

## A WEB-BASED INFORMATION SYSTEM FOR LECTURER'S PERFORMANCE APPRAISAL USING RATING SCALE METHODS

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### Abstrak

Pembelajaran daring marak digunakan oleh tiap institusi pendidikan di masa pandemi covid-19 ini. Tanpa adanya pertemuan tatap muka, Dosen dituntut untuk menyajikan suatu pembelajaran yang berkualitas agar mahasiswa tetap tertarik untuk mengikuti perkuliahan. Untuk menyajikan pembelajaran yang menarik, diperlukan juga umpan balik dari mahasiswa. Permasalahan yang timbul adalah umpan balik yang selama ini digunakan (EDOM) dianggap terlalu lama dalam hal pengolahan datanya, sedangkan dosen dituntut untuk melakukan pengajaran berkualitas di setiap pertemuannya. Jika mahasiswa kehilangan minat terhadap suatu perkuliahan dikarenakan performa dosen yang tidak mampu menjadikan tiap kelas virtual menarik, maka kegiatan perkuliahan tersebut menjadi tidak efektif. Dengan adanya sebuah sistem pengukuran performa dengan penerapan gamifikasi yang mampu mengukur performa dosen di tiap pertemuan, Dosen dapat menerima umpan balik sekaligus mengejar reward atau ranking terhadap performa mereka. Penelitian ini menggunakan model waterfall dan menghasilkan sistem informasi berbasis web yang dapat menjadi bahan evaluasi dalam peningkatan kualitas pembelajaran secara daring.

Kata kunci: Sistem Informasi, Website, Skala Rating, Performansi, Gamifikasi

### Abstract

Online learning is widely used by every educational institution during the Covid-19 pandemic. Without face-to-face meetings, lecturers are required to present quality learning with feedback from students. The problem that arises is that EDOM is considered too long in terms of data processing, while lecturers are required to carry out quality teaching at each meeting. If students lose interest in a lecture due to the performance of the lecturer who is unable to make each virtual class attractive, the lecture activity will be ineffective. With the existence of a performance measurement system with the application of gamification that can measure the performance of lecturers at each meeting, lecturers can receive feedback while pursuing rewards or ratings on their performance. This study uses the waterfall model and produces a web-based information system that can be used as evaluation material in improving the quality of online learning.

Keywords: Information System, Website, Rating Scale, Performance, Gamification

### INTRODUCTION

Lately, the Covid-19 pandemic has occurred throughout the world. It requires a business or any industry player to make several alternatives in their operational activities. The world of education is also affected by the pandemic that is currently happening. In teaching and learning activities, every school environment, campus, and other academic institutions stipulate that teaching and learning activities during the pandemic are carried out with courage and avoid face-to-face meetings to enforce social distancing rules and avoid transmission of viruses that occur

between humans. Learning involves interaction between teachers and students and lecturers and students through applications carried out through a personal computer (PC) or laptop connected to an internet network connection to be held in a virtual classroom.

Lecturers are one of the most critical components in higher education's resource development system, with a mandate to uphold the Tri Dharma of Higher Education, namely Research, Community Service, and Teaching. Lecturer performance is one of the most critical components in the education system in higher education. Therefore, patterns and support for educational

development and lecturers will be the most critical determinants of meeting higher education goals. One of the lecturers' performances that are measured through an evaluation is teaching.

Evaluation is an activity to collect information about the work of something, which is then used to determine the right alternative in making a decision (Suharsimi, 2013). The primary function of evaluation in learning for lecturers is to determine the effect of lecturer teaching on students. Good teaching will undoubtedly help students achieve good and quality learning. One way to evaluate learning is by conducting an EDOM questionnaire. The EDOM questionnaire is useful for evaluating lecturers' performance by students conducted in the middle and end of the semester. The biggest problem is that it takes about 8-16 weeks to get feedback from students on the lecturer's performance during lectures. Meanwhile, performance is the output produced by functions or indicators of a job or a profession within a specific time (Suwadi, Hendrantoro, & Wirawan, 2009).

Lecturers' role in online learning continuity is vital, considering that the lecturer is most likely to be a leader in the online class. There are also findings that when students are no longer interested in lectures delivered by lecturers virtually, the online lecture activities will take place without quality and can be ineffective. Therefore, learning in every online classroom must be ensured of quality, with real-time student feedback.

