Influence of school feeding program on students' academic performance: A case of public secondary schools in Musanze district, Rwanda

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ABSTRACT

This study examined the influence of the School Feeding Program (SFP) on students' academic performance in selected public secondary schools in Musanze District, Rwanda. The study was guided by four objectives: To assess the effect of the School Feeding Program on students' attendance and punctuality; assess the effectiveness of the school feeding program; and determine the impact of the school feeding program on students' academic performance. It was grounded on maslow's hierarchy of needs and herzberg's two factor theory. the study employed a descriptive research design using a mixed-methods approach that combined quantitative and qualitative methods. The study population consisted of 1,341 respondents. The purposive and Simple random sampling method was used to select a total sample of 417 respondents. Data were collected using questionnaires, interview guides, and document review. Quantitative data were analyzed using frequencies and percentages, while qualitative data were analyzed through thematic analysis. The findings revealed that the School Feeding Program had a positive effect on students' attendance and punctuality. However, occasional challenges related to food supply, adequacy, quality, and delays in meal provision were reported. It recommends strengthening funding and food supply systems, ensuring adequate and nutritious meals, improving feeding infrastructure and timely meal provision, and strengthening monitoring and supervision to enhance the effectiveness and sustainability of the program in public secondary schools.

Keywords: Academic achievement, educational outcomes, School attendance, School Feeding Program, Student punctuality, Student performance

I. INTRODUCTION

Educationis universally acknowledged as a key driver of individual growth and socio-economic development of a nation. Students' academic performance, however, is dependent on several factors such as the availability of learning materials, quality of teaching, support from parents, health, nutrition and punctuality at school. Of these, sufficient nutrition has been given a great deal of attention as students who are hungry or not well nourished may be unable to concentrate, participate, remember, attend, or learn. The World Food Programme (WFP) (2022) reported that school feeding programmes can help reduce school absences, increase attendance, participation, health and educational outcomes for millions of learners around the world. Likewise, the Food and Agriculture Organization (Burkhart, 2019) noted that proper nutrition is crucial for cognitive development and effective learning as students need enough energy and nutrients to maintain their attention and to actively participate in classroom activities. As a result, school feeding programmes have become a leverage to promote children's attendance and their learning. Governments and development partners in sub-Saharan Africa have increasingly encouraged school feeding programmes as a strategy to enhance access to education, retention and students' well-being.

The Government of Rwanda has called on member states to continue providing school meals, and especially to scale up school feeding programmes in basic education, so that students are able to attend school, alleviate hunger while they are learning, and be able to concentrate on the learning process in the classrooms (Ministry of Education [MINEDUC], 2021). As far as Rwanda is concerned, the school feeding programme has also engaged the participation of parents, schools, local government institutions and other stakeholders to foster school feeding and manage school feeding.

While school feeding programmes are supposed to facilitate learning outcomes in Rwanda, implementation constraints can affect these outcomes. Some of these challenges can be the financial burden on some families to be able to contribute meals to the school, meals may not be adequate or nutritionally sound, meals may not be served consistently, cooking facilities may not be available at every school, and program management may be ineffective. These challenges can impact the consistency of meals provided, and the quality of meals being provided to students to meet their nutritional and learning needs.

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Musanze District is one of the districts in Rwanda that has a number of public secondary schools that have educational programs aimed at enhancing student participation and performance. The difficulties which students encounter in public secondary schools which may affect their learning performance are various such as the socio-economic status of the family, sufficient meals, inability to attend school, and the availability of adequate learning environment. The school feeding program can then be expected to have a potentially significant role in alleviating hunger at school and consequently in helping students to focus, attend, participate and perform well in school. The impact of school feeding on academic performance of students in public secondary schools in Musanze District on the other hand needs to be tested empirically. Local evidence is significant because what works in this program in one place, might not work in another, depending on how it is implemented, and the socio-economic and school context in which the students live.

