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NutriScan QR-Code in Improving Student Complaint Responsiveness Toward the Quality of the MBG Meal Program

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A B S T R A C T

The Free Nutritious Meal (Makan Bergizi Gratis/MBG) program in Indonesia aims to improve the nutritional status of students through the provision of balanced meals. However, its implementation still faces various challenges, particularly related to inconsistent food quality and the lack of an effective complaint response system. This study proposes the NutriScan QR-Code as a digital innovation designed to improve student complaint responsiveness toward MBG meal quality. This research employed a quantitative approach using a pre-experimental design with a one-group pretest–posttest model. Data were collected using a Likert-scale questionnaire administered to high school students in grades 10-12 who were beneficiaries of the Free Nutritious Meals Program. A total of 59 respondents participated in the pretest phase and 46 respondents in the posttest phase following the implementation of NutriScan QR-Code. The data were analyzed using an Independent Sample t-test to examine differences before and after the implementation of the NutriScan system. The findings show that the implementation of the QR-Code-based NutriScan system significantly improved student complaint responses. This is evidenced by the t-test results (Sig. 2-tailed = 0.010 < 0.05), indicating a statistically significant difference between pretest and posttest scores. All measured indicators including complaint frequency, ease of use, response speed, system clarity, and student satisfaction showed improvement after the system was implemented. In conclusion, the NutriScan QR-Code system is effective in enhancing the efficiency, accessibility, and responsiveness of student complaint management regarding MBG meal quality. It also promotes transparency and encourages active student participation in monitoring school nutrition services

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INTRODUCTION

In January 2025, the Government of Indonesia officially launched the national Free Nutritious Meal (Makan Bergizi Gratis/MBG) program to improve the nutritional status of students, pregnant women, breastfeeding mothers, and toddlers through the provision of nutritious meals in accordance with daily Nutritional Adequacy Standards (Angka Kecukupan Gizi/AKG). This program is expected to support government efforts in addressing the three major nutritional burdens in Indonesia. However, in its implementation, various serious problems have been identified, such as inconsistent menu quality, portion mismatches, and delays in follow-up actions regarding complaints submitted by students. This is confirmed by findings from the Ministry of Health data as of October 5, 2025, which recorded nearly 12,000 cases of food poisoning among school children consuming the MBG meals.

Several other findings related to the MBG program also indicate quality inconsistencies. One prominent case occurred in May 2025 at SMPN 2 Bulukumba, where approximately 712 portions of fried rice received by students were reported as having a foul smell and being undercooked, leading to rejection for consumption. Reports of such unfit food then spread widely in the media and triggered public criticism, including similar findings in South Sulawesi involving suspected spoiled fried rice. In addition, in February 2026, hundreds of moldy bread items were discovered in several schools, namely at SMP Negeri 5 Blora on February 24, SMPN 1 Delanggu in Klaten on February 27, and in several regions of Lampung Province at the end of February.

As observed by the authors in one senior high school in Bandung Regency, the complaint reporting process was carried out manually by students or through unstructured communication channels, resulting in poorly documented complaint information. Specifically, complaints were written on pieces of paper and inserted into lunch containers, making the evaluation and improvement process ineffective. Similar conditions are likely to occur in other schools. These incidents indicate that the main challenge currently faced is the suboptimal monitoring mechanism and complaint response system between recipients and managers. The limited reporting channels hinder early detection mechanisms for suboptimal food conditions, preventing timely delivery of objective feedback from students as end consumers to the Satuan Pelayanan Pemenuhan Gizi (SPPG) as the program manager. This condition limits the ability of schools and service providers to take preventive actions, which indirectly affects the overall effectiveness of continuous quality assurance in the MBG program.

In this era of digital transformation, the utilization of technology can serve as a relevant solution to improve digital service effectiveness. Various studies have shown that Quick Response Code (QR-Code) technology has high effectiveness in supporting digital service systems across multiple sectors, including education and food management. The implementation of QR-Code has been proven to improve operational efficiency, data accuracy, and information access speed for users. In the educational environment, QR-Code based systems have been successfully applied for student meal card management with a transaction success rate of 92% and reporting accuracy of up to 95%,

demonstrating the capability of this technology in supporting school operations. Furthermore, the application of this technology has also been successfully implemented in food service and digital transaction systems, where QR-Code based systems can accelerate service processes, minimize data entry errors, and improve ease of use.

In the context of feedback collection and complaint systems, QR-Code technology offers significant advantages compared to conventional methods. Recent studies show that the use of QR-Code can increase respondent participation rates in surveys because of its convenience, which does not require manual URL entry. This system enables real-time data collection, allowing managers to quickly identify problems and take corrective actions more efficiently. In addition, the integration of QR-Code with digital systems also supports transparency and accountability, as implemented in food safety regulations that require the provision of information and complaint channels through digital codes.

