Analysis of digital presence information systems in minimizing the potential for fraud for employee discipline in schools

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Abstract

This research aims to analyze the effectiveness of the digital presence information system in minimizing the potential for fraud in order to increase employee discipline. The main focus of the research is on independent variables, including school registration in the application, teacher account management by school admin, teacher device registration, QR device registration by school admin, and QR regeneration every 10 seconds. The dependent variables observed include the effectiveness of the attendance system, employee discipline, the reliability of GPS location and IP address, the impossibility of transferring accounts, and the impossibility of QR duplication. This research uses a quantitative research method with a survey approach using a questionnaire as a data collection instrument. The sample of respondents was 30 schools as application users. Analysis of testing the validity and reliability of instruments using SmartPLS 4 software. It is hoped that the research results will provide an in-depth understanding of the effectiveness of the digital presence information system in the context of employee discipline in the school environment. It is hoped that the findings from this research can make an important contribution to the development of digital attendance information systems in schools. It is hoped that the practical implications of this research will help schools improve the effectiveness and security of digital attendance systems. Apart from that, it is hoped that the benefits of this research can contribute to literature related to employee discipline management in the educational context. This research provides new insights into the application of digital attendance technology in schools, highlighting key aspects that influence system effectiveness and security. Thus, it is hoped that this research can become a basis for further research and provide direction for the development of digital attendance information systems in educational institutions.

Keywords:Digital Attendance System, Employee Discipline, System Development

INTRODUCTION

Education plays an important role in shaping the character and quality of human resources. In this context, employee discipline in the school environment is a key factor in creating an effective work and learning atmosphere. As according to Rivaldo & Nabella (2023) That education as a foundation for shaping, preparing, fostering and developing human resource capabilities that are very decisive in future success. With the development of information technology, the Digital Presence System has emerged as a solution to optimize employee attendance management and minimize the potential for fraud.

A digital attendance information system is an automation system used to record and track individual attendance, especially in work or educational environments. In contrast to traditional methods that involve manual recording, digital attendance systems use technology to identify, record and process attendance data. "Presence is the main thing in an activity, because it is evidence of the implementation report" (Priyambodo, Usman, & Novamizanti, 2020). Digital presence systems have become an integral part of human resource management (HR) in various organizations. This technology not only provides efficiency in recording employee attendance, but also opens up opportunities to optimize the overall HR management process.

One of the technologies that can be utilized currently is QR-Code (Quick Response Code) technology as an intermediary for transferring information between the server and the user through a digital presence application that has been created in such a way using various customized methods. "QR-Code is a type of

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two-dimensional symbol developed by Denso Wave in 1994. Each QR-Code symbol is arranged in a square shape and consists of function patterns and encoding regions. All symbols are surrounded by quiet zone boundaries on all four sides. There are 4 types of function patterns including finder patterns, separators, timing patterns, and alignment patterns. The encoding region contains data, which represents version information, format information, data and error correction." (Priyambodo et al., 2020).Below, Figure 1 is a display of the QR-Code structure(Quick Response Code)
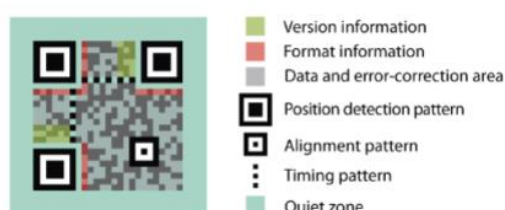

Figure 1
QR-Code Structure

The use of QR-Code (Quick Response Code) technology in information systems has become a popular choice because of its ease of use and speed of reading. Moreover, currently QR-Code technology has been embedded and has become a standardized feature on smartphones, for example on Android and iOS, making QR-Code encoding and decoding even easier to use. Previous research in the application of digital attendance illustrates the efficiency of QR-Code in providing unique identification for each employee and their attendance, creating a fast and reliable way to record touchless attendance. The use of Android technology in QR-Code scanning provides mobility and ease of integration. Android applications can provide effective and responsive solutions to ensure easy, accurate and real-time attendance data collection.

