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The Effectiveness Of Fingerprint Implementation In Improving Student Discipline At State Vocational High School 01 In Bengkulu City

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Abstract. This study aims to determine the effectiveness of implementing the Fingerprint system in improving student discipline at the State Vocational High School 01 (SMKN 01) Bengkulu City. This research uses a qualitative method presented descriptively. The research informants consisted of 5 individuals, including 2 key informants and 3 main informants. Data collection techniques included interviews, documentation, and observation. The data analysis techniques used in this study were data collection, data reduction, data presentation, and conclusion drawing and verification. Based on the research findings and discussion using the effectiveness measurement theory by Duncan (in Richard M. Steers, 1984:53), three indicators were applied. The results indicate that the effectiveness of the Fingerprint implementation in improving student discipline at SMKN 01 Bengkulu City can be concluded as follows: 1) Goal Achievement: This is reflected in the gradually improving level of student discipline. 2) Integration: SMKN 01 Bengkulu City conducted socialization regarding the Fingerprint attendance system and recorded students' fingerprints and facial data from class to class for two weeks prior to its full implementation. 3) Adaptation: The school created schedules for students to help them become accustomed to their responsibilities and disciplined in arriving earlier.

Keywords: *Effectiveness, Fingerprint, Improvement of Student Discipline*.

INTRODUCTION

The development of information technology in the current era of globalization has brought significant changes to various sectors of life, including education. Technological advancements have encouraged educational institutions to adapt to various digital innovations to improve service quality and the effectiveness of school management. One such innovation is the use of fingerprint-based attendance systems as a replacement for manual attendance methods. Fingerprint technology utilizes unique fingerprint patterns, is difficult to forge, and allows for accurate and real-time data recording, making it an increasingly popular choice in various educational institutions.

In practice, manual attendance systems that use signatures or conventional attendance lists often present various challenges, such as inaccurate data, are prone to manipulation, require long processing times, and are susceptible to loss or damage. This can disrupt administrative order and potentially hinder the teaching and learning process. Therefore, the implementation of a digital attendance system using fingerprints is considered a solution to these problems. With this system, every student's attendance is recorded automatically and

accurately and stored in a database, making it easier for teachers and schools to monitor student discipline.

In education, discipline is a crucial aspect that must be instilled from an early age. Punctual attendance at school is a crucial indicator in developing responsible students who respect the rules. Through the fingerprint attendance system, schools can foster a culture of discipline because every student is required to arrive on time to avoid being recorded as tardy. The recorded data is objective and cannot be manipulated.

SMKN 01 Kota Bengkulu is one of the schools that has implemented fingerprint-based digital attendance for all its students. This implementation was implemented in response to various challenges encountered with the manual attendance system, such as high student tardiness, frequently lost attendance, and lengthy attendance recording processes that disrupted effective learning. With a student population of 1,342, the use of manual attendance presents a challenge for teachers on duty in monitoring attendance accurately and efficiently. Therefore, the implementation of the fingerprint system is a strategic step to improve student order and discipline within the school environment.

Prior to the system's implementation, the school conducted a two-week phased socialization and fingerprint recording program to allow students to adapt to the new technology. Five fingerprint machines are used, placed in the school hall, so students can check in on any machine before entering the classroom. This system shortens attendance times, automatically records attendance data, and allows teachers on duty to immediately see who is on time, late, or absent.

Initial observations indicate that the use of fingerprints has positively impacted student discipline. Students are more aware of time and strive to arrive early to avoid being recorded as tardy. Through digital attendance data, schools can also conduct weekly or monthly evaluations of student discipline, allowing for more targeted coaching. However, the fingerprint system also has drawbacks, such as difficulty detecting dirty sensors, dependence on electricity and the network, and the need for regular maintenance to ensure optimal machine function.

In the context of program evaluation, the effectiveness of fingerprint implementation needs to be analyzed comprehensively using relevant indicators. This study utilizes Duncan's effectiveness theory (in Richard M. Steers, 1984:53), which encompasses three main indicators: goal achievement, integration, and adaptation. Through these indicators, researchers can assess the extent to which the fingerprint system achieves the school's planned goals, such as improving student discipline, enhancing administrative order, and minimizing attendance manipulation. Furthermore, system integration can be measured by machine accuracy, fingerprint recognition speed, user convenience, and security. Meanwhile, adaptation relates to the readiness of students, teachers, and school facilities to implement this system sustainably.