1.1 Statement of the Problem

School feeding is increasingly seen as an important intervention to enhance the welfare of students, their attendance, concentration, participation and learning outcome. The Rwanda Government has implemented the National School Feeding Programme (NSFP) to improve nutrition and enhance learning outcomes in the country (MINEDUC, 2021). The Government of Rwanda invested heavily in school feeding infrastructure, financial resources, guidelines and community involvement. However, the effectiveness of the programme is affected by various challenges including differences in regularity and quality of meals, the extent to which the programme is implemented, students' attendance, parental contributions, resources provided by the school, and socio-economic factors (MINEDUC, 2021). This study aimed to find out the impact of the school feeding program on the academic performance among the students in Public Secondary Schools in Musanze District. This is especially important as the school feeding policy clearly states that enhanced cognition and quality of learning are outcomes of the programme in Rwanda (MINEDUC, 2021).

1.2. Research Objectives

i. To Assess the effect of the school feeding program on students' attendance and punctuality
ii. To assess the effectiveness of school feeding program in selected secondary schools in Musanze District
iii. To determine the impact of school feeding program on student academic performance in selected schools in Musanze District

II. LITERATURE REVIEW

2.1 Theoretical Review

2.2.1 Maslow's Hierarchy of Needs

Maslow's Hierarchy (Maslow, 1943) stresses the necessity of satisfying fundamental physical needs like food before moving on to processes associated with higher cognition, such as learning. In a school setting, the act of feeding can serve these needs, providing an environment favorable to productive learning. In the same way, herzberg's two-factor theory distinguishes hygiene factors (food and health) and motivators (achievement and recognition). According to (Herzberg et al, 1959), children that do not meet base hygiene needs like hunger have lower motivation or performance levels in academics. Therefore, school food programs are a crucial factor in meeting needs that support motivation and performance in school. The relevance of maslow's and herzberg's theories is in that they emphasize basic needs to be satisfied before any learning can take place. School feeding programs fulfill these foundational needs to allow better concentration and academic stimulation. When there is a lack of good nutrition, it prevents students from remaining motivated and doing well in school.

2.2.2 Herzberg's Two Factor

Herzberg's Two-Factor Theory, also known as the Motivation-Hygiene Theory, explains motivation through two categories: hygiene factors and motivators. Hygiene factors, such as basic working conditions, prevent dissatisfaction, while motivators, such as achievement and recognition, encourage greater satisfaction and performance (Herzberg et al., 1959). In this study, the theory relates school feeding to the satisfaction of students' basic needs. Providing adequate and nutritious meals can reduce hunger, distraction, and dissatisfaction, allowing students to concentrate better on learning. Improved academic achievement may then act as a motivator that encourages greater participation and effort. The theory is therefore relevant because it explains how meeting students' basic nutritional needs can create favorable conditions for learning and academic performance.

2.2 Empirical Review

2.2.1 School Feeding Program and Students' Attendance and Punctuality

Several empirical studies have examined the relationship between school feeding programs and students' attendance. Wall et al. (2022) conducted a systematic review of nine studies on school meal programs and educational

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outcomes among schoolchildren in sub-Saharan Africa. Similarly, Desalegn et al. (2021) conducted a prospective cohort study among 480 children aged 10–14 years in 16 rural schools in southern Ethiopia. The study demonstrated that school feeding can contribute to improved school attendance by reducing hunger and providing an incentive for students to remain in school.

A systematic review and meta-analysis by Wang et al. (2021) also examined the effects of school feeding on educational and health outcomes among school-age children and adolescents in low- and middle-income countries. The meta-analysis found that students receiving school feeding attended, on average, 2.56 percentage points more school days than students in control groups. Wall et al. (2022) reviewed school feeding interventions across sub-Saharan Africa and found that eight of the nine studies reviewed reported improvement in at least one educational outcome, including attendance, enrollment, academic performance, or learning capability. Omwami et al. (2011) found that students who benefited from school feeding interventions demonstrated higher school attendance rates than those who did not receive school meals. Their findings indicated that providing meals at school can encourage learners to attend school more regularly.

