Jurnal Teknologi Informasi dan Pendidikan
Volume 18, No. 1, March 2025
https://doi.org/10.24036/jtip.v18i1.850

P.ISSN: 2086 – 4981
E.ISSN: 2620 – 6390
tip.ppj.unp.ac.id

Development of a Lecture Monitoring Information System for Management Department at the State University of Medan

Haryadi[1], Haikal Rahman[1], Aprinawati[2], Rangga Restu Prayogo[2], Dina Sarah Syahreza[2], Dedy Husrizal Syah[1*]✉

[1]Digital Business Department, Universitas Negeri Medan, Medan, Indonesia
[2]Management Department, Universitas Negeri Medan, Medan, Indonesia
Corresponding Author: desra@unimed.ac.id

Article Information

Article history:

No. 850
Rec. May 10, 2024
Rev. January 30, 2025
Acc. March 14, 2025
Pub. March 15, 2025
Page. 67 – 80

Keywords:

- *web*
- *monitoring*
- *R&D*
- *ADDIE*

ABSTRACT

The development of information technology, especially websites, is necessary to increase the efficiency and accuracy of monitoring and evaluating lectures in higher education, especially during the Covid-19 pandemic. This study aims to develop a web-based lecture monitoring information system and test the feasibility level of the information system developed based on validation/assessment from a team of experts and students. This research uses a Research and Development (R&D) approach with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). System designed using Appsheet with Google Sheets database. Media Validation was carried out by a Visual Media Expert Lecturer and tested on 70 class commissioner students in the management department at State University of Medan. In general, the results of the media aspect validation as measured by two indicator aspects of interface and multimedia are classified as very feasible at 88.89%, and the results of the field trial assessment as measured by four indicator aspects of correctness, reliability, integrity, and usability are also categorized as very feasible at 89.89%.

How to Cite:

Haryadi, H., & et al. (2025). Development of a Lecture Monitoring Information System for the Management Department at the State University of Medan. Jurnal Teknologi Informasi Dan Pendidikan, 18(1), 67-80. https://doi.org/10.24036/jtip.v18i1.850

This open-access article is distributed under the Creative Commons Attribution-ShareAlike 4.0 International License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. ©2023 by Jurnal Teknologi Informasi dan Pendidikan.

1. INTRODUCTION

The current development of education, significantly higher education, is required by the times to be faster, more precise, and more efficient. With the application of information

technology, the world of education is expected to be able to answer existing challenges. An increasingly burgeoning realm within the domain of information technologies pertains to website technology, manifesting notable momentum in its evolution. This technological domain finds multifaceted applications encompassing promotional endeavors, marketing initiatives [1], dissemination of information, educational pursuits, and facilitation of communication channels [2]. In education, significantly higher education, website technology can be used in lecture and administrative activities without being limited by space and time [3]. Moreover, coupled with the Coronavirus Disease (COVID-19) pandemic, which is usually called coronavirus, most people. This virus occurred in the 21st century, causing many activities to be disrupted, including lecture activities.

In the application of information technology, a deep understanding of the information system as the foundation is required. An information system refers to a structured sequence of formalized protocols whereby raw data undergoes aggregation, processing to yield informative outputs, and subsequent dissemination to designated end-users [4]. Notably, the conceptualization of an information system transcends the necessity of computer integration. Those information systems that predominantly leverage computational technology are called Computer-Based Information Systems (CBIS) [5]. However, in practice, the term information system is more often used without the embellishment of being computer-based, even though, in reality, computers are an essential part. Because, in essence, an information system cannot run well without a computer. If connected with information technology, CBIS plays a crucial role in improving the quality of an agency. Its use is not only an automation process for information access but also creates an integrated system's accuracy, speed, and completeness so that technology in processing organizations will be relevant, practical, scalable, and flexible [6][7].

With the integrated information system, educational institutions can more easily manage and monitor the quality of their education. Quality is essential in every management implementation because good quality guarantees the implementation of suitable management activities and vice versa. One way that can be used to assess the quality of management is through monitoring and evaluation. Monitoring and Evaluation (Monev) is an important activity carried out for progress and improvement of performance. From the results of the implementation of money, management can find out the obstacles, shortcomings, and advantages of the system that has been implemented so that this can be used as evaluation material so that improvement and problem-solving strategies can immediately be developed. In the process, education contains information that must be managed professionally. Of the many pieces of information, one of the pieces of information that must be managed in the world of education is information regarding lecture monitoring and evaluation. The development of technology and information presents a solution in responding to development challenges, and the existence of website-based lecture monitoring and evaluation in pandemic conditions makes the provision of information flow easier to access anywhere and anytime via the internet.