Given these various phenomena, it is crucial to assess the effectiveness of fingerprint implementation as a digital attendance system in improving student discipline at SMKN 01 Bengkulu City.

LITERATURE REVIEW

Effectiveness is an important concept in public administration used to measure the success of a program, policy, or activity in achieving its stated objectives. According to Gibson in Harbani Pasolong (2010), effectiveness is the degree to which an organization achieves its goals; the closer the results are to the planned objectives, the higher the effectiveness. A similar opinion is expressed by Emerson in Handayaningrat (1990), who states that effectiveness is a measure of the achievement of predetermined goals. Mahmudi (2005) also emphasizes that effectiveness is measured through the contribution of outputs to the achievement of organizational goals.

Based on these opinions, effectiveness can be concluded as the ability of a program to achieve its goals accurately and optimally. A program is considered effective if the efforts undertaken are in accordance with the planned targets and the results have the desired impact.

This study uses effectiveness indicators according to Duncan (in Richard M. Steers, 1984:53), which encompass three main dimensions:

1. Goal Attainment
   Effectiveness is measured by the extent to which a program or system achieves its stated objectives. In the context of this research, the achievement of objectives is linked to the success of the fingerprint attendance system in improving student discipline, reducing tardiness, and creating orderly attendance administration.
2. Integration
   Integration refers to a system's ability to establish unity and cohesion among its components. In fingerprint attendance, integration encompasses the level of machine accuracy, fingerprint recognition speed, ease of use, and data security. The better the system's integration, the higher its effectiveness.
3. Adaptation
   Adaptation is the system's ability to adjust to needs, changes, or environmental conditions. In this research, adaptation relates to how students, teachers, and schools adapt to using fingerprints, the availability of supporting facilities, the impact of system implementation, and any obstacles that arise during implementation.

These three indicators provide a comprehensive analytical framework for assessing the success of fingerprint implementation in improving student discipline.

METHODS

Data analysis was conducted using the Miles and Huberman model (Sugiyono, 2017), which consists of three main stages:

1) Data Reduction
   The process of selecting, simplifying, and focusing data obtained from interviews, observations, and documentation to create information relevant to the research focus.
2) Data Display
   The reduced data is presented in narrative form so researchers can understand the patterns, relationships, and findings that emerged during the study.
3) Conclusion Drawing and Verification
   Researchers draw conclusions based on the analyzed data. Conclusions are tentative and will be strengthened through verification until valid findings are obtained.

RESULTS

This study examines the effectiveness of implementing a digital fingerprint attendance system in improving student discipline at SMKN 01 Bengkulu City using Duncan's effectiveness indicators, namely goal achievement, integration, and adaptation. Research results were obtained through interviews with key informants and principal informants, field observations, and documentation of student attendance data and school information.

Achievement of Objectives

The implementation of fingerprinting at SMKN 01 Bengkulu City has been part of the school's work program since February 2023. This program emerged in response to the increasing number of students arriving late when attendance was still being done manually. Various other issues, such as frequently lost attendance lists, time-consuming recording, and inaccurate attendance data, also prompted the school to switch to a digital attendance system.

From the interviews, both key informants and principal informants confirmed that fingerprinting has helped improve student discipline. M. Teguh Saputra, Deputy for Student Curriculum, explained that every student must register their attendance before 7:15 a.m., as the system will automatically lock after that time. This time limit has been shown to encourage students to arrive early to avoid being recorded as late.

This was reinforced by student Adelia Permata, who stated that Fingerprint encourages them to be more disciplined and makes it easier for parents to monitor attendance through automatic reports. Student Febri Dwi Mujianto also emphasized that this system eliminates the previously common practice of "leaving absences." In addition to interview data, attendance documentation shows that the majority of students arrive on time.