Apart from that, GPS (Global Positioning System) is used to determine position coordinates. In practice, this digital presence information system with QR-Code and GPS is quite effective and efficient in being implemented in an agency, especially after the pandemic which recommends being touchless in various ways. Although in practice there is often fraud and various challenges in ensuring the validity and validity of presence data, especially in the minimal use of digital presence in security policies, restrictions / too easy to cheat. One problem frequently encountered is practices such as "account entrustment", where individuals can lend their accounts to others to record attendance without being physically present. Apart from that, sharing QR-Code by sending or photocopying the QR-Code to be scanned from a place that is far away (inappropriate) than it should be, as well as using fake locations with applications are also forms of cheating that are increasingly occurring.

A culture of cheating and undiscipline is an organizational culture that must be avoided and minimized. "Organizational culture has a significant effect on employee performance" (Syafwandi and Abdila 2023). Apart from that, invalid presence data can cause inaccuracies in decision making, which in turn can have a negative impact on the quality of human resources in various aspects, namely discipline, performance, productivity, as well as the risk of ineffective human resource management as a whole, which also has an impact on the cash flow of an agency or the company. "The maturity of a company's implementation of risk management determines the quality and effectiveness of the company in identifying and managing risks" (Alijoyo & Norimarna 2021). Therefore, developing a digital attendance information system that has minimal potential for fraud is very necessary to avoid these things.

This research aims to explore the impact of the effectiveness of digital attendance systems in improving employee discipline in the school environment. The main challenge faced in attendance management is the potential for fraud which can harm the quality of human resource management in educational institutions.

The research hypothesis is proposed with the assumption that the implementation of the Digital Attendance System will positively

contribute to more effective attendance management and ultimately increase the level of employee discipline.

Thus, this research is expected to make a significant contribution to understanding the influence of the Digital Presence System in the context of increasing employee discipline in the school environment. It is hoped that the findings from this research can become a basis for developing more effective attendance management policies and practices in educational institutions.

RESEARCH METHODS

This research uses a quantitative approach with survey and questionnaire methods as the main instruments for data collection, involving a sample of 30 schools that use the digital presence application that has been created.

Data analysis was carried out using SmartPLS 4, a software that has proven reliable in quantitative research. Theoretical support for this research was obtained from various literature that discusses attendance management, the implementation of digital attendance technology, and its impact on employee discipline in the educational context.

Activities carried out at this stage include:
1. Questionnaire, study data is collected through a questionnaire which is the main instrument of this research.
2. Interviews are conducted with people who can provide information related to the research object.
3. Literature studies are carried out to strengthen the theoretical foundations of journals and other reading materials related to the research object.

The questionnaire was designed using a Likert scale, which is a common tool for assessing respondents' perceptions. Below is Table 1 which explains the Likert scale:

Table 1
Likert Scale

Answer	Weight
Strongly agree	5
Agree	4
Neutral	3
Don't agree	2

Strongly Disagree	1

Research variable

The variables and indicators distributed in the questionnaire in the application are explained in Table 2 below.

Table 2
Variables and Indicators

Variable	Indicator
Independent Variable (X)	● X1: School Registration in the App
	● X2: Teacher Account from School Admin
	● X3: Teacher Device (HP) Registration
	● X4: QR Device Registration by School Admin
	● X5: Regenerate QR Every 10 Seconds
Dependent Variable (Y)	● Y1: Effectiveness of the Presence System
	● Y2: Employee Discipline
	● Y3: Reliability of GPS Location and IP Address
	● Y4: Impossibility of Transferring Account to Another Device
	● Y5: Impossibility of QR Duplication

RESULTS AND DISCUSSION

The digital presence that has been built will be analyzed using SmartPLS 4 software as an analysis tool, with the hope that this software will help provide an in-depth understanding of the relationship between the variables studied.

Researchers have built a digital presence for the needs of more than 30 schools at one of the institutions that oversees the basic

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education education and then 30 schools were used as samples for analysis in evaluating the use of this digital presence.

Below, Figure 2 shows a display of the digital presence information system with QR-Code and GPS (scanner application for employees).