P.ISSN: 2086 – 4981
E.ISSN: 2620 – 6390
tip.ppj.unp.ac.id

One of the important aspects in monitoring and evaluation of lectures is the supervision of the learning process itself. In the learning process, monitoring is done by looking at the results of filling in lecture minutes, which is one part of lecture administration. The lecture minutes document contains material the lecturer presents to students at each lecture meeting, which aims to provide information and data on the ongoing lecture process. Apart from that, it also controls the implementation of the learning process. Lecture monitoring is carried out to analyze the lecture process [8]. The intended analysis is to check student attendance, lecturer attendance, whether the percentage of the lecture process has met the minimum meeting limit, and find solutions if there are problems so that it will produce better decisions and conclusions.

In addition to monitoring, evaluation also plays a key role in ensuring the achievement of learning goals. Implementing the curriculum in educational institutions aims to enable students to achieve the targets set by academic regulations. The essence of education is to encourage changes in student behavior in intellectual, moral, and socio-cultural aspects. Evaluation, as an element generally encountered in education, currently has a broader meaning. Although the definition has evolved, educational evaluation was initially related to student learning achievement. In [9] the first definition of evaluation development, Ralph Tyler states that it is a process of collecting data to assess the extent to which educational goals have been achieved, considering what aspects and parts are involved in that achievement.

The importance of monitoring and evaluation is increasingly felt in institutions with a large number of students such as the Management Department at State University of Medan. The large number of academic communities in the Management Department (Digital Business, Entrepreneurship, Management Study Program) of State University of Medan has a severe impact on the management, processing, and operations of lecture monitoring services, especially in the Management Department (Digital Business, Entrepreneurship, Management Study Program) of State University of Medan. The addition of various study programs at State University of Medan will significantly affect the quality of student information services and grade transparency, such as Online Attendance services, Inputting Assignment Grades, mid-term examination (UTS), and Student final examination (UAS). The absence of rigorous oversight concerning student attendance, daily assignment evaluations, mid-term examinations (UTS), and final examinations (UAS) is a notable challenge within the academic domain. Such supervisory tasks are incumbent upon every lecturer, embodying a crucial aspect of pedagogical responsibility. Careful and correct academic administration is required to ensure the quality of lecture attendance information services, including the content, form, and data accuracy.

Facing these challenges, the current monitoring and evaluation system is still not optimal because it is still done manually. Implementation of lecture monitoring and evaluation activities in the Department of Management at State University of Medan is still carried out manually by writing on sheets of paper; the information and data obtained are

not timely and inaccurate, so the monitoring and evaluation process has not been carried out efficiently. Several findings emerged from the systematic observation and direct documentation of attendance records conducted by course instructors weekly. Regarding lecture monitoring and evaluation, consider this when recording it manually because it can take a very long time. Therefore, innovative steps are needed to solve this problem by connecting with information systems that are expected to be able to provide effective and efficient solutions, such as timely, paperless data and accurate information for decision-making. This research is expected to produce an information system for monitoring and evaluating learning and lectures in the management department of State University of Medan, which provides services in the form of lecturer attendance, availability of SAP (lecture teaching unit)/syllabus and teaching materials, suitability of lecture minutes, collection of questions, suitability of questions and teaching materials, as well as collecting learning outcome scores. Furthermore, this system can help study programs and quality assurance units in monitoring and evaluating the lecture process.

2. RESEARCH METHOD

This study adopts a research and development (R&D) methodology commonly employed to formulate and evaluate specific products. This approach entails a systematic process aimed at both the creation and assessment of the viability of said products [10]. This research produces an information system used in the learning/lecture monitoring and evaluation. Research into developing a lecture monitoring and evaluation information system was carried out to determine the system's feasibility in the learning monitoring and evaluation process. Therefore, it is necessary to have a research design with stages so that this research can move in the right direction. The sequential phases of inquiry delineated herein pertain to the ADDIE instructional design framework, encompassing Analysis, Design, Development, Implementation, and Evaluation [11]. Originating from the seminal work of Dick and Carey in 1996, the ADDIE model initially found application in the crafting of educational environments [12]. The evolutionary trajectory of the ADDIE model unfolds through discrete stages, notably comprising "analysis, design, development, implementation, and evaluation," each constituting integral components of the iterative process [13].