Previous research found that feedback on the measurement of lecturer performance has a positive effect on improving behavior in work that will impact performance by using the evaluation of the lecturer 360 Degree Performance Model. (Bungai & Perdana, 2017). Assessment of performance or also known as performance is a significant activity. This assessment can be made as input for improving performance at a later time (MacDonald & Lawton, 1977). This research changes the scope from the phrase "next time" from "1 semester" to "every lecture meeting".

Telkom Institute of Technology Purwokerto (ITTP) is a private university that has transformed from the former Telecommunication Academy (AKATEL) Sandhy Putra Telkom, founded in 2002. In its operational activities, ITTP carries out teaching and learning activities by utilizing various classrooms and labs. However, since entering the covid-19 pandemic era, ITTP has switched to online teaching and learning activities using the Google Meet and Zoom Virtual Conference platforms. With the use of this technology, various complaints were raised by students, including the lack of lecturers' ability in providing material, the

lack of lecturers in the use of technology, the lack of lecturers in interacting virtually with students, the lack of teaching timing by lecturers, the provision of less attractive material, disruption of internet connection by lecturers, microphone interference and so on. Meanwhile, online learning can be successful if the lecturer can provide an exciting form of material presentation. From these findings, The research gap found as an issue in this study, where at ITTP, EDOM filling was carried out in the middle and end of the semester, even though performance appraisal was a critical activity as input to make improvements to improve performance at the next meeting without waiting for the EDOM results at the end of the semester.

Based on these problems, this research was conducted to create an information system for assessing lecturer performance using the rating scale method as an evaluation tool in every class meeting, because basically, the faster the lecturers get the feedback, the sooner they will be able to fix the shortcomings of their virtual classes at the next meeting, so the more likely it is that a virtual class will continue to be effective. This is certainly different from the Lecturer by Student Evaluation (EDOM) scheme that has been used by ITTP so far. This study also uses gamification to aim the lecturers to increase their motivation to improve their teaching performance in each virtual classroom through a reward and ranking system to improve the quality of online learning.

## RESEARCH METHODS

### Online Learning

Learning is an activity that involves someone gaining knowledge, skills, and positive values by using various sources for learning. In essence, learning in a complete sense is a conscious effort from a teacher or lecturer to teach their students to achieve a goal. Online learning utilizes multimedia technology, virtual classes, CD / DVD ROM, video streaming, voice messages, email and conference calls, and video streaming (Kuntarto, Moechtar, Gunawan, Santoso, & Ahmadin, 2017). In this study, online learning refers explicitly to the use of virtual classes used by ITTPs to carry out teaching and learning activities during a pandemic.

While the disadvantages of online learning include the lack of interaction between teachers and students, resulting in the formation of values in the slow teaching and learning process, the tendency to ignore academic or social aspects encouraging the growth of business aspects, the online teaching and learning process tends towards training rather than education. students who do not

have high learning motivation tend to fail, and not all places provide internet facilities, which caused not all students can get the same experience with one another (Hadisi & Muna, 2015).

### Performance and EDOM

Performance means how well a person or machine is doing a particular activity or job. The performance referred to in this research is the overall performance of the lecturers in online lectures. The performance displayed or given by lecturers can be objectively assessed based on predetermined standards. The performance appraisal aims to reward if the results achieved are better than before and an evaluation for future performance if the results achieved are not satisfactory. From this evaluation, it can be determined actions that can be taken to improve lecturer performance shortly.

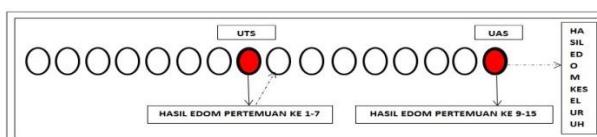


Figure 1. EDOM Scheme

Figure 1 describes that the assessment of lecturer performance by students has been carried out by ITTP using the evaluation of lecturers by students (EDOM), which is distributed in the middle of the lecture semester and at the end of the semester. Filling in this questionnaire has several shortcomings, such as the lengthy level of distribution of the questionnaire, which is only carried out in the middle of the semester and at the end of the semester, relatively long data processing, students tend to forget details during lectures so that it is difficult to assess at each meeting, to the lack of time for lecturers to improve the quality of learning through the EDOM results is due to its nature which is only distributed in the middle and end of each semester. Meanwhile, Performance appraisal tends to focus more on how well a lecturer runs a virtual class by applying several teaching aspects in each meeting, as described below :