Figure 2
Digital Presence Information System
(Scanner Application for Employees)

Apart from the application for users (employees) which is installed on Android smartphones, a QR-Code Generator application has also been created which can be accessed via a browser from registered PC/tablet devices. The researcher documents this in Figure 3 below.
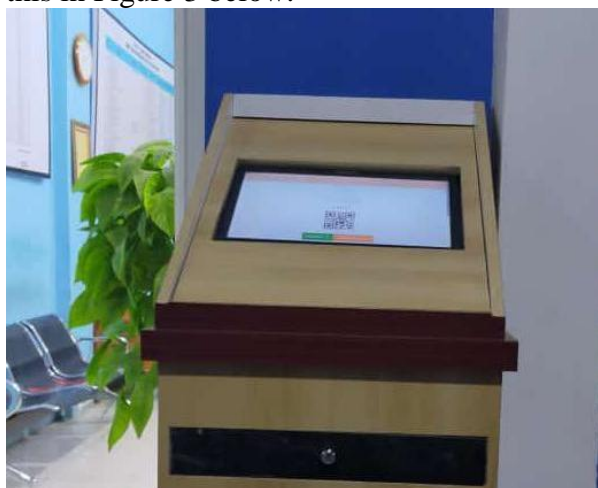

Figure 3
Digital Presence Information System (PC for QR-Code Generator Device)

There are several preparations, conditions and working methods or what can be called Standard Operating Procedures (SOP) for the

digital Presence Information System with QR Code and GPS, which are as follows:

- Schools must be registered in the application by the Dikdasmen superadmin

- Teachers must have an account registered by their respective schools

- Teachers download the attendance application (Android APK)

- Teachers must register/apply for a device (Android smartphone) via the Android application and activate it by the school admin with the device ID that appears

- The QR Generator device uses a tablet/PC, must be registered by the school admin with the device ID that appears

- QR will appear & regenerate every 10 seconds, previous QR Code will be expired and invalid

- Once the account is active to record attendance, the teacher must scan the QR-Code with the scanner application on the smartphone, at the specified time the attendance data will be recorded, as well as the delay if it exceeds the tolerance time limit. Apart from that, the GPS location and IP address will also be recorded.

- If you are on leave/sick, you must enter the application along with proof/sick letter in the photo

- Accounts cannot be transferred to random devices because each device has a unique device ID which must be registered first.

The things above are based on anticipating and minimizing the potential for fraud that often occurs or may occur. So many restrictions and validations are applied. With the aim of increasing teacher discipline.

In this digital presence information system, analysis will be carried out based on predetermined variables and indicators. Data collected through questionnaires were analyzed to test the reliability and validity of the construct, as well as to test the strength and causal direction between variables. This is explained in figure 4 below.
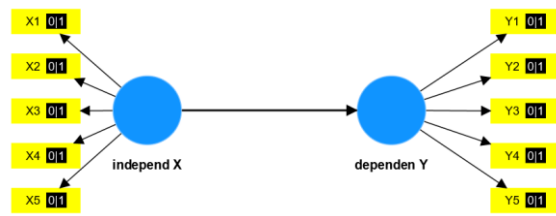
Figure 4
Outer Model

This model aims to evaluate the validity of each item in the questionnaire results and examine validity into two types, namely convergent validity and discriminant validity. Apart from that, checking the reliability of the composite and testing the inner model.

Convergent Validity Test

The convergent validity test is seen from the loading value of each item, this is called the outer loading value. This test is carried out to confirm that each question in the questionnaire has been properly understood by the respondent.

According to (Sarwono, 2014:44) an indicator is said to have good reliability if the outer loading value is above 0.7. The convergent validity results are explained in Figure 5 below.
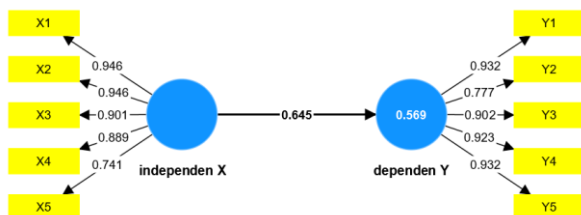

Figure 5
Convergent Validity Test

The independent variable construct (X) is measured by five indicators, namely X1, X2, X3,

The dependent variable construct (Y) is measured by five indicators, namely Y1, Y2, Y3, Y4, Y5, all of which show loading values above 0.7, this also shows a good convergent validity test. So this convergent validity test is in accordance with the experts' statements. Below is a table of 3 validity variables and convergent test results.

