



Evaluation of Web-Based Academic Management Information System Products in Improving Academic Administration

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Abstract. The issues that arise regarding the efficiency and effectiveness of academic management, one of which is due to the need for integration of activities using information technology. This research aims to develop a web-based academic information system product using the Research & Development (R&D) method and the ADDIE model. The study involves teachers and students at SMA Negeri 9 Banda Aceh and several experts in the development and implementation phases. The research results indicate that 90.29% of products in the category are deemed highly suitable through expert judgment validation. Meanwhile, the usability results of the product in limited trials were 76; in the main field trial, it was 72; and in the operational field trial, it was 84, categorizing the product as suitable and beneficial for schools in managing academic activities to enhance the effectiveness of school academic management. The implications of this research indicate the potential to improve academic management activities by integrating technology, thereby reducing administrative burdens, saving time, optimizing resource utilization, and assisting stakeholders in decision-making.

Keywords: Academic; Evaluation; information system; website.

INTRODUCTION:

The rapid development in information and communication technology has opened doors to faster interaction and exchange of information (Mujahidin et al., 2023). There is a strong correlation between educational advancements and the development of ICT in today's world of globalization and cutthroat competition (Yudana & Prapitsasari, 2022). Information Communication Technology encompasses the technological systems used for transmitting, storing, processing, displaying, creating, and automating the dissemination of

information (Chege et al., 2020). Those who are following this trend share the rising standards of society for educational services. Hence, schools must consistently find new ways to manage the use of ICT to deliver services; this includes using it as a promotional tool and as a means of communication and information sharing between schools, parents, students, relevant institutions, and the public.

According to data from the Central Statistics Agency (BPS), the population using the Internet has increased during the period from 2018 to 2022. This is indicated by the rise in the percentage of the population accessing the

Internet, which was around 39.90% in 2018 and increased to 66.48% in 2022. The increased percentage of the population accessing the Internet has occurred throughout all regions in Indonesia. Based on the data, the percentage of the population aged five years and above who have accessed the Internet in the school/campus environment was 7.79% in 2021 and 12.14% in 2022. Other data indicates that the percentage of schools using Internet facilities according to educational levels in urban areas in 2018 was 88.29%. The growth and utilization of the Internet enable educational institutions to integrate academic activities with technology-based approaches to obtain relevant information for academic purposes.

Information is categorized as one of the primary sources that educational institutions must enhance to create competitive opportunities compared to others. Improving management performance effectiveness is a benchmark to add value to competition. In realizing this, integrating educational management activities with information technology becomes a necessity that education stakeholders need to consider (Subandi et al., 2018). One is implementing information systems in academic activities, thus creating good governance (Lestari et al., 2021).

One of the urgencies of the issue in this research is that schools always strive to improve academic services. However, based on the observations made, it is found that academic management is less effective and efficient because the process is still carried out conventionally or manually. The utilization of information technology has yet to be maximized at SMA Negeri 9 Banda Aceh, resulting in repetitive, inaccurate, unrecorded data and requiring a long time (inefficiency) for retrieval. Inconsistent data is also found. This indicates the importance of implementing a management information system in educational institutions (Purnamawati et al., 2023; Chamisah, 2017; Vlachogianni & Tselios, 2022).

In the context of educational institutions, the strategic implementation of a web-based academic system can provide significant advantages if done correctly. However, such implementation needs to be aligned with the educational institution's goals, vision, and mission. Therefore, a thorough analysis of factors influencing the formation of an information system that is suitable and in line with the school's needs is required. The DeLone

and McLean, success model approach, can be utilized to evaluate the feasibility of an information system. It offers a thorough assessment of the system's performance (Permana & Mudiyanti, 2021) and can be employed to determine the key factors impacting the success of information systems (AbdelKader & Sayed, 2022). Rahayu et al. (2018) & Lutfi (2023) identified six components that make up this framework: system success, information, services, usage, user satisfaction, and net benefits (usage impact).