The procedure for developing a learning/lecture monitoring and evaluation information system consists of five stages: 1) Analysis stage (instrument analysis, media analysis, and target user characteristics). A needs analysis is conducted at this stage to determine problems and appropriate solutions for students, hardware, and software. The main activities carried out at the analysis stage are analyzing the background or need for developing a learning monitoring information system and the need for developing a learning monitoring information system. After analyzing the need for development, researchers must also analyze the need for developing monitoring and evaluation of

P.ISSN: 2086 – 4981
E.ISSN: 2620 – 6390
tip.ppj.unp.ac.id

learning and lectures. This analysis was conducted to determine the need for the information system. 2) Design stage (designing the monitoring and evaluation instruments that will be presented, preparing the display layout (reviewing the UI/UX aspect), and preparing the delivery flow for the instrument form in a flowchart. This application design stage includes designing the flowchart, designing the overall media design (storyboard), preparation of material text, questions, and answers, as well as a collection of background, images, and buttons 3) Development stage (creation of the system using Google Sheets and Appsheets, assessment by validation experts, and revision). In the developmental phase of the ADDIE instructional design model, endeavors are directed toward the materialization of product design concepts through a series of systematic activities. Following the preparatory design phase, wherein initial schematics are conceived, this developmental stage pertains to actualizing these designs into tangible products poised for implementation. At this stage, it is designed using Google Sheets and Appsheet. Application development includes creating interfaces, coding, testing, and deploying. At this stage, media experts also carry out validation [14]. 4) At the implementation stage, the designs and products that have been completed are implemented in the situation and field; from the implementation that has been carried out, it will be continued at the next stage, namely the evaluation stage. 5) This evaluation stage summarizes feedback on implementing the learning/lecture monitoring and evaluation information system. At this stage, an evaluation is carried out by distributing questionnaires to students (class commissioners) to find out their assessment regarding the acceptability of the information system that has been designed [15]. If necessary, revisions will be made to the learning monitoring and evaluation information system.

The scale that will be used to measure data from this research is a Likert scale. The Likert scale is used to measure a person's attitude/perception about an attitude object [16]. The Likert scale, which uses the total score of all question items, is an interval scale [17]. This study employed a five-point Likert scale to assess individual behavioral tendencies. A Likert scale is a psychometric tool commonly used in surveys and questionnaires. It presents respondents with statements and asks them to indicate their agreement or disagreement on a predetermined scale. In this case, the scale ranged from "strongly agree" to "strongly disagree" with a neutral midpoint, capturing the spectrum of individual responses to each question item [18]. This research uses statements submitted and expressed with answers, which are statements of attitude.

The population in this study were media/visual experts and students. At the same time, the respondents in the system feasibility trial were students who were assigned as representatives (coming) from each class within the Management Department and were tested on media/expert practitioners. Visual as a respondent. The assertion posits that within the statistical analysis framework, the sample functions as a reflective entity mirroring the broader population from which it is drawn. Central to this proposition is the notion that the salient attributes and features inherent within the population must find

Volume 18, No. 1, March 2025
https://doi.org/10.24036/jtip.v18i1.850

correspondence within the sample selected for analysis. One of the requirements for sampling is that the sample must be representative, meaning it must represent the population [19]. The sample in this research were media experts, namely Expert Lecturers in the Field of Visual Media Science in the Computer Science study program. The samples for the practicality test of this development research were students assigned as representatives (commissioners) from each class in the Management Department, numbering around ± 70 people.

This design focuses on preparing a lecture monitoring and evaluation system as a web application using the AppSheet platform integrated with the Google Sheet database. Data for this research was obtained through two main instruments: a questionnaire for visual media validation and a trial instrument. The visual media validation instrument includes a validation sheet specially prepared to be evaluated by visual media experts in the context of lecture information systems.

Table 1. Media/Visual Expert Assessment Instrument

Aspect	Indicator	Item Number
Interface	Consistency	1
	Easy to understand	2
	Clear Instructcions	3
	Navigation Presentation	4
	Display layout	5
	Clarity of color, font and text	6
	Quality of interface	7
	Image suitability	8
	Compatibility of element combinations	9
Multimedia	Multimedia presentation	10
	Accuracy of content	11
	Display of elements on one screen	12

Meanwhile, the trial instrument consists of an assessment sheet used by students to assess the quality of content and materials in the lecture monitoring and evaluation system, which is then used in field trials. The assessment methodology used in the validation and material assessment instruments is the result of an adaptation of previous research by [20], but with certain adjustments according to the context and needs of this research.