The May 2025 attendance recap for all grades (10, 11, and 12) showed high attendance rates with a relatively low number of tardy students. For example, in grade 10, 469 students were recorded as arriving on time, with 23 students being late; while in grade 11, 381 students were recorded as arriving on time, with only 14 students being late. These figures indicate a positive trend in discipline. Overall, the research results indicate that the goal of implementing Fingerprint to improve student discipline has been achieved. This is evident in the increase in punctuality in arrival, the reduction in attendance manipulation, and the increased accuracy of attendance data received by homeroom teachers and parents.

Integration

Integration relates to the fingerprint system's ability to operate effectively within the school environment. Based on observations and interviews, fingerprint integration at SMKN 01 was deemed to be running quite well. The school has five fingerprint scanners installed in a row in front of the hall, making it easy for students to choose from. According to the school operator, Jaya Kusuma, the system is quite accurate in detecting students' fingerprints and faces. The data recording process also took two weeks before the system was implemented, ensuring all students were registered in the database.

Students acknowledged the system's ease of use. Berliana said she usually arrives before 7:00 a.m. to avoid queues, and the attendance process only takes a few seconds. Meanwhile, Febri added that the notifications on the fingerprint scanner screen help ensure attendance is recorded correctly. In terms of security and convenience, students and teachers have found this digital system beneficial. Attendance data is accurate and stored in the school's computer system, minimizing the risk of loss or damage. Student attendance information can also be directly reported to parents, increasing transparency and oversight.

However, some integration challenges were encountered, including machine capacity, which sometimes caused queues due to the large number of students (1,342). Furthermore, Wi-Fi network disruptions occasionally caused delays in data reading on the machine. Nevertheless, these challenges did not significantly disrupt the integration of fingerprint functionality into school activities.

Adaptation

Adaptation describes the extent to which students, teachers, and schools can adjust to the new system. Based on research results, adaptation to fingerprinting has been successful and has had a positive impact.

Schools have experienced significant benefits from this system, particularly in making it easier for teachers to monitor student attendance, improving classroom order, and minimizing time previously wasted on manual recording. Parents can also easily monitor their children's attendance through automatic information sent by the school. Students generally adapted easily to the use of fingerprinting. Interviews with Adelia and Berliana indicated that using fingerprinting has become a routine they can follow without significant obstacles. Students also

understand the importance of arriving early to avoid being locked out by the system. On the other hand, several obstacles to adaptation emerged, such as long queues due to limited devices, system congestion due to the large number of incoming data, and interruptions due to power outages or unstable Wi-Fi. Febri stated that system congestion sometimes forced them to temporarily implement manual attendance. This obstacle suggests that increasing the number of devices would help optimize student adaptation and ensure smooth implementation.

Overall, the adaptation was deemed effective because all parties, including teachers, students, and parents, were able to follow the new system well, although there were still technical obstacles that needed to be fixed.

DISCUSSION

This research discusses the analytical effectiveness of implementing a digital fingerprint attendance system in improving student discipline at SMKN 01 Bengkulu City. The analysis was conducted by linking field findings to Duncan's theory of effectiveness, which encompasses three indicators: goal achievement, integration, and adaptation. These three indicators help understand the extent to which the fingerprint system functions as a tool for improving discipline and modernizing school administration.

Achievement of Objectives

The implementation of fingerprinting at SMKN 01 Bengkulu City aimed to improve student order and discipline, address issues of attendance manipulation, and improve the attendance recording system, which previously used manual methods. Research data indicates that these objectives have been successfully achieved.

Before the implementation of fingerprinting, the school faced various obstacles with manual attendance, such as lost attendance lists, inaccurate recording, and students' tendency to entrust their signatures to friends. However, after the implementation of fingerprinting, students were no longer able to falsify attendance because attendance could only be recorded using their fingerprints or faces. This demonstrates that fingerprinting effectively eliminates the possibility of attendance manipulation and encourages students to attend on time.

In terms of discipline, the student attendance recap displayed in the validation table shows a fairly high level of punctuality. Data on student compliance with the 07.15 schedule is evidence that the Fingerprint system has successfully changed student behavior to arrive early so as not to be recorded as late. Interviews with students also confirmed this finding; they admitted that the new system made them more careful in managing their arrival time. Thus, from the perspective of Duncan's theory, the goal achievement indicator has been met because the Fingerprint attendance system was able to produce behavioral changes according to the school's planned targets.