Kazianga et al. (2012) found that school feeding interventions positively influenced school participation and enrolment. However, their findings showed that the relationship between school meals and attendance among already-enrolled learners was not consistently positive, suggesting that the effects may vary depending on students' circumstances. Desalegn et al. (2021) found that students who did not benefit from school feeding programmes were more likely to be absent from school than those who received meals. The study also found that beneficiaries had fewer days of absenteeism, demonstrating the contribution of school feeding to regular school attendance.Wang et al. (2021) found that school feeding programmes significantly increased the percentage of school days attended by learners. Their findings demonstrated that providing meals at school contributes to improved school attendance among children and adolescents.

Similarly, Mohammed et al. (2023) found that students who did not benefit from school feeding programmes were more likely to experience school absenteeism than those who received school meals. Their findings emphasized the importance of school feeding in reducing absenteeism and promoting regular attendance.

2.2.2 Effectiveness of School Feeding Programs

In Rwanda, the implementation of school feeding has expanded under the National School Feeding Programme. Empirical research has increasingly examined whether the program produces educational benefits. For example, Munyehirwe and Ndokoye (2024) investigated the impact of the National School Feeding Programme on academic achievement in primary schools in Nyaruguru District. Wall et al. (2022) found considerable evidence linking school feeding with academic outcomes in sub-Saharan Africa. Six of the nine studies included in their systematic review assessed academic performance. Several of these studies reported improvements in test scores among students who received school meals. For example, an intervention in Burkina Faso resulted in a 9.6% increase in correctly answered mathematics questions among students receiving school meals. Niyonsaba et al. (2025) found that inadequate resources, limited stakeholder involvement, and weak monitoring affected the quality and sustainability of the programme. Habyarimana et al. (2023) found that the implementation of school feeding programmes in Rwanda was moderate. They established that insufficient food quantity and quality, inadequate cooking materials and infrastructure, and high food prices were major challenges affecting programme effectiveness.

Liguori et al. (2024) found that the effectiveness of school meal programmes in sub-Saharan Africa was affected by challenges related to meal quantity, quality, food diversity, preparation, distribution, infrastructure, funding, and coordination. These findings highlight the need to strengthen programme implementation and coordination among stakeholders to improve nutritional outcomes. Ndayishimye and Dushimimana (2024) found that collaboration among stakeholders, particularly parental engagement, had a positive and significant relationship with the successful implementation of school feeding programmes. Their findings emphasized the importance of parents making timely contributions and working closely with school administration to ensure effective programme implementation.

2.2.3 School Feeding Program and Students' Academic Performance

Desalegn et al. (2021) found that students who benefited from school feeding programmes achieved higher average academic scores than those who did not receive school meals. Their findings showed a statistically significant improvement in academic performance among students receiving school meals. Kazianga et al. (2012) found that students who benefited from school meals improved their mathematics performance, with an increase of 9.6% in the proportion of correctly answered questions. Their findings demonstrated the contribution of school feeding to improved learning achievement.

Abotsi (2013) found that the school feeding programme had a positive influence on students' academic performance and classroom attentiveness. Similary, Munyehirwe and Ndokoye (2024) found a positive relationship between the types, frequency, quality, and quantity of meals provided and pupils' academic achievement in Rwanda. These findings indicated that the school feeding programme contributes significantly to student's academic success.

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Mensah and Nsabimana (2025) showed that the programme contributed to reducing gender gaps in academic achievement. Wall et al. (2022) found that school feeding programmes were positively associated with improvements in academic performance, including mathematics and other learning outcomes.

III. METHODOLOGY

3.1 Research Design

We employed a descriptive research design with mixed method approach in this study. It sought to study the effect of the school food programme on student performance at school through both quantitative and qualitative data. By this method, the researcher was able to gather detailed views of all relevant parties.