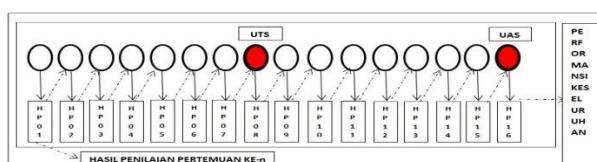


Figure 2. Performance Appraisal Scheme

Figure 2 describes the performance appraisal scheme which unlike the EDOM questionnaire,

performance assessments are carried out after a single lecture so that students can provide feedback on lecturer performance in real-time. Also, lecturers can make performance assessments as learning materials to improve the quality of virtual learning for the very next meeting, where this is mainly different from the EDOM questionnaire scheme.

### Rating Scale Method

Rating Scale is a data collection tool used in observation to explain, classify, assess individuals or situations. The Rating Scale method provides a systematic and structured procedure for reporting evaluation results using the observation method (Djellal & Gallouj, 2008). The Rating Scale type that will be used in this research is the numerical rating scale. Below is a table of the assessment format :

Table 1. Rating Scale

Scale	Description
1	Very Unsatisfactory
2	Not Satisfactory
3	Enough
4	Satisfactory
5	Very Satisfactory

Table 1 above describes the measurement with a rating scale. The Numerical Rating Scale is done by giving numbers to the given aspect columns on a scale of 1-5. Each number has specific criteria.

### Software Development Methods

Information systems are any organized combination of humans, hardware, software, communication networks, data sources, and organized policies and procedures that store, retrieve, modify, and separate information within an organization (O'Brien & Marakas, 2012). In this research, system development is carried out using the waterfall software development method. A waterfall model is an approach to software development that describes a linear and sequential development method (Tutorials Point, 2020). Waterfall Model consists of five phases, each phase defined by different tasks and objectives, where the whole phase describes the life cycle of the software until its delivery.

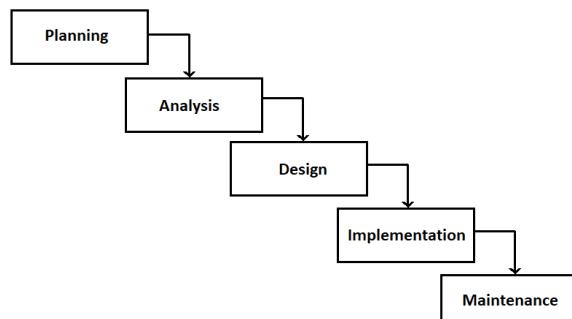


Figure 3. Waterfall Model

Figure 3 describes the cycle in software development with the waterfall model. Where the initial stages begin sequentially starting from planning, analysis, design, implementation, and maintenance.

## Web-based Programming

This study uses web-based software development because with a website, the data obtained by the lecturer as evaluation material will be real-time, and this is one of the things that is the strength of this system design. A website is an application that contains multimedia documents (text, images, animation, video) that uses the HTTP (Hypertext Transfer Protocol) protocol and access it using a software called a browser (Rudianto, 2011). This study uses the PHP programming language, in which PHP is a server-side scripting language that is integrated with Hypertext Markup Language (HTML) to create dynamic web pages. As for the database using MySql. MySql is a database creation program that is open source so that anyone can use it freely and is easy to apply (Nugroho, 2014).