Table 3
Validity Variables and Convergent Test Results

Variable	Indicator Validity
Independent Variable (X)	Valid
Dependent Variable (Y)	Valid

Test AVE Value

Testing the Average Variance Extracted (AVE) value is very important because it provides an overview of the manifest representation of the latent construct. The AVE value that is considered adequate to show strong convergent validity is at least 0.5. The following figure 6 below shows the results of the AVE value test.
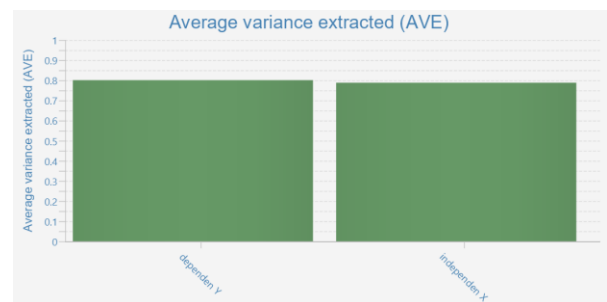

Figure 6
Test AVE Value

Based on the results of the AVE value test in Figure 4, each construct or indicator in the independent and dependent constructs has an AVE value exceeding the threshold of a minimum value of 0.5. The independent construct (X) has an AVE value of 0.78 and the dependent construct (Y) has an AVE value of 0.8.

Discriminant Validity Test

This discriminant validity compares the cross-loading values between indicators in the model. An indicator is considered to have good discriminant validity if its loading value on the construct being measured is higher compared to its loading on other constructs. The following table 4 below shows the results of the discriminant validity test.

Table 4
Discriminant Validity Test

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	independent X	dependent Y
X1	**0.946**	0.562
X2	**0.946**	0.562
X3	**0.901**	0.735
X4	**0.889**	0.811
X5	**0.741**	0.617
Y1	0.665	**0.932**
Y2	0.582	**0.777**
Y3	0.834	**0.902**
Y4	0.571	**0.923**
Y5	0.665	**0.932**

Based on the results obtained in table 4 above, all indicators show adequate discriminant validity with the highest scores on the relevant constructs compared to other constructs.

It can be concluded that this research instrument meets the criteria for discriminant validity which indicates that the constructs in this research model are measured appropriately by the indicators that have been determined.

Construct Reliability Test

Construct reliability is measured using two metrics, namely Cronbach's Alpha and Composite Reliability. These two metrics assess the internal consistency of the indicators that make up each construct.

According to (Ghozali, 2016) the Cronbach's Alpha value is more than 0.60, so the question items in the questionnaire are reliable. If the Cronbach's Alpha value is less than 0.60, then the question items in the questionnaire are not reliable. The following is table 5 of the results of the construct reliability test.

Table 5
Construct Reliability Test

	Cronbach's Alpha	Composite Reliability
independent X	0.931	0.949
dependent Y	0.938	0.952

It can be seen in table 5 above that the Cronbach's Alpha and Composite Reliability

of all constructs in this study show a value of more than 0.60, this shows that the question items in the questionnaire are reliable.

Test the Inner Model

The inner model test was carried out to measure the R Square (R^2) value which reflects the strength and relevance of the regression model that has been built.

According to (Chin, 1998), the R^2 value is categorized into three levels, namely substantial with a value of 0.67 and above, moderate with a value of 0.33 and weak with a value of 0.19. The following is picture 7 of the inner model test results.
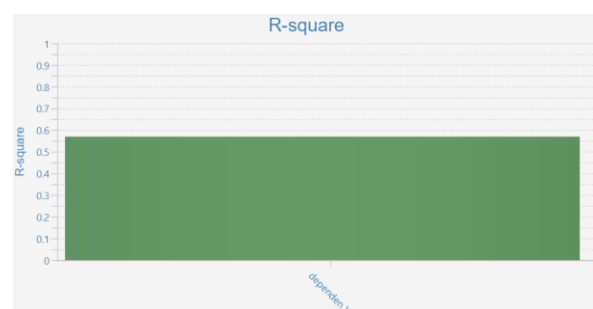

Figure 7
Test the Inner Model

The results from Figure 7 show that the R^2 value is 0.569, this shows that the model is in the moderate category, namely with a value of more than 0.33. Even though it is not included in the substantial category, the moderate R^2 value shows that the model has good validity and the selected variables are determinant in minimizing the potential for cheating for employee discipline in schools.

Hypothesis testing

The final step of this research is to carry out hypothesis testing with the aim of identifying the significance of the influence between the variables under study.

Hypothesis testing is carried out to see whether a hypothesis can be accepted or rejected, including by paying attention to the significance values between constructs, t-statistics and p-values.

Rules of thumb used in this research is the t-statistic > 1.96 with a significance level of p-values of 0.05 (5%) and the beta coefficient is

positive. The following is table 6 of the results of the hypothesis test.