Table 2. Field Testing Instrument

Aspect	Indicator	Item Number
Correctness	Completeness	1-2
	Consistency	3-4
Reliability	Accuracy	5-8
	Error Tolerance	9
	Simplicity	10
Integrity	Instrumentation	11
	Security	12
Usability	Operability	13

P.ISSN: 2086 – 4981
E.ISSN: 2620 – 6390
tip.ppj.unp.ac.id

The research instrument was operationalized using a Likert scale. The analysis of the instrument will yield scores for each item. Subsequently, the instrument's overall score will be calculated by averaging the item scores using a predetermined formula :

$$x=\Sigma x/n \quad (1)$$

Description : x = average score
Σx = total item score
n = number of item

Following the computation of the average score for each instrument item, the eligibility percentage will be determined by applying a predetermined formula :

$$\text{percentage of feasibility (\%)} = (\text{observation score})/(\text{ideal score}) \times 100\% \quad (2)$$

The percentage outcomes are subsequently juxtaposed with the Likert scale descriptors (Reference [21]). The guidelines delineating the evaluation of the Likert scale within the scope of this investigation are explicated in Table 3.

Table 3. Likert Assessment Scale

No	Percentage	Interpretation
1	0 % - 20 %	Not Worth It
2	21 % - 40 %	Not feasible
3	42 % - 60 %	Fairly Decent
4	61 % - 80 %	Worthy
5	81 % - 100 %	Totally Worth It

Source: adapted from Likert [19]

3. RESULTS AND DISCUSSION

This paper presents the outcomes of the initial model development stages. These stages encompass (1) a comprehensive needs analysis and (2) the formulation of specifications for delivering the information system to users; this was done to help create interest and motivate users in organizing the lecture monitoring and evaluation information system, while at the analysis stage content, several important instrument points are urgent in collecting data from respondents, including a) lecture schedule, b) meeting techniques (offline/online), c) learning media, and d) proof of lectures. The results of this need analysis are then realized in the system's main menu design, as shown in Figure 1.

Jurnal Teknologi Informasi dan Pendidikan
Volume 18, No. 1, March 2025
https://doi.org/10.24036/jtip.v18i1.850

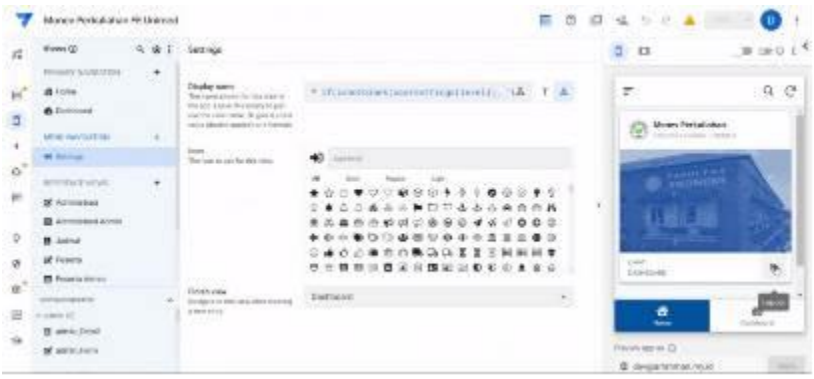


Figure 1. Main Menu Display Appsheet Design

(stage 2) The next stage of product design involves creating a flow chart and storyboard. The flowchart describes the navigation flow for operating the lecture monitoring information system on various devices [22],[23]. Storyboards describe the arrangement of images, text, effects, icons, and other components on the information system screen display [24],[25]. The lecture monitoring and evaluation information system used Appsheet with a Google Sheets database (as attached figures 1, 2 and 3). The result of this design can be seen in Figure 2, which shows the display of the monitoring menu and evaluation of lectures that have been adjusted to the needs of users.

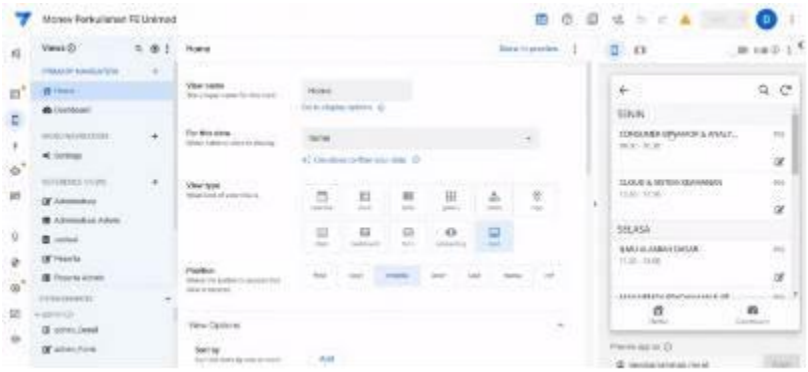


Figure 2. Lecture Monev Menu Display Appsheet Design

After the interface design is completed, the next step is to validate and improve the system display based on expert input. (stage 3). At the development stage, the lecturer in the Visual Media Science field in the Computer Science study program carried out validation testing of media expert instruments. Concomitantly, media product revisions are undertaken based on the recommendations provided by media experts. The results of the implementation of the media expert's advice can be seen in Figure 3 and 4, which displays a web interface with a softer background color as recommended.