## Lecturer Performance Indicators

As previously explained, performance appraisals tend to focus more on how well a lecturer runs in each virtual class meeting by applying several teaching aspects that are used as indicators. The following describes examples of indicators used in measuring lecturer performance:

Table 2. Aspect Assessment

No.	Aspect Assessment	Score (1-5)
1	The lecturer ability to liven up the virtual classroom atmosphere	
2	Lecturer ability in presenting material virtually	
3	The ability of lecturers to interact virtually with students	
4		

No.	Aspect Assessment	Score (1-5)
5	<p>The ability of lecturers to use teaching aids or technology</p> <p>Lecturer ability in time management</p>	

Table 2 describes the indicator used as a derivative of the EDOM indicator used by ITTP whose validity has been tested. Assessment indicators are carried out in the minimum possible statement items because this will be a repetitive thing that students must do to assess lecturer performance. After filling in by students, a performance score is obtained with the following formula :

Where :

PP(n) = Assessment of the performance of the (n)th meeting

**T(s) = The total score obtained**

T(i) = Total Indicators used

With these calculations, the final results of the performance filling values are obtained by grouping as follows:

Table 3. Performance Report

Scale	Description
0 - 1	Very Bad Performance
1.1 - 2	Bad Performance
2.1 - 3	Average Performance
3.1 - 4	Good Performance
4.1 - 5	Excellent Performance

Table 3 describes the results of the calculation of the performance score obtained by the five main criteria.

## Gamification Concept

Gamification is a concept that refers to the use of game design elements in applications or systems that have nothing to do with the game to change user behavior (Deterding, Khaled, Nacke, & Dixon, 2011). In this study, gamification adheres to the concept of points, where the points collected are points of performance with an excellent scale assessment, which will then be juxtaposed in a competition leaderboard with other lecturers in terms of teaching performance in virtual classrooms.

## RESULTS AND DISCUSSION

The results of creating a new system are done by making the use case diagram schema, activity diagram, entity-relationship diagram, and system view as described as follows :

### Use Case Diagram

Use case diagrams are diagrams that describe the relationship between actors and the system (Sukamto & Shalahuddin, 2018). It describes an interaction between one or more actors and the system to be created. Use case diagrams can also be used to find out what functions are in a system and can also present an interaction of actors with the system. The use-case for the new system is described below :

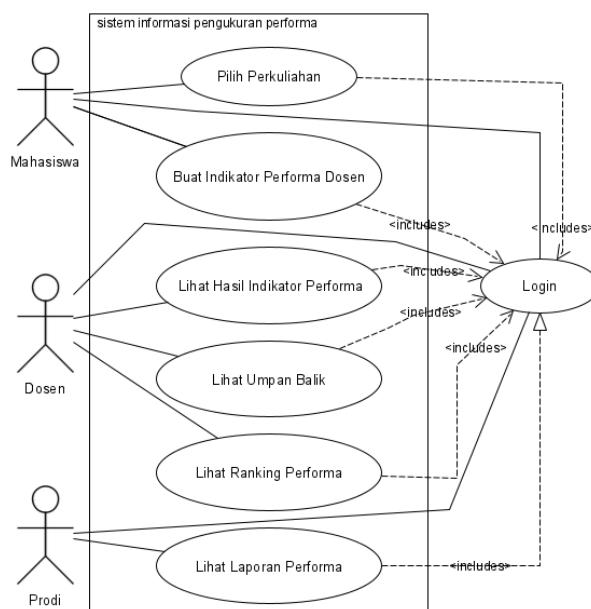


Figure 4. Use Case Diagram

Figure 4 above describes the actors in use cases consist of Students, Lecturers, and Study Programs Unit with their respective functions.

### Activity Diagram

Activity diagrams can be interpreted as a visual form of workflow that contains activities and actions, containing options, repetitions, and concurrency (Rizky, 2019). Activity diagrams are created to explain computer activities, systems, and the organization's flow of activities. Based on the new system flow, students filling out the lecturer performance appraisal are carried out by students after receiving lectures on predetermined days and hours.

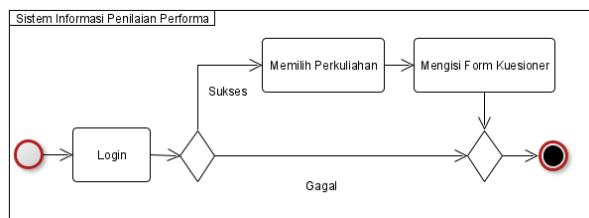


Figure 5. Activity Diagram – The Questionnaire

Figure 5 explains the activity diagram schematic for filling out the questionnaire by students by logging into the system and then fill out an online questionnaire, which can later be used as a form of learning feedback to lecturers.