Table 6
Hypothesis testing

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
independent X -> dependent Y	0.645	0.657	0.122	5,269	0,000

Based on the results in table 6, a hypothesis can be established based on data relating to measures to minimize the potential for cheating for employee discipline in schools. The following are the results of the hypothesis test.

independent X -> dependent Y, The Original Sample (O) value is 0.645 and the T statistic is 5.269 with a p value of 0.000. Because the p value <0.05 and the T statistic > 1.96, this hypothesis is accepted. This means that the independent variable X has a significant influence on the dependent Y. So the results of this hypothesis have a strong hypothesis and are very influential onMinimize the potential for cheating for employee discipline in schools.

CONCLUSION

This research was conducted to analyze the digital presence information system by identifying variables and indicators that have been determined to support itMinimize the potential for cheating for employee discipline in schools. Through the application of the Partial Least Square (PLS) method using SmartPLS 4, the results of the analysis. Conclusions that can be drawn from this research are as follows. The main findings of this research show that the independent variable (X) has a significant influence on the dependent variable (Y), with a valueThe

Original Sample (O) value is 0.645 and the T statistic is 5.269 and the p value is 0.000. This means that by practicing the variables and indicators that have been determined, you willinfluence onMinimize the potential for cheating for employee discipline in schools.

BIBLIOGRAPHY
Alijoyo, F. Antonius, & Norimarna, S. (2021). "Risk management maturity assessment based on iso 31000-a pathway toward the organization's resilience and sustainability post covid-19: The Case Study of SOE Company in Indonesia." P. 125 in 3rd International Conference on Management, Economics & Finance.

Antonius, F., dkk. (2023). "A hierarchical attention mechanism for sensor data analytics in internet of things (iot) applications." Journal of Theoretical and Applied Information Technology. 101(20).

Cahyono, Latif. (2017). "Pengembangan sistem informasi absensi siswa berbasis web di smk ypkk 1 sleman yogyakarta." Jurnal Pendidikan Teknik Informatika 1–2.

Firliana, dkk. (2018). "Perancangan sistem informasi absensi dosen dengan validasi mahasiswa berbasis web." Jurnal Sains Dan Informatika 4(2):105–11.

Liantoni, F., Septiyawan R., & Weny, M., R., (2018). "The implementation of qr-code technology on bulak fish center information system." Jurnal Online Informatika 3(2):123–27.

Nishom, M., Abidin, T., & Wiyono, S. (2023). "Pemanfaatan teknologi qr-code untuk presensi siswa di era disrupsi digital." JMM (Jurnal Masyarakat Mandiri) 7(2):1984–92.

Priyambodo, A., Usman, K., & Novamizanti, L. (2020). "Implementasi qr code

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berbasis android pada sistem presensi." J. Teknol. Inf. Dan Ilmu Komput. 7(5).

Septiawan, dkk. (2016). "Perancangan dan implementasi presensi digital guru dan karyawan SMA Negeri 9 Semarang." Jurnal Teknologi Dan Sistem Komputer 4(2):215–22.

Simargolang, M.,Y., & Warsito, W.,A. (2017). "Analisis sistem pengolahan absensi karyawan pada pt. bakrie sumatera plantations tbk bunut." (JurTI) Jurnal Teknologi Informasi 1(2):114–24.

Subiantoro, & Sardiarinto. (2018). "Perancangan sistem absensi pegawai berbasis web studi kasus: kantor kecamatan purwodadi." Swabumi (Suara Wawasan Sukabumi): Ilmu Komputer, Manajemen, Dan Sosial 6(2).

Syafwandi. & Syafiadi R. A. (2023). "A model of human resources development to improve the performance of employees." Jurnal Aplikasi Manajemen. 21(3):802–17.

Triyono, Rosiana S., & Taufik G. (2018). "Perancangan sistem informasi absensi guru dan staff pada smk pancakarya tangerang berbasis web." Journal Sensi 4(2):153–67.

Tan, dkk. (2017). "Penerapan teknologi rfid untuk purwarupa pencatatan presensi mahasiswa di laboratorium komputer." Vol 3:122–28.

Wibowo, Sugeng, & Sarjono. (2018). "Analisis dan perancangan sistem informasi presensi siswa berbasis android pada sd dan smp kanaan global school jambi." Jurnal Manajemen Sistem Informasi 3(2):1093–1105.

Rivaldo, Y., & Nabella, S. D. (2023). Employee performance: Education, training, experience and work discipline. Calitatea, 24(193), 182-188.