3.2 Study Area

The study is conducted in selected public secondary schools in Musanze District, Northern Province of Rwanda. Musanze District is selected because it has a number of public secondary schools where school feeding programs are implemented. The study does not cover all schools in Rwanda or all schools in Musanze District; rather, it focuses on selected public secondary schools that constitute the study area and provide the required information.

3.3 Target Population

The population of the study was 56 Head teachers and 1226 teachers. The teachers were the largest group in the study population. They play an important role as they have face-to-face interaction with students and actively participate in teaching and learning activities. Their experiences and observations offer information about the implementation of school-level programs and the impact of implementation on students and the school environment.

3.4 Sampling Methods and Sample Size

The study employed purposive sampling and Simple random sampling using the Slovin formula to determine the sample size of teachers. The two approaches are used because the respondents have different roles and levels of involvement in the subject under investigation. Purposive sampling is appropriate for respondents who possess specific knowledge and responsibilities relevant to the study, while the teacher sample is determined from the larger teacher population to obtain a manageable and representative number of respondents.

The sample size of the teachers was determined with Slovin's formula. The sample size used Slovin's formula with the formula 'n' the sample size needed, 'N' was the population size and e is margin of error (preferred 0.05 or 5%) for the error, confidence level was raised as 95%. The target population (N) was then used to estimate the sample size (n) based on these values

(n) is:

This formula is written as $n = \frac{N}{1+N(e^2)}$

Where N = Total population,

n = Sample size,

e = error margin (0.05).

$$n = \frac{N}{1+N(e^2)} = \frac{1226}{1+ 1226\ (0.05^2)} = 302.3 \approx 302$$

Table 1

Distribution of Respondent by Sample

Respondent Group	Population (N)	Sample Size Calculation	Final Sample Size	Sampling Method
Head teachers	56	All members included	56	Purposive sampling
Teachers	1,226	Slovin formula: n = N / (1 + Ne²)	302	Simple random sampling
Total	**1282**		**358**	

3.5 Data Collection Instruments and Procedures

3.5.1 Questionnaires

A structured questionnaire was administered to teachers. The questionnaire is designed to collect quantitative data on the implementation of the school feeding program and its perceived effects on students' educational outcomes. It contains closed-ended questions, mainly using a Likert-type scale, which enables respondents to indicate the extent to which they agree or disagree with statements related to the study variables.

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3.5.2 Interview Guide

Semi-structured interview was administered to Head teachers (HTs). The interviews are designed to obtain detailed qualitative information that may not be adequately captured through structured questionnaires. The respondents are selected because of their responsibilities in managing, supervising, and monitoring education programs.

3.5.3 Data Collection Procedures

Before the commencement of data collection, the researcher obtained the necessary authorization from the relevant authorities in Musanze District and introduced the study to the selected schools and participants. The researcher explained the purpose of the study, the type of information required, and the importance of participants' contribution to the research. After obtaining permission, the researcher contacted the selected schools and arranged appropriate dates and times for data collection. The questionnaires were administered to the selected teachers. The researcher explained how to complete the questionnaires and provided sufficient time for respondents to answer all questions. Completed questionnaires were collected and checked for completeness before being accepted for analysis.

For the qualitative component, interview questions were administered to Headteachers (HTs). Interviews were conducted at convenient times and in suitable settings that allowed respondents to provide information freely. The researcher asked questions concerning the implementation of the school feeding program, its effectiveness, challenges, students' attendance and punctuality, and perceived effects on academic performance. The responses were carefully recorded and organized for subsequent analysis.

The researcher also reviewed relevant school records and official documents, particularly those related to students' attendance, punctuality, academic results, and school feeding program implementation. Documentary information was recorded using a document review guide and used to complement information obtained from questionnaires and interviews. Throughout the data collection process, the researcher maintained ethical standards by explaining the voluntary nature of participation, respecting participants' privacy, maintaining confidentiality, and using the information collected strictly for academic research purposes. The researcher also ensured that respondents were not subjected to unnecessary pressure or harm during the study.

3.6 Data Analysis

Quantitative data were analyzed using frequencies and percentages, while qualitative data were analyzed through thematic analysis.