P.ISSN: 2086 – 4981
E.ISSN: 2620 – 6390
tip.ppj.unp.ac.id

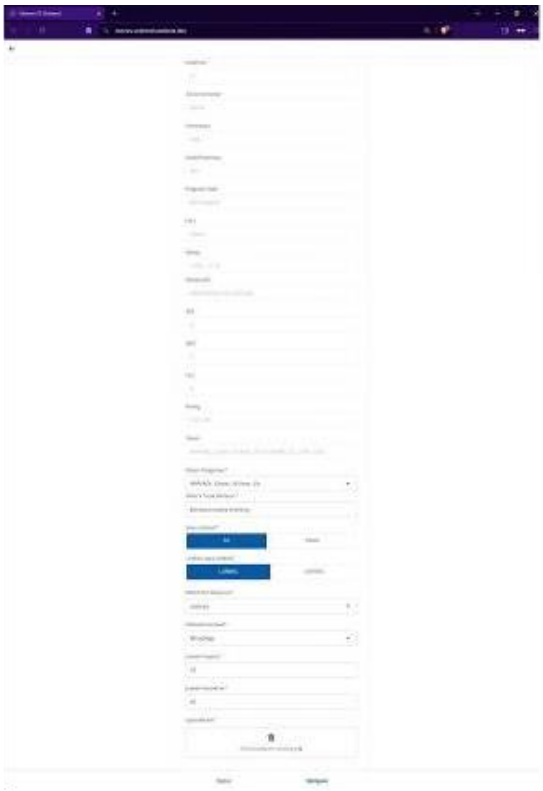


Figure 3. Display of Designed Lecture Monitoring and Evaluation Web Results

Table 4. Media Expert Advice and Recommendations

No	Validator	Expert Feedback on Media Instrument Development
1	Media Expert	Images will be attractive if given a soft background and object color

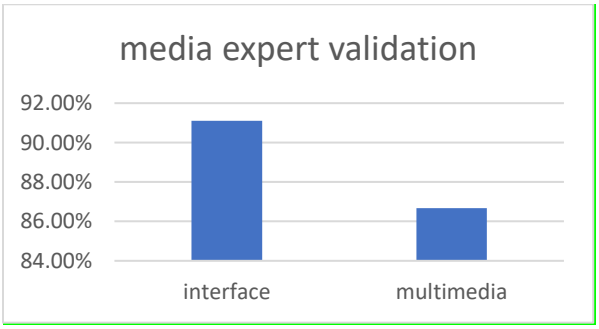


Figure 4. Diagram of Media Expert Validation

After the system is fixed according to the input of media experts, the next step is to test its effectiveness in real situations. (stage 4) If media experts have validated it, it continues with the field trial stage for ± 70 students. Moreover, the fifth stage (stage 5) entails

Volume 18, No. 1, March 2025
https://doi.org/10.24036/jtip.v18i1.850

the final evaluation of the proposed system through field trials. Standardized instruments or questionnaires will be administered to assess the system's feasibility and user acceptability. The monitoring and evaluation information system for lectures in the Management Department of State University of Medan that has been designed can be accessed by various devices such as PCs, laptops, tablets, and mobile phones via a web page: https://monev.unimed.workers.dev/ (as attached figures 5 and 6). This is because this information system is supported by aspects of mobility, comprehensiveness and ease of use [26]. The functionality of the system in recording lecture event news can be seen in Figure 5, which shows the reporting interface that has been implemented.