In the research carried out by Subandi et al., (2018), it was determined that the effectiveness of the academic information system on the web reached an overall rate of 81.07%. Implementing management information systems has great potential to support stakeholders in decision-making. By providing information related to administration, academic matters, human resource management, organizational resource management, and financial management, this system enhances operational efficiency and establishes a solid foundation for strategic policies (Bravo et al., 2021). New research highlights the widespread applicability of DeLone and McLean's effective information system method to studying quality characteristics, including information, services, and systems, and how these components impact information system usage and user satisfaction (Lutfi, 2023).

Based on the existing gap issues at SMA Negeri 9 Banda Aceh, the researcher evaluated the academic information system developed using the DeLone and McLean indicators based on two indicators: system success and content (information). System success is measured based on five indicators: ease of use, system flexibility, system reliability, speed of access, and system security (AbdelKader & Sayed, 2022). This is because system quality focuses on the technological and process characteristics of the system (Rokhman et al., 2022). Meanwhile, the quality of the content (information) is based on five indicators: information completeness, ease of understanding, information presentation, relevance to needs, and information accuracy (Yoon & Kim, 2023). Information quality asserts that the available information must be correct, timely, and for the right people (AbdelKader & Sayed, 2022). This research was conducted to evaluate the information system developed by the researcher in the design and development stages.

METHOD

R&D is the research methodology used in this study. R&D is a technique for conducting studies that result in tangible deliverables, such as models, modules, or other products (Saputro, 2017). The goal of R&D is to validate and develop a product (Sugiyono, 2019). Meanwhile, this research aims to evaluate the

developed academic information system product. The sample for this research consists of 18 teachers and 36 students from SMA Negeri 9 Banda Aceh. This study employs the ADDIE approach at level 3, as developed by Robert Maribe Branch. The steps of the Research & Development (R&D) level 3 can be seen in Figure 1 below.

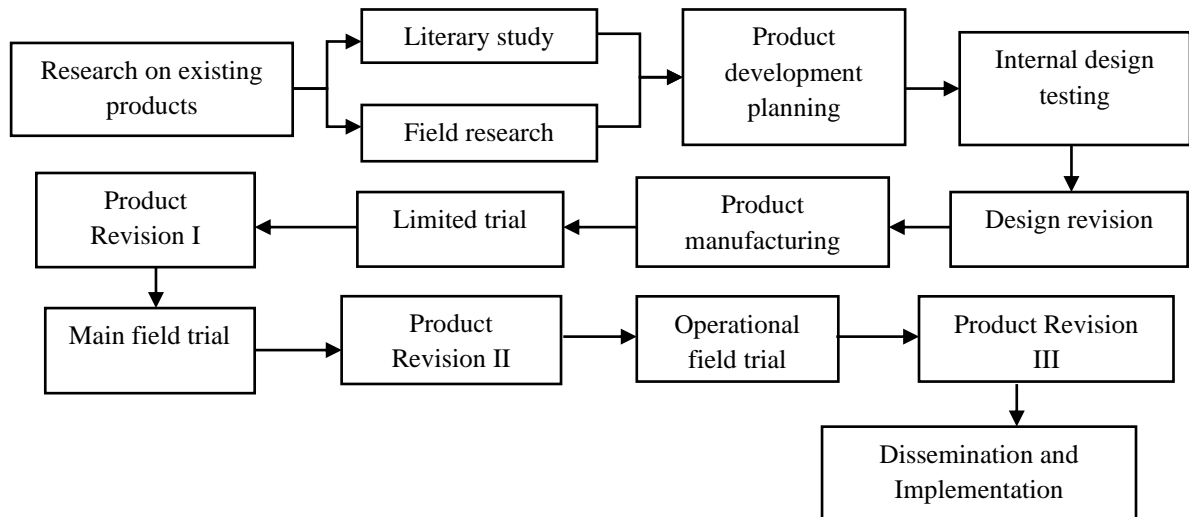


Figure 1. Research & Development (R&D) Level 3 Research Steps

(Source: Sugiyono, 2019)

