendini, A. (2021). Pengembangan perangkat lunak pengujian kendaraan bermotor (Tanjidor) dengan model waterfall pada dinas perhubungan. *Jurnal Khatulistiwa Informatika*, *9*(1). https://doi.org/10.31294/jki.v9i1.10099

Khalilah. (2022a). Lamemba sebagai Lembaga Akreditasi Mandiri: Sejarah Pengembangan, Kesiapan dan Tantangan. *Idaarah: Jurnal Manajemen Pendidikan* , *6* (2), 334–355. https://doi.org/10.24252/idaarah.v6i2.32289

Khalilah, K. (2022b). Sejarah Perkembangan Lembaga Akreditasi Mandidi Pendidikan Tinggi Kesehaan Indonesia. *Jurnal Pendidikan Damhil* , *2* (2). https://doi.org/10.37905/dej.v2i2.1561

Khairuddin, K., & Hadijaya, Y. (2023). Institutional Quality Management Based on Strengthening Accreditation of Study Programs at Islamic State University of North Sumatera. *Edumaspul: Jurnal Pendidikan*, *7*(1), 1054–1067. https://doi.org/10.33487/edumaspul.v7i1.4721

Lam-Gordillo, O., Baring, R., & Dittmann, S. (2020). Ecosystem functioning and functional approaches on marine macrobenthic fauna: A research synthesis towards a global consensus. *Ecological indicators*, *115*, 106379. https://doi.org/10.1016/j.ecolind.2020.106379

Nadiya, Septama, HD, & Komarudin, M. (2021). Pengembangan Dashboard Instrumen Akreditasi Program Studi Versi 4.0 (IAPS 4.0) Menggunakan Laravel Framework. *Tukang Listrik* , *15* (3). https://doi.org/10.23960/elc.v15n3.2176

Rahardja, U., Lutfiani, N., Rafika, A. S., & Harahap, E. P. (2020, October). Determinants of lecturer performance to enhance accreditation in higher education. In *2020 8th International Conference on Cyber and IT Service Management (CITSM)* (pp. 1-7). IEEE.

Pani, F. E., Ibba, G., Marchesi, M., Pinna, A., Porru, S., Tonelli, R., & Valcalda, B. (2019). Blockchain certification and granular editing permissions in document management system. *IC3K 2019 - Proceedings of the 11th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management*, *3*(Ic3k), 299–306. https://doi.org/10.5220/0008349902990306

Park, W., Wu, J. Y., & Erduran, S. (2020). The Nature of STEM Disciplines in the Science Education Standards Documents from the USA, Korea and Taiwan: Focusing on Disciplinary Aims, Values and Practices. *Science and Education*, *29*(4), 899–927. https://10.1007/s11191-020-00139-1

Purwandari, N., & Firmansyah, B. (2023). Sistem Repository Dokumen Akreditasi Program Studi Berbasis Web pada Institut Bisnis dan Informatika Kosgoro 1957. *Remik* , *7* (1). https://doi.org/10.33395/remik.v7i1.11976

Ratno, P. P., & Fanani, M. Z. (2023). Jurnal Mantik Management information system modeling within the framework of the accreditation dashboard based on key performance indicators. *Manajemen, Teknologi Informatika, Dan Komunikasi (Mantik)*, *7*(3). https://doi.org/10.35335/mantik.v7i3.4285

Setiawan, H. P. L., Madenda, S., Wibowo, E. P., & Hasan, R. (2023). Using Information System Simulations and Modeling to Reconstruct Traditional Building Structures: The Case of Joglo Buildings in Indonesia. *ISVS E-Journal*, *10*(7), 266–281.

Sri, Y., Muchlas, R., Ekohariadi, S., & Kurniawan, A. (2021). Design and Development of Alumni Tracking Information System. *RISTEC : Research in Information Systems and Technology*, *2*(1), 773–777. https://doi.org/10.31980/ristec.v2i1.1214

Susilawati, S., Yaqin, M. Z. N., Wahidmurni, W., & Putri, C. A. (2023). Assessment of Needs for Developing Curriculum Study Program for Masters of Education in Madrasah Ibtidaiyah Teachers Towards Excellent Accreditation. *Nidhomul Haq : Jurnal Manajemen Pendidikan Islam*, *8*(2), 302–314. https://doi.org/10.31538/ndh.v8i2.3959

Syukur, A., Sabri, S. R., & Arta, Y. (2020). *Monitoring Single Site Verification (SSV) System and Optimization BTS Network based on Android*. ICoSET 2019, 243–249. https://doi.org/10.5220/0009186102430249

Simulasi, A., Instrumen, P., Terstandar, A., Berbasis, L., Susilo, WS, Kurniawan Budhi, R., & Prayitno, A. (2023). Aplikasi Simulasi Penilaian Instrumen Akreditasi Terstandar LAMEMBA Berbasis Web. *Jurnal Teknologi Informasi Ampera* , *4* (1), 31–45. https://doi.org/10.51519/journalita.v4i1.342

Siregar, L. (2020). Review Pengujian Keamanan Perangkat Lunak dalam Software Development Life Cycle (SDLC). *Journal of Applied Sciences, Electrical Engineering and Computer Technology*, *1*(3), 1-11.

Sulaiman, S., Purwoko, AA, & Purwaningsih, DI (2022). Pengembangan Sistem Informasi untuk Akreditasi Program Studi. *Pendidikan: Jurnal Pendidikan* , *20* (2). https://doi.org/10.31571/edukasi.v20i2.4577

Taber, S., Akdemir, N., Gorman, L., Van Zanten, M., & Frank, J. R. (2020). A "fit for purpose" framework for medical education accreditation system design. *BMC Medical Education*, *20*(Suppl 1), 1–12. http://dx.doi.org/10.1186/s12909-020-02122-4

Wahyuningrum, T. (2021). *Buku Referensi Mengukur Usability Perangkat Lunak*. Deepublish.

Widiyanto, & Wahyuningsih, SS (2022). Sistem Informasi Manajemen Dokumen Akreditasi Program Studi Pendidikan Jarak Jauh. *Lembaran Ilmu Kependidikan* , *51* (1), 12–20. https://doi.org/10.15294/lik.v51i1.33370

World Health Organization. Regional Office for South-East Asia. (2024). *Decade for health workforce strengthening in SEAR 2015-2024 : mid-term review, 2020*.