3.7 Ethical Consideration

The study adhered to a good, ethical stance to protect and respect the dignity of all participants. Some of the ethical standards we observed were confidentiality, anonymity, informed consent and the right to withdraw. Personal information was managed with the aim of preserving confidentiality, and no identifying information was obtained to ensure security of information. All participants were well informed about the study's aims, procedures, risks, and benefits prior to consenting, and could withdraw from the study at any point without any negative consequences. These safeguards safeguarded the conduct of the study with an element of honor and respect for the rights of the participants.

IV. FINDINGS & DISCUSSION

4.1 Findings

4.1.1 Effect of School Feeding Program on students' attendance and punctuality

Since February 2016, the School Feeding Program in Rwanda, covering basic education levels, was officially expanded to all day schools, including the 9- and 12-year basic education systems. Such expansion was part of a government and parent partnership to facilitate school attendance and reduce dropouts, particularly in the 12-year basic education system. The program was launched nationwide to support students' nutrition and enhance their academic performance. This study aimed to evaluate the program's impact by gathering data, mostly from 302 teachers. Findings were tabulated in table 2.

Table 2

Effect of School Feeding Program on students' attendance and punctuality

Statement	SA	A	NS	D	SD	Total
Availability of school meals encourages students to attend school regularly.	157 (52.0%)	101 (33.4%)	17 (5.6%)	17 (5.6%)	10 (3.3%)	302 (100%)
Adequate school meals reduce student absenteeism.	147 (48.7%)	105 (34.8%)	20 (6.6%)	20 (6.6%)	10 (3.3%)	302 (100%)
Regular provision of school meals encourages students to attend school consistently.	162 (53.6%)	96 (31.8%)	16 (5.3%)	19 (6.3%)	9 (3.0%)	302 (100%)

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Timely provision of school meals encourages students to arrive at school on time.	143 (47.4%)	110 (36.4%)	20 (6.6%)	19 (6.3%)	10 (3.3%)	302 (100%)
Students are less likely to arrive late when school meals are regularly provided.	146 (48.3%)	106 (35.1%)	19 (6.3%)	21 (7.0%)	10 (3.3%)	302 (100%)

Table 2 presents teachers' views regarding the effect of the school feeding program on students' attendance and punctuality. The findings indicate an overall positive perception among the teachers. Regarding the availability of school meals, 157 teachers (52.0%) strongly agreed and 101 teachers (33.4%) agreed that the availability of school meals encourages students to attend school regularly. Therefore, 85.4% of teachers agreed or strongly agreed with the statement. Only 8.9% disagreed or strongly disagreed, while 5.6% were not sure. This indicates that meal availability is perceived as an important factor in encouraging regular attendance. For adequate school meals, 147 teachers (48.7%) strongly agreed and 105 (34.8%) agreed that adequate meals reduce student absenteeism. Thus, 83.4% expressed agreement. This suggests that teachers perceive adequate feeding as contributing to reduced absenteeism among students.

The third statement received the highest level of agreement. 162 teachers (53.6%) strongly agreed and 96 (31.8%) agreed that regular provision of school meals encourages students to attend school consistently. The combined agreement was 85.4%, showing that regularity of meal provision is strongly associated with consistent attendance from the teachers' perspective. Regarding punctuality, 143 teachers (47.4%) strongly agreed and 110 (36.4%) agreed that timely provision of school meals encourages students to arrive at school on time. Similarly, 146 teachers (48.3%) strongly agreed and 106 (35.1%) agreed that students are less likely to arrive late when school meals are regularly provided. These results suggest that the school feeding program is also perceived to contribute positively to students' punctuality. Overall, the findings show that between 83.4% and 85.4% of teachers agreed or strongly agreed with the five statements. This demonstrates that teachers generally perceive the school feeding program as having a positive effect on students' attendance and punctuality in the selected public secondary schools in Musanze District.