This study included research in two stages: development, which focused on creating the product, and implementation, which involved internal testing (limited testing, main field testing, and operational field testing). The development stage was carried out with expert validation by two validators, the principal of SMA Negeri 9 Banda Aceh and an IT expert. Meanwhile, in the implementation stages, it was tested on teachers and students of SMA Negeri 9 Banda Aceh with a different number of respondents at each stage. The product was validated by validators and processed based on percentage criteria interpreted (Kamal et al., 2020) in numerical form in Table 1 as follows:

Table 1. Analysis of Criteria for Feasibility Classification

Percentage (%)	Classification
$100 \geq P > 81,25$	Highly Feasible
$81,25 \geq P > 62,75$	Feasible
$62,75 \geq P > 43,75$	Less Feasible
$43,74 \geq P > 25$	Not Feasible

In the trial, the testing design utilized the System Usability Scale (SUS) developed by John Broke. SUS was employed to assess the usability level and evaluate how effective, efficient, and satisfactory a website or system is according to users. This measurement is illustrated through adjective ratings to clarify the usability level. Subsequently, the results can be interpreted within the acceptability range to assess whether the developed system is acceptable. Adjective ratings and acceptability range can be seen in Figure 2 (Hestehave et al., 2023).

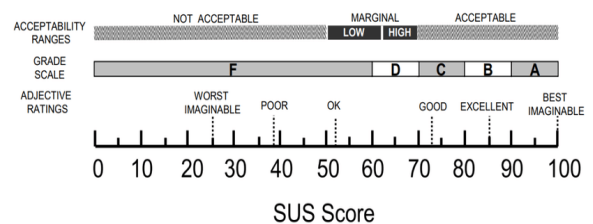


Figure 2. Adjective Rating dan Acceptability Range

RESULTS AND DISCUSSION

Result

The product development process goes through expert validation stages by two experts, namely the Head of State Senior High School 9 Banda Aceh and an IT expert. This validation is conducted to measure the system's success and the information obtained by the product. Measurement uses the theory of success aspects developed by DeLone and McLean to test the product's suitability. In terms of system feasibility, there are 15 statements with five indicators. Figure 3 presents a bar diagram of the expert validation results:

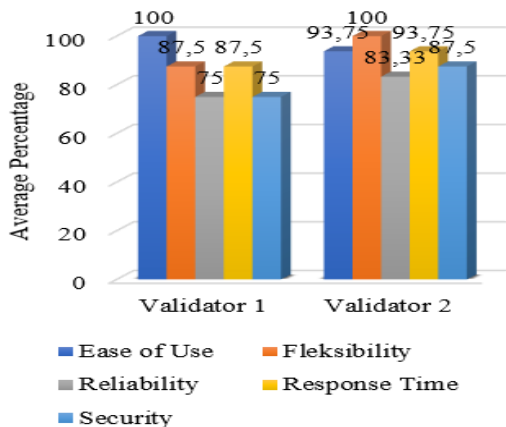


Figure 3. The graph of the results of the System Feasibility Evaluation on the Product

Based on Figure 3, it is shown that overall, the system product obtained a system feasibility percentage of 86.67% for validator 1 with the category of feasible and 91.67% for

validator 2 with the category of highly feasible. Meanwhile, content feasibility (information) includes 16 statements with five indicators. The results are presented in Figure 4 as follows:

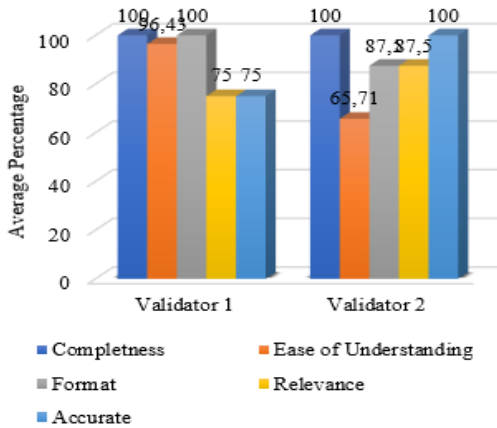


Figure 4. The graph represents the Evaluation Results of Content Suitability in the Product