Although QR-Code implementation has been widely studied for attendance systems, payments, and food ordering, research specifically integrating it as a complaint medium for evaluating meal quality in nutrition programs remains very limited. Most previous studies have focused on operational and transactional aspects, without specifically emphasizing the role of QR-Code as a feedback instrument and participatory quality monitoring tool for students. This research gap forms the basis for the urgency of this study.

Based on these issues, this study proposes an innovation called NutriScan QR-Code as a digital solution to accelerate and simplify the student complaint mechanism. This system is designed to allow students to directly submit complaints, evaluations, or feedback regarding food quality simply by scanning a code. This study aims to analyze the effectiveness of implementing the NutriScan QR-Code in improving the responsiveness of managers toward student complaints and to identify the extent to which this system contributes to enhancing transparency and service quality in the MBG Program. With this system, it is expected that food quality monitoring can be conducted more quickly, accurately, and based on valid data.

LITERATURE REVIEW

The Free Nutritious Meal Program (Program Makan Bergizi Gratis/MBG) is a government initiative aimed at improving health and nutritional quality for the Indonesian population, particularly children and pregnant women. This program is designed to enhance nutritional status, establish healthy eating habits, and strengthen clean and healthy living behaviors. To date, the government has been committed to ensuring that the free nutritious meal program is implemented safely, properly, and in accordance with established standards. Although there are currently three certification standards that must be fulfilled namely the Sanitation and Hygiene Eligibility Certificate (Sertifikat Laik Higiene Sanitasi/SLHS), Hazard Analysis and Critical Control Points (HACCP) certification for food risk management, and halal certification in practice, there are still many complaints regarding MBG menus due to unmet

standards of nutrition, cleanliness, and food safety. Therefore, an evaluation of the quality of MBG menus is essential to ensure the achievement of the program's objectives. The quality of menus in the MBG program is a crucial aspect that must be considered because it directly affects the health of beneficiaries. Food menus that do not meet nutritional standards, are unhygienic, or are unfit for consumption can lead to digestive disorders, diarrhea, and even food poisoning.

Monitoring the quality of MBG menus is not only the responsibility of program implementers but also requires the active participation of students as the main beneficiaries. In the context of this study, active student participation refers to actions such as submitting criticism, suggestions, or reports regarding the quality of MBG menus. However, in practice, student participation in submitting complaints remains relatively low. NutriScan is an innovative digital complaint platform based on QR-Code technology that is used to accommodate student reports regarding the quality of MBG menus. A QR-Code, or Quick Response Code, is a two dimensional code that can store information and be accessed quickly and practically by scanning it using digital devices. Based on previous studies, the use of QR-Code technology has shown effectiveness in improving information access, interaction, and user participation in digital education systems. However, research on the use of QR-Code as a medium for reporting MBG menu quality is still limited. Therefore, this study focuses on the use of the QR-Code based NutriScan system in increasing students' complaint responsiveness regarding MBG menu quality. The operational system of NutriScan begins with scanning the QR-Code using a smartphones. Students are then directed to the NutriScan system, which contains important information about NutriScan and guidelines for proper use. After that, students are directed to a digital complaint form to submit their complaints or evaluations of the MBG menu. Once submitted, the report enters the system and can be reviewed by the school or program administrators.

MBG menu quality that does not meet established standards is often not reported promptly because students experience difficulties in submitting complaints. The use of the QR-Code based NutriScan system provides a more accessible, faster, and more practical reporting mechanism. This convenience encourages increased student confidence and participation in reporting issues related to MBG menu quality. Thus, the implementation of NutriScan is expected to improve students' complaint responsiveness toward the quality of MBG menus.

METHODOLOGY

Research Design

This study employed a quantitative approach using a pre-experimental method. The research design adopted was a one-group pretest–posttest design. In this design, measurements are conducted twice: before the treatment (pretest) and after the treatment (posttest). This design is commonly used in educational technology research to examine changes before and after the implementation of a digital system in a limited educational setting, as also highlighted in studies on experimental approaches in educational technology and QR-code learning systems.

The design can be expressed as O1 X O2, where O1 represents the pretest, X represents the treatment (implementation of NutriScan QR-Code system), and O2 represents the posttest. The research design model is illustrated as follows:

Table 1. One-Group Pretest–Posttest Research Design

Group	Pretest	Treatment (X)	Posttest
Students	O1	NutriScan QR-Code	O2

Description:

O1 = Measurement before treatment
X = Implementation of NutriScan QR-Code system
O2 = Measurement after treatment

Research Procedure

The research procedure was conducted systematically through several stages:

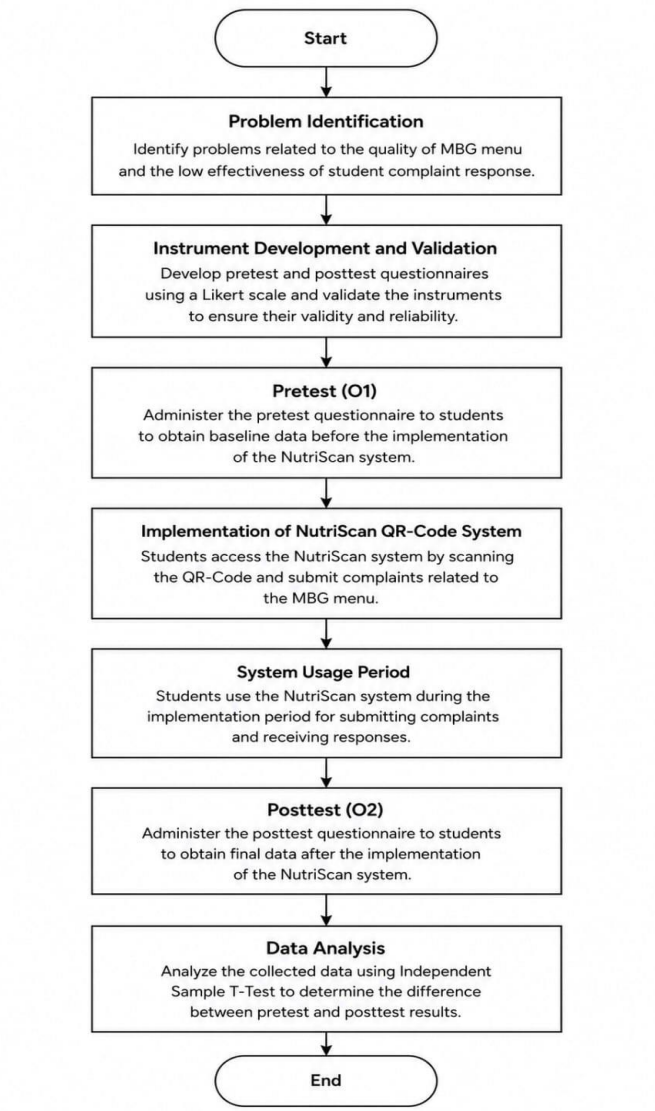

Figure 1. Research Flow of NutriScan Study

The research procedure was systematically carried out starting from problem identification to data analysis. The initial stage began with identifying issues related to the quality of the MBG menu and the low effectiveness of student complaint response systems. Next, research instruments were developed in the form of pretest and posttest questionnaires using a Likert scale, which were then validated to ensure their feasibility.

After the instruments were declared valid, the pretest (O1) was administered to students to obtain baseline data. The next stage was the implementation of the NutriScan QR-Code system, where students could submit complaints regarding the MBG menu by scanning a QR code. After the implementation period, a posttest (O2) was conducted to obtain final data. The collected data were then analyzed statistically using an Independent Sample t-test to determine the difference between pretest and posttest results.

Research Instrument

The instruments used in this study consisted of pretest and posttest questionnaires developed using a Likert scale, ranging from strongly disagree to strongly agree. These instruments were used to measure student responses toward the complaint system, covering several aspects: response speed, ease of system use, clarity of complaint information, and user satisfaction with the NutriScan QR-Code system.

Data Collection Techniques

Data collection was conducted through several methods:

1. Pretest questionnaires distributed before the implementation of the NutriScan system.
2. Observation during the system usage process.
3. Posttest questionnaires administered after system implementation.

The data obtained from these three stages were used to analyze changes in student responses toward the QR-Code based complaint system.

Data Analysis Techniques

The number of respondents in the pretest stage was 59 students, while in the posttest stage there were 46 students. This difference in sample size indicates that the data are independent, therefore an Independent Sample t-test was used for analysis.

The formula for the independent t-test is expressed as follows:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

Description:

$\bar{X}_1$ = mean of pretest

$\bar{X}_2$ = mean of posttest

S_1^2, S_2^2 = variance

n_1, n_2 = number of samples

Decision rule:

Sig < 0.05 → H0 is rejected
Sig > 0.05 → H0 is accepted

RESULTS

Descriptive Analysis

Pre-Test Results

Table 2. Pre-Test Descriptive Statistics

Indicator	Mean
Complaint frequency	2.71
Ease of complaint	2.76
Response speed	2.73
System clarity	2.83
Student satisfaction	2.97

Table 2 shows that the average student responses before the implementation of the NutriScan QR-Code system were in the moderate category. This indicates that the previous complaint system was not yet optimal in facilitating students to effectively submit their complaints.

Post-Test Results

Table 3. Post-Test Descriptive Statistics

Indicator	Mean
Complaint frequency	2.74
Ease of complaint	3.23
Response speed	3.28
System clarity	2.93
Student satisfaction	3.09

Table 3 shows an increase in the mean values across all indicators after the implementation of the NutriScan QR-Code system. This indicates an improvement in the complaint system as perceived by the students.