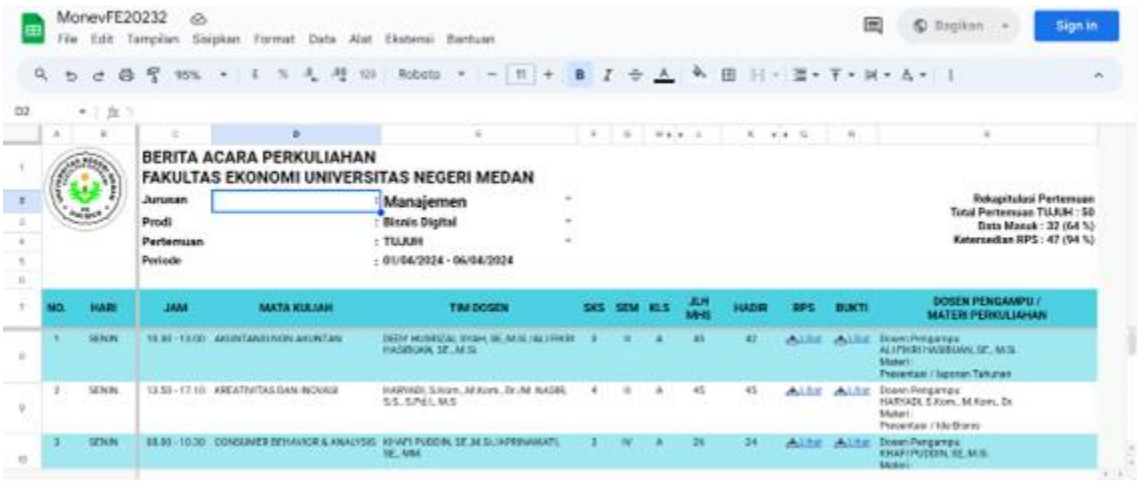


Figure 5. Interface Report Lecture Event News

The results of system validation show an excellent level of feasibility, which is reflected in various aspects of the assessment and monitoring reports produced. The information system is validated using media assessment instruments that research instrument validators have validated in terms of content [27] and construct [28]. The evaluation conducted by media specialists is grounded upon two primary dimensions, specifically the interface component, registering at 88.57%, and the multimedia element, attaining a score of 90%. Hence, the validation by media experts yields an aggregate score of 89.29%, thereby warranting its classification as highly viable. The success of this system implementation can be seen in the display of monitoring and evaluation reports in Figure 6.

P.ISSN: 2086 – 4981
E.ISSN: 2620 – 6390
tip.ppj.unp.ac.id

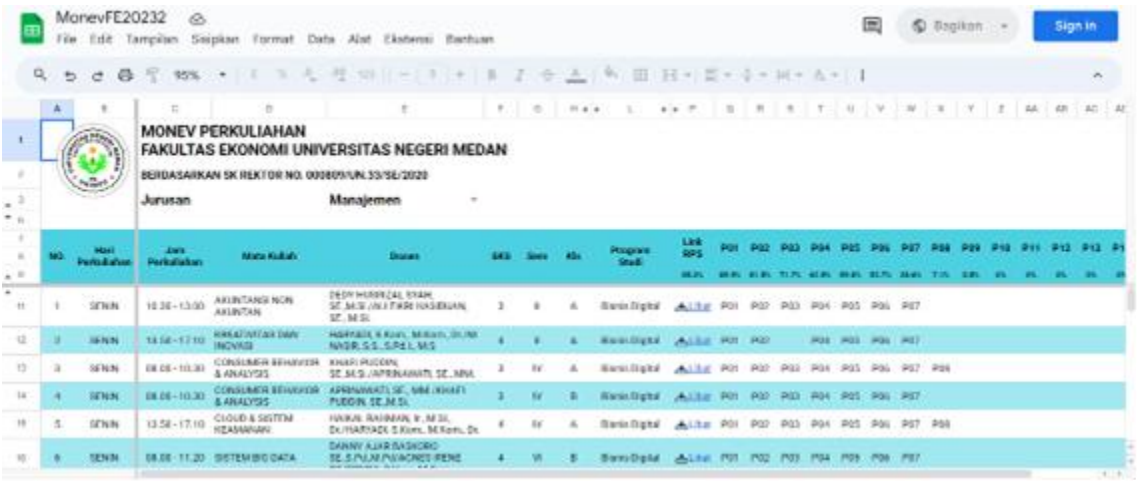


Figure 6. Interface Report Lecture Monev

The results of the student field trial assessment of the lecture monitoring and evaluation information system developed were assessed at the validation stage as consisting of a correctness aspect of 89.93%, a reliability aspect of 90.05%, an integrity aspect of 89.86%, and a usability aspect of 89.71%. The results of this trial assessment were 89.89%, so it can also be categorized as very feasible. The following is a figure 6 diagrams of the results of the field trial assessment on students.