Figure 4 illustrates that overall, the web-based academic management information system achieves a content (information) feasibility percentage of 92.19% with a highly feasible category according to Validator 1 and 90.63% with the same category according to Validator 2. The product feasibility percentage obtained from Validator 1 is 89.43% with a highly feasible category, and from Validator 2 is 91.15% with a highly feasible category. The analysis results conclude that the final feasibility percentage for the web-based academic management information system is 90.29%, categorized as highly feasible for use. The recommended product validation results by validators are qualitatively found in Table 2.

Table 2. Expert Validation Results

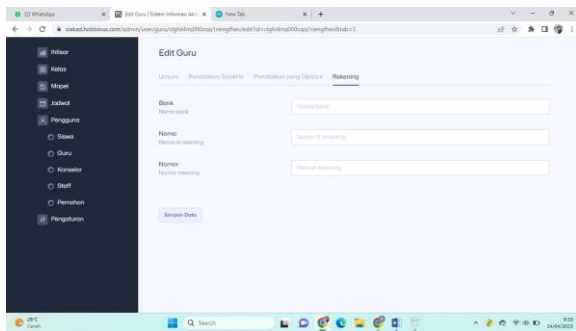
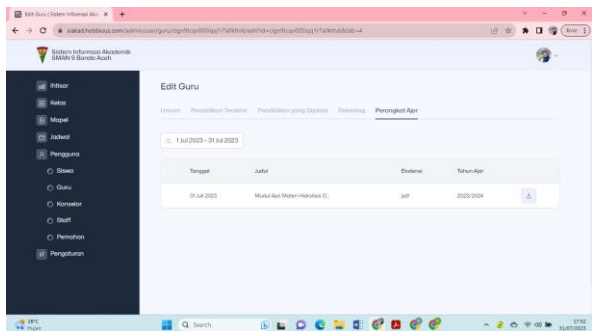
Validator	Comment
The Head of SMA Negeri 9 Banda Aceh	1. The media is ready for use. 2. Addition of assessment features/assessment results
IT Expert	1. Integrate teaching materials uploaded by teachers into the admin account. 2. Fix the location of the signature on the printout of the teacher's daily journal. 3. Improve the display of teacher's teaching materials in the summary section by removing it. 4. Remove the display of the number of classes taught in the summary view of the teacher's account.

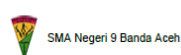
Based on the feedback provided, product improvements were subsequently carried out. However, these product enhancements were made considering various

factors such as cost estimates, time considerations, and others. Several aspects underwent improvement based on expert comments on the developed product, including the teacher summary section, instructional

features in the admin account, and feature display. The updated product outcomes are shown in Table 3.

Table 3. The qualitative changes in product validation outcomes on the web-based academic management information system

Before Revision	After Revision
 <p>There has been no addition of teaching materials for teachers on the admin account</p>	 <p>After the addition of the teaching materials feature for teachers on the admin account</p>



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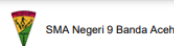
Nama : Rini Ade Octaviany
NIP : 12345678901234567890
Periode : Juli

Tanggal	Kegiatan	Jam ke	Waktu	Kredit	Sasaran
25 April 2023	Rapat dengan Kepala Sekolah	5	10.50 - 11.30		Bahas pengajaran awal semester
31 Juli 2023	Bimbingan Belajar Peserta Didik	3	09.00 - 09.40		Peserta Didik Tidak Mencapai KKM

Kepala Sekolah
Langsa, 31 Juli 2023

Dra. Ramlah Zaini, M.Si

Before the change of signing location by the school principal



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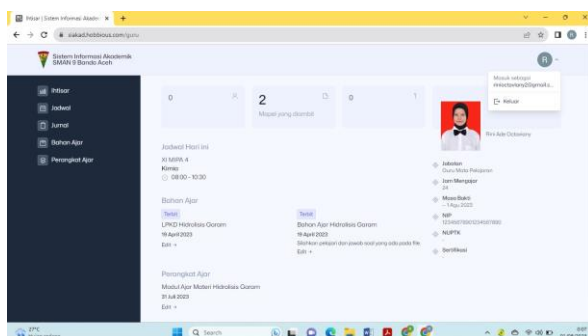
Nama : Murni Idyati, S.Pd
NIP : 12345678901234567890
Periode : Oktober