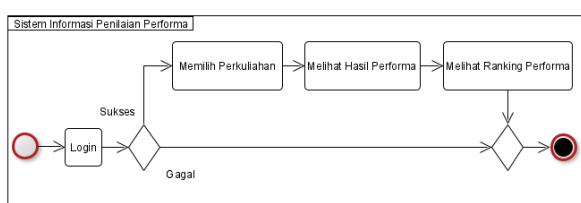


Figure 6. Activity Diagram – The Result

Figure 6 describes that after filling in the online questionnaire data, the data is entered into the system, which will then be distributed to each lecturer according to the assessment results. Lecturers log into the system, choose the courses according to the number of classes they have held, and see the results of their performance appraisals and individual ranking created from the students' feedback.

### Entity-Relationship Diagram

The picture below is an Entity Relationship Diagram (ERD) in the form of a graphic notation in conceptual data modeling that describes the relationship between the system's storage.

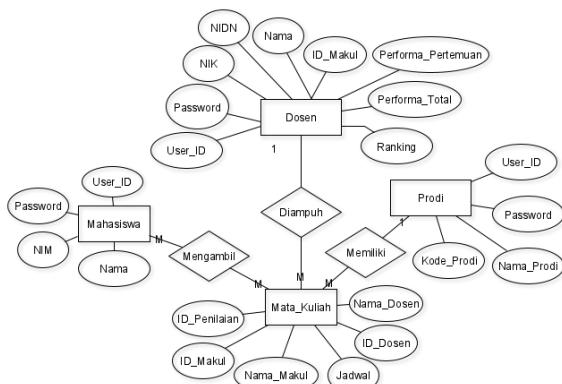


Figure 7. Entity Relationship Diagram

Figure 7 describes the relationship between data, there is a relationship between students as performance appraisers and lecturers and study programs staff as parties who can use the results of these assessments as material for evaluating real-time online learning.

### System View

The system view describes the results of the system that has been made with the direction of the research.

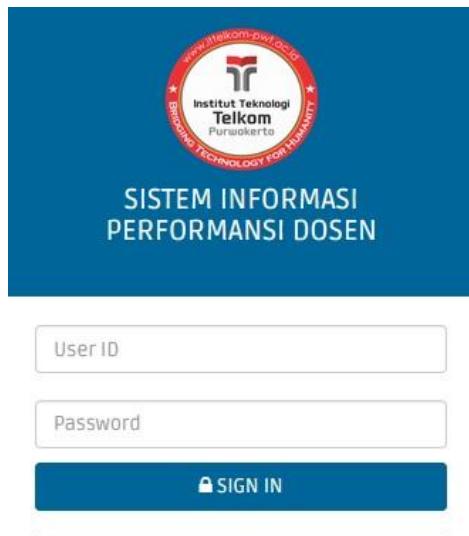


Figure 8. Login Page

Figure 8 is the result of the login page, which verifies system users according to the given user ID and password. Without inputting the correct data, the system will not work.



Figure 9. The Schedule

Figure 9 shows the scheduling menu. After being successfully verified, Students will be asked to choose the course they have just completed according to their lecture schedule and provide input on the performance of the lecturer as the person in charge of the lecture.

Figure 10. The Form

Figure 10 shows the questionnaire page which appears after selecting a schedule. Students can enter the lecturer performance assessment form from the provided menu. Students can also add input in the form of descriptions to provide suggestions for improving online learning activities. In this filling menu, the student's name and Student ID Number (NIM) will be recorded into the system but will not be displayed as a report to the lecturer, which they can stay anonymous. The number of respondents in a questionnaire depends on the class participants. If there are 40 respondents in a class, then the number of respondents in a questionnaire is 40, and it is mandatory.

laporan Detail Performansi MK Pemrograman Web - DPR					
10	records per page	search:			
Tanggal	Nama MK	Pengampu	Jumlah Responden	Skor Performa	Detail
11-1-2021	Pemrograman web	DPR	40	4,5	<a href="#">Detail</a>
29-1-2021	Pemrograman web	DPR	40	4,3	<a href="#">Detail</a>
20-1-2021	Pemrograman web	DPR	40	4,1	<a href="#">Detail</a>
6-1-2021	Pemrograman web	DPR	40	2,8	<a href="#">Detail</a>
27-1-2021	Pemrograman web	DPR	40	2,5	<a href="#">Detail</a>
18-1-2021	Pemrograman web	DPR	40	2,2	<a href="#">Detail</a>
4-1-2021	Pemrograman web	DPR	40	1,4	<a href="#">Detail</a>

Figure 11. The Report

Figure 11 shows the report page. After students fill in the data, the data will be stored in a web server, which can then be seen directly by the lecturer who teaches the lecture. From these results, the lecturer can see the performance reports that have been made by students in the form of presenting the assessment score table.