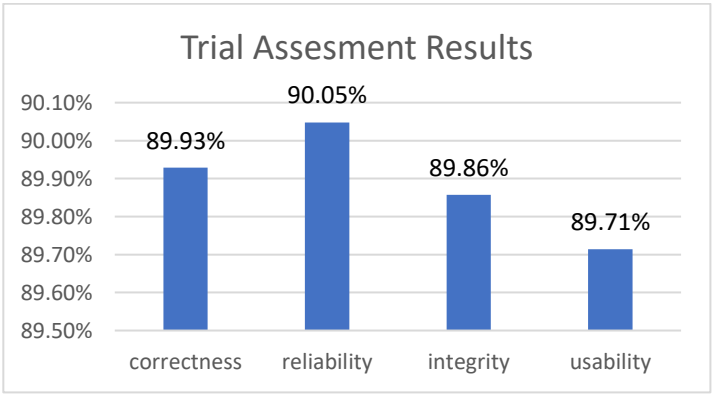


Figure 7. Diagram of Trial Assessment Results

This finding is consistent with a study conducted by Researchers [29], who concluded that the use of a web-based lecture monitoring and evaluation information system can provide a significant boost to the efficiency and effectiveness of the learning process in higher education, while monitoring the academic performance of students and lecturers in real-time, and identify areas that need improvement, and provide faster feedback to lecturers and students. This finding is strengthened by direct observations of students which state that the use of this information system has a positive impact on

increasing the efficiency of lecture management, monitoring student academic progress, and providing timely feedback.

4. CONCLUSION

The development of a web-based lecture monitoring information system for the Department of Management, State University of Medan, has been completed using the AppSheet application with Google Sheets as the database. Based on an assessment by media experts, the average percentage score of 88.89% was obtained, so it was included in the very feasible category.

Likewise, the average student field trial assessment results were 89.89% and categorized as very feasible; therefore, the development of a lecture monitoring information system for the Department of Management at State University of Medan is worthy of being used as an information system in implementing learning and lecture monitoring and evaluation at the Faculty of Economics, State University of Medan.

Research into the development of a web-based lecture monitoring information system is only limited to media suitability by validators, so it is hoped that it can be further developed in the future; however, the lecture monitoring information system within the Department of Management at State University of Medan has been able to help study programs (Digital Business). , Management & Entrepreneurship) overseen by the Management Department and the quality assurance unit in monitoring and evaluating the lecture process at the Faculty of Economics, State University of Medan.

ACKNOWLEDGEMENTS

The author would like to thank the Institute for Research and Community Service, State University of Medan, which has provided financial support for this research activity.

REFERENCES

[1] A. Duarte Alonso, A. Bressan, M. O'Shea, and V. Krajsic, "Website and social media usage: Implications for the further development of wine tourism, hospitality, and the wine sector," *Tour. Plan. Dev.*, vol. 10, no. 3, pp. 229–248, 2013.

[2] N. Hidayati, "Pemanfaatan website sekolah sebagai strategi digital marketing di Madrasah Aliyah Unggulan Amanatul Ummah Surabaya," *J. Kependidikan Islam*, vol. 11, no. 1, pp. 111–133, 2021.

[3] R. Setiawan, D. Mardapi, A. Pratama, and S. Ramadan, "Efektivitas blended learning dalam inovasi pendidikan era industri 4.0 pada mata kuliah teori tes klasik," *J. Inov. Teknol. Pendidik.*, vol. 6, no. 2, pp. 148–158, 2019.

[4] D. R. Kaparang, R. Ilyas, and S. Pratasik, "Perancangan Sistem Informasi Akademik Berbasis Web pada SMK," *Edutik J. Pendidik. Teknol. Inf. dan Komun.*, vol. 2, no. 5, pp. 696–703, 2022.