Tanggal	Kegiatan	Jam ke	Waktu	Kredit	Sasaran
7 September 2023	Mengoreksi Tugas	1-3	07.30 - 10.00		Pemeriksaan tugas pada 2 kelas.
7 September 2023	Jam Mengajar X IPAS 8	5-6	10.50 - 12.20		Peserta Didik
7 September 2023	Membuat Soal Ulangan Harian	7-8	12.20 - 13.45		Perangkat Ajar
26 September 2023	Mengajar di kelas XI 2A	1-2	07.30 - 09.00		Kemampuan belajar anak meningkat
26 September 2023	Memeriksa Tugas	5-6	10.50 - 12.20		Mendapatkan hasil belajar anak

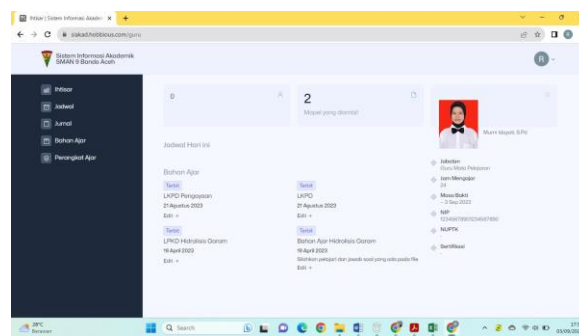
Kepala Sekolah
Banda Aceh, 20 Oktober 2023

Dra. Ramlah Zaini, M.Si

After the change in the location of the teacher's journal signature by the school principal

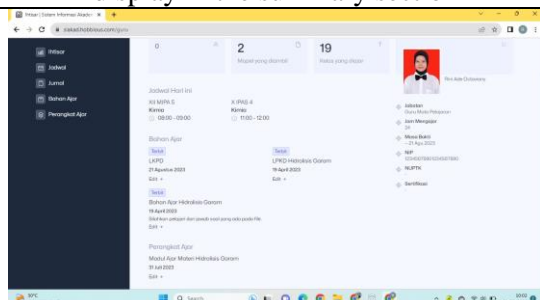


Before the removal of the teaching materials



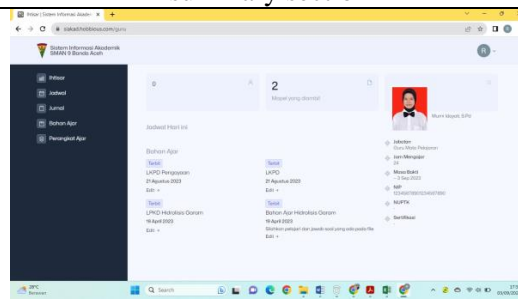
After the removal of teaching materials in the

display in the summary section



Before the removal of the display of the number of classes taught in the teacher account summary

summary section



After the revision by removing the display of the number of classes in the teacher account summary

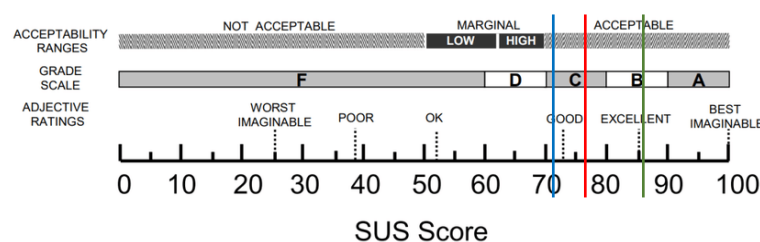
The next stage is the implementation phase, involving the testing of the information system on teacher and student respondents at SMA Negeri 9 Banda Aceh. The testing process consists of three stages: a limited test with three teacher respondents and 6 student respondents; the principal field test with a total of six teachers and twelve student respondents; and the

operational field test with nine teacher respondents and eighteen student respondents. The testing design utilizes the System Usability Scale (SUS) developed by John Brooke to measure the success of a system. Table 4 displays the outcomes of the system testing.