Assumption Testing

Normality Test

Table 4. Normality Test Results

Data	Sig.	Description
Pre-test	0.112	Normal
Post-test	0.353	Normal

The normality test results show that both pre-test and post-test data have significance values greater than 0.05. Therefore, it can be concluded that the data are normally distributed.

Homogeneity Test

Table 5. Homogeneity Test Results

Statistic	Value
Group 1 Variance	14.848
Group 2 Variance	14.675
F value	1.012
Sig. (P(F≤f) one-tail)	0.488
Description	Homogeneous

The homogeneity test results show that the significance value is 0.488 > 0.05, indicating that the variances of the two groups are homogeneous.

Hypothesis Testing (Independent Sample t-Test)

The hypothesis test was conducted using an Independent Sample t-Test to determine the difference in student complaint responses before and after the implementation of the NutriScan QR-Code system.

Table 6. Independent Sample t-Test Results

Variable	t-value	Sig. (2-tailed)
Complaint response	-2.626	0.010

Based on the t-test results, the significance value (Sig. 2-tailed) is 0.010. This value is lower than the significance level of 0.05 (0.010 < 0.05), therefore H_0 is rejected and H_1 is accepted. This indicates that there is a statistically significant difference in student complaint responses before and after the implementation of the NutriScan QR-Code system.

DISCUSSION

The research results show that the use of QR-Code NutriScan has a significant effect on improving students complaint responses. This improvement is reflected in the increase in the average scores across all indicators, such as complaint frequency, ease of submitting complaints, response speed, system clarity, and student satisfaction. Conceptually, these findings strengthen the theory that the digitalization of public services can enhance user participation. QR-Code as a technology based medium provides more practical access compared to conventional systems.

In addition, the use of QR-Code NutriScan is also able to reduce students psychological barriers, such as reluctance or fear in expressing complaints. This system allows students to submit complaints more quickly, flexibly, and relatively anonymously. From a management education perspective, this innovation reflects the implementation of effective technology based service principles in improving service quality. This is in line with the concept of modern management, which emphasizes efficiency, transparency, and user participation.

Thus, QR-Code NutriScan not only functions as a technological tool but also as a strategic instrument in building an open communication culture between students and the managers of the MBG program.

NutriScan Illustration

Figure 2. NutriScan Logo

Figure 3. NutriScan QR-Code

Figure 4. NutriScan Home Page

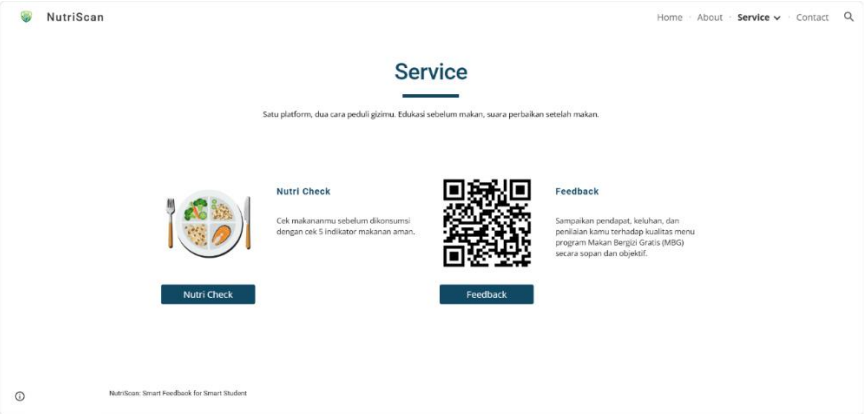

Figure 5. NutriScan Service Page

Figure 6. NutriScan Feedback Form

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the research and discussion regarding the effectiveness of QR-Code based NutriScan in improving student complaint responses regarding the quality of the Free Nutritious Meal (MBG) menu, it can be concluded that student complaint responses before the implementation of QR-Code NutriScan were in the moderate category and not yet optimal. After the implementation of QR-Code NutriScan, there was an improvement in student complaint responses following the system implementation.

This is proven by the results of the Independent Sample T-Test analysis, which shows a significant difference between pretest and posttest values. The obtained significance value (Sig.) of < 0.05 indicates that H_0 is rejected and H_1 is accepted, meaning that QR-Code based NutriScan is proven to be effective in improving student complaint responses. This improvement shows that the QR-Code NutriScan digital based system is effective in enhancing ease, speed, and student satisfaction in submitting complaints regarding the quality of the MBG menu.

FURTHER STUDY

This research still has limitations, so further research is needed related to the topic of NutriScan QR-Code in Improving Student Complaint Responsiveness Toward the Quality of the MBG Meal Program in order to perfect this research and increase insight for readers.

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