Integration

Integration refers to the extent to which system components function cohesively within the school environment. The study results indicate that the fingerprint system integration is effective, despite some technical challenges. SMKN 01 Bengkulu City uses five fingerprint machines installed close together so students can check in at any machine, expediting queues. Observations show that most students can check in within seconds without significant difficulty. This demonstrates that the system is operating effectively.

Interviews with school operators revealed that the devices are capable of accurately and quickly identifying fingerprints. Data is also automatically stored on the computer, making it easier for teachers to monitor students' daily attendance. Data security is also assured because the system can only be accessed by authorized personnel, such as operators and the curriculum vice-principal.

However, several integration issues were still encountered. These included long queues during peak hours due to large student numbers, limited machine capacity, and Wi-Fi network disruptions that sometimes prevented data from being synchronized promptly. Disruptions like this can still be handled with temporary manual attendance, but it shows that the integration has not run perfectly. Overall, the integration of the Fingerprint system can be said to be effective because of its ability to increase administrative efficiency, service speed, and data accuracy, while the obstacles that arise do not disrupt the main function of the system.

Adaptation

Adaptation relates to the ability of users, including students, teachers, and school officials, to adjust to the new system. Based on research results, user adaptation to fingerprinting was relatively good and had a significant positive impact.

Students, as the primary users of the system, demonstrated strong adaptability. They understood the fingerprinting procedures, knew the attendance deadline, and were accustomed to queuing and using the machines without teacher assistance. Students also recognized that the system provided direct benefits for them and their parents in terms of attendance transparency.

Teachers and school officials also demonstrated strong adaptability. Teachers no longer needed to spend time manually recording attendance, allowing learning activities to begin more quickly. Schools also found the automated reports that facilitated weekly or monthly student discipline evaluations helpful. However, adaptation was not without technical challenges. Some students complained of long lines at certain machines, machines sometimes slowing down fingerprint reading, and network issues that delayed some data entry. However, these challenges did not diminish students' or teachers' willingness to use the system.

Theoretically, good adaptation indicates that the fingerprint system is not only administratively accepted but also accepted as part of the school's disciplinary culture. This confirms that Duncan's adaptation indicators are met.

CONCLUSION

Based on the research results and discussion, the conclusions of this study regarding the effectiveness of fingerprint implementation in improving student discipline at SMKN 01 Kota Bengkulu, using Duncan's effectiveness theory (in Richard M. Steers 1984:53), are as follows:

1. Achievement of Objectives
   With the current implementation of fingerprint attendance, SMKN 01 Kota Bengkulu has experienced adjustments to the change in attendance system from manual to fingerprint attendance. It can be said that the objectives have been achieved, as evidenced by the gradually increasing level of student discipline.
2. Integration
   In this regard, SMKN 01 Bengkulu City has conducted a trial to assess the accuracy of this fingerprint system among students. Furthermore, SMKN 01 Bengkulu City has conducted outreach regarding the fingerprint attendance system. It can be said to be well-targeted, as students have experienced a very positive impact. Its use requires minimal time, requiring only fingerprint or facial recognition. Furthermore, the fingerprint system is secure due to its accuracy and the security of important data, which can only be accessed by the student or the school.
3. Adaptation
   The adaptation of this fingerprint attendance system has both positive and negative impacts. The positive impacts include increased student discipline, high accuracy, direct attendance reporting to parents, and regular class hours. It also helps teachers monitor attendance, increases student engagement, and identifies students who are having

difficulty attending school. Meanwhile, the negative impact is the lack of attendance media which causes students to have to queue, apart from that, the obstacle felt due to the lack of fingerprint machines is that too much data is entered which causes congestion in the system.

SUGGESTION

The author's suggestions based on the conclusions above are:

1. SMKN 01 Kota Bengkulu should add more fingerprint facilities than before, if possible, in every classroom to eliminate queues during each attendance period.
2. Students using fingerprint attendance who are frequently late or arrive close to 5:15 PM are advised to arrive earlier to minimize the risk of late attendance or the possibility of the attendance device being locked before taking attendance.

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