Table 4. Results of Usability Testing for Academic Management Information System Based on Website

No	Testing Stages	Average SUS Scores	Acceptability Aspects	Scale Value Aspects	Criteria Aspects
1	Limited Trial	76	Acceptable	Category B	Excellent
2	Main Field Trial	72	Acceptable	Category C	Good
3	Operational Field Trial	84	Acceptable	Category B	Excellent

Based on Table 4, usability criteria are presented in Figure 5 as follows:



Note:
— Average SUS scores for limited trial
— Average SUS scores for main field trial
— Average SUS scores for operational field trial

Figure 5. The Usability Level of Web-Based Academic Management Information System According to SUS Scores

Discussion

The academic management information system is crucial for improving the efficiency of educational administration. In addition, the integration of IT in schools has the potential to

expand access to education, enhance educators' abilities to deliver instruction, modernize management systems, and increase student productivity (Alfaini et al., 2021). Implementing management information systems leads educational institutions/organizations towards

achieving goals by raising service standards and educational quality (Abduloh & Purwantoro, 2021; Gunawan et al., 2020; Yani et al., 2021). Furthermore, information technology plays a vital role in problem-solving, fostering creativity, improving effectiveness, and enhancing efficiency in human activities.

This study is conducted through the development and implementation stages of the ADDIE model. The development stage involves assessing the feasibility of a web-based academic management information system through expert judgment, considering both system feasibility and content feasibility aspects. The expert judgment evaluation method is used to review the first product and give comments that can improve the product development process (Purnamawati et al., 2023). During viability testing, an information system's operation must be able to meet goals or fix problems. Therefore, one of the considerations in evaluating the feasibility of a proposed system is whether the organization will benefit from a more efficient process after the new system is operational (Sutabri, 2012; Philippus, 2005).

In the next stage, the product implementation is carried out through three stages of testing: limited testing, main field testing, and operational field testing. The instrument used to measure the product's success is the System Usability Scale (SUS) developed by John Brooke (Holden, 2020). Usability is one of the critical elements of technological success. The International Organization Standard says that there are three ways to measure usability: how successful, how efficient, and how satisfied people are (Nioga et al., 2019; Vlachogianni & Tselios, 2022; & Baumgartner et al., 2019). One benchmark metric is the System Usability Scale (SUS), an indicator that does not require additional costs, is reliable and is used globally with high validity and reliability. SUS has both positive and negative aspects. The SUS instrument is technology-agnostic, which can be applied to evaluate various technological products, including websites, mobile applications, and learning management systems (Vlachogianni & Tselios, 2022). Additionally, this parameter has proven reliable even with various population size (Holden, 2020).

The products developed during the final stage demonstrate the integration of educational institution needs with the evolving times. Using academic management information systems will

reduce the administrative burden, time, and resources required in academic management. Szymkowiak et al., (2021) express that information systems improve effectiveness and time-saving, acting as a vital instrument for managing businesses, making decisions, competing, evolving, and notably excelling in innovative approaches to learning and education. Additionally, computerized systems will simplify teacher tasks in both teaching and administration (Yahya & Wijoyo, 2020).

CONCLUSIONS AND SUGGESTIONS

The web-based academic management information system was developed using the ADDIE approach. This research focused on the development and implementation stages, testing the product through expert judgment validation and three usability tests using the System Usability Scale (SUS). The results indicate that expert judgment validation and product usability are highly feasible for use. Therefore, the product can be utilized by schools to manage academic activities, enhancing the effectiveness of academic management. The implications of the product for users include accessibility from anywhere and at any time, providing long-term benefits to schools by integrating technology into management activities, thus facilitating educational stakeholders in making better decisions.

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