Figure 12. The Graph Report

Figure 12 shows the graph report that was made due to several needs during the analysis interviews. Lecturers needed to present the data in graphical form to make it easier to monitor the results

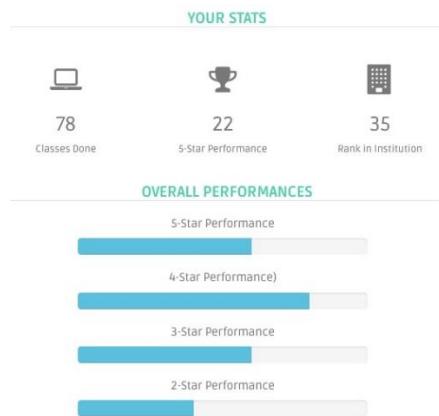


Figure 13. The Gamification Result

Figure 13 shows the gamification result of this research. The concept of gamification in this system lies in the rewarding and points features, lecturers who have obtained a performance score at each meeting are expected to be able to achieve a higher score level at the next meeting, this will be a challenge for lecturers to perform better on the next virtual class meetings. Also, there is a performance ranking for each lecturer in the institution, so that each lecturer is expected to be able to compete in terms of improving their teaching performance to reach the top rank in the institution.

### Blackbox Testing

Blackbox testing aims to test the functional specifications of the software. According to (Mustaqbal, Firdaus, & Rahmadi, 2015) Black Box Testing focuses on the functional specifications of the software, a collection of input conditions, and testing program functions.



Figure 14. Blackbox Testing

Figure 14 shows the result of black-box testing on this system, Which results in that all functions and features of the system have gone well by the design made.

### User Acceptance Testing

User Acceptance Testing (UAT) is a test carried out by end-users. In this research, the end-users are the students and lecturers who directly interact with the system and verifies whether the existing functions are running according to their needs.

Table 4. UAT Result

No.	Acceptance Requirements	Agree	Disagree
1	The system is user friendly	20	0
2	The rating scale method on this system is easy to understand	20	0
3	Notifications are received on new activities	20	0
4	The system gives a "warning" message on error action	20	0
5	The system gives a "success" message on success action	20	0

Table 4 shows the result of the UAT of the system from 20 respondents which consist of students and lecturers in ITTP.

## CONCLUSIONS AND SUGGESTIONS

### Conclusion

With the existence of a web-based lecturer performance appraisal system, Telkom Institute of Technology Purwokerto improved the quality of their virtual teaching and learning during this pandemic. The use of the rating scale method in this study is proven to be able to make performance measurements obtained clearly because the criteria used can explain the assessment with clear indicator weights and easy to apply. It also helps the lecturers to evaluate their performance appraisal in each class meeting, where it can provide much faster feedback compared to the existing EDOM evaluation results. The existence of a computerized system also allows lecturers to immediately find out the teaching results of each class they hold. By

conducting evaluations that are no longer only in the middle and end of the semester, but the results of evaluations from each meeting, the quality of teaching will be monitored. With gamification, each lecturer is expected to emerge a competition between a lecturer and another lecturer in terms of performance appraisal and quality lecture presentation to improve the quality of learning between lecturers and students and to improve the quality of the institution in general.

### Suggestion

For further research, additions to online learning indicators can be made. This study uses five indicators derived from the EDOM questionnaire to be applied in the online learning questionnaire, where the number can increase from only five indicators to more. Also, development in the gamification concept can be done by utilizing several rewards. The rewards offered can be in the form of direct prizes from ITTP for awards to lecturers with the best performance, which of course will be very useful to support the lecturers' careers.

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