P.ISSN: 2086 – 4981
E.ISSN: 2620 – 6390
tip.ppj.unp.ac.id

[5] M. M. Anvarova, "The information systems infrastructure in modern era," *Sci. Educ.*, vol. 4, no. 3, pp. 237–241, 2023.
[6] I. M. Wartana and M. Ardita, *Mengenal Teknologi Informasi*. Media Nusa Creative (MNC Publishing), 2021.
[7] A. T. Rosário and J. C. Dias, "How industry 4.0 and sensors can leverage product design: opportunities and challenges," *Sensors*, vol. 23, no. 3, p. 1165, 2023.
[8] F. Shofiyah and Y. Wirani, "Analisis dan Implementasi Dashboard Monitoring Program Link and Match Perguruan Tinggi Berbasis Google Sheet," *J. Inform. Terpadu*, vol. 7, no. 2, pp. 53–61, 2021.
[9] L. Rubin, *Educational evaluation: Classic works of Ralph W. Tyler*, vol. 23, no. 2. Springer Science & Business Media, 1991.
[10] Sugiyono, "Metode Penelitian Kualitatif dan R and D," *Bandung Alf.*, vol. 15, no. 2010, p. 480, 2015.
[11] F. Hishamudin, "Model ADDIE," *Univ. Teknol. Malaysia*, 2016.
[12] Sugiyono, *Statistika Non Parametrik untuk penelitian*. 2008.
[13] Sugiyono, *Metodologi Penelitian Kuantitatif, Kualitatif, dan R&D*. 2016.
[14] N. R. Rambe and D. Q. M. Ely, "Development of Macromedia Flash Learning To Improve Intensive Listening Ability," *J. Teknol. Inf. dan Pendidik.*, vol. 16, no. 2, pp. 115–125, 2023.
[15] R. M. B. Kmurawak, D. Setyaningsih, Y. Tokoro, M. Inggaber, and M. R. Sampebua, "Computer-based Learning Model in Early Schools During the Covid-19 Pandemic in Rural Areas," *J. Teknol. Inf. dan Pendidik.*, vol. 17, no. 1, pp. 257–270, 2024.
[16] P. D. Sugiyono, *metode penelitian kuantitatif, kualitatif,dan R&D*. 2016.
[17] I. Ghozali, *Teknik Penyusunan Skala Likert*. Semarang: Badan Penerbit UNDIP, 2013.
[18] R Likert, "A Technique for the Measurement of Attitudes," *Arch. Psychol.*, vol. 140, pp. 44–53, 1932.
[19] A. Hidayat, "Menghitung besar sampel penelitian - uji statistik," *13 Agustus*. 2012.
[20] R. Dian Anggraeni and R. Kustijono, "Pengembangan Media Animasi Fisika pada Materi Cahaya dengan Aplikasi Flash berbasis Android," *J. Penelit. Fis. dan Apl.*, vol. 3, no. 1, p. 11, Jun. 2013, doi: 10.26740/jpfa.v3n1.p11-18.
[21] R. Likert, "The method of constructing an attitude scale," in *Scaling: A Sourcebook for Behavioral Scientists*, 2017, pp. 233–243.
[22] I. Ehsan *et al.*, "Internet of things-based fire alarm navigation system: A fire-rescue department perspective," *Mob. Inf. Syst.*, vol. 2022, 2022.
[23] I. N. M. Bistaman, N. I. Subri, M. Z. Shahabuddin, S. F. S. Radzuan, and B. H. Abd Rahman, "Android Based GPS Attendance Application for Kolej Universiti Islam Perlis (KUIPs) Staff," *Int. J. Adv. Res. Technol. Innov.*, vol. 4, no. 3, pp. 1–12, 2022.
[24] M. Asgari and T. Hurtut, "A Design Language for Prototyping and Storyboarding Data-Driven Stories," *Appl. Sci.*, vol. 14, no. 4, p. 1387, 2024.
[25] D. H. Syah, I. Muda, and E. A. Bakar, "Development of Learning Media for Android-Based Budget Accounting," in *Journal of Physics: Conference Series*, 2021, vol. 1779, no. 1.
[26] Satrinawati, D. Irfan, and A. Mubai, "Utilization of Outseal PLC Microcontroller Trainer Learning Media Assisted by Mobile Applications," *J. Teknol. Inf. dan Pendidik.*, vol. 16, no. 2, pp. 182–190, 2023.
[27] J. P. Widodo, L. Musyarofah, and J. Slamet, "Developing a Moodle-based learning management

system (LMS) for slow learners," *J. Inspirasi Pendidik.*, vol. 12, no. 1, pp. 1–10, 2022.
[28] J. Fitra and H. Maksum, "Efektivitas Media Pembelajaran Interaktif dengan Aplikasi Powntoon pada Mata Pelajaran Bimbingan TIK," *J. Pedagog. Dan Pembelajaran*, vol. 4, no. 1, pp. 1–13, 2021.
[29] A. Mayasari, Y. Supriani, and O. Arifudin, "Implementasi Sistem Informasi Manajemen Akademik Berbasis Teknologi Informasi dalam Meningkatkan Mutu Pelayanan Pembelajaran di SMK," *JIIP-Jurnal Ilm. Ilmu Pendidik.*, vol. 4, no. 5, pp. 340–345, 2021.

P.ISSN: 2086 – 4981
E.ISSN: 2620 – 6390
tip.ppj.unp.ac.id