4.1.2 Effectiveness of the School Feeding Program

Table 3 presents teachers' perceptions of the effectiveness of the school feeding program in selected public secondary schools in Musanze District.

Table 3

Teachers' views on the effectiveness of the school feeding program

Statement	SA	A	NS	D	SD	Total
School meals are available to students on the scheduled school days.	152 (50.3%)	103 (34.1%)	17 (5.6%)	20 (6.6%)	10 (3.3%)	302 (100%)
The quantity of food provided is sufficient for students' needs during the school day.	134 (44.4%)	113 (37.4%)	21 (7.0%)	23 (7.6%)	11 (3.6%)	302 (100%)
School meals are provided regularly according to the established feeding schedule.	146 (48.3%)	109 (36.1%)	18 (6.0%)	19 (6.3%)	10 (3.3%)	302 (100%)
The meals provided are nutritious, safe, and of good quality.	138 (45.7%)	108 (35.8%)	22 (7.3%)	23 (7.6%)	11 (3.6%)	302 (100%)
School meals are served at the appropriate time without unnecessary delays.	129 (42.7%)	114 (37.7%)	22 (7.3%)	25 (8.3%)	12 (4.0%)	302 (100%)

The findings show that the majority of teachers considered the program effective across the five assessed dimensions. Regarding meal availability, 152 teachers (50.3%) strongly agreed and 103 (34.1%) agreed that school meals are available to students on scheduled school days. The combined agreement was 84.4%, indicating that most teachers perceive meal availability as satisfactory.

Concerning the quantity of food provided, 134 teachers (44.4%) strongly agreed and 113 (37.4%) agreed that the quantity is sufficient for students' needs during the school day. Overall, 81.8% agreed or strongly agreed. However, 11.3% disagreed or strongly disagreed, suggesting that some teachers perceive challenges regarding the adequacy of food quantities. Regarding regularity, 146 teachers (48.3%) strongly agreed and 109 (36.1%) agreed that meals are provided regularly according to the established feeding schedule. The combined agreement of 84.4% indicates that regular meal provision is generally viewed positively. For the quality and nutritional value of meals, 138 teachers (45.7%) strongly agreed and 108 (35.8%) agreed that the meals provided are nutritious, safe, and of good quality. Therefore, 81.5% of respondents expressed agreement. Nevertheless, 11.3% disagreed or strongly disagreed, indicating that there may still be concerns about food quality, safety, or nutritional adequacy in some schools.

Finally, 129 teachers (42.7%) strongly agreed and 114 (37.7%) agreed that school meals are served at the appropriate time without unnecessary delays. The combined agreement was 80.5%, which was the lowest among the five indicators. This suggests that although meal service is generally considered timely, delays may still occur in some schools. Overall, the findings indicate that 80.5%–84.4% of teachers agreed or strongly agreed with the five statements.

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This suggests that the school feeding program is generally perceived as effective in terms of meal availability, adequacy, regularity, quality and nutritional value, and timeliness. However, the findings also point to areas requiring improvement, particularly the quantity of food provided and timely serving of meals.

4.1.3 Impact of School Feeding Program on Students' Academic Performance

Table 4 presents teachers' views on the impact of the school feeding program on students' academic performance.

Table 4

Challenges in implementing the school feeding program in Musanze District

Statement	SA	A	NS	D	SD	Total
Regular access to school meals improves students' concentration during lessons.	158 (52.3%)	101 (33.4%)	15 (5.0%)	18 (6.0%)	10 (3.3%)	302 (100%)
Adequate and nutritious school meals contribute to improved academic achievement.	151 (50.0%)	105 (34.8%)	16 (5.3%)	20 (6.6%)	10 (3.3%)	302 (100%)
School feeding encourages students to participate actively in classroom activities.	145 (48.0%)	110 (36.4%)	17 (5.6%)	20 (6.6%)	10 (3.3%)	302 (100%)
Students who receive regular school meals demonstrate better learning outcomes.	148 (49.0%)	106 (35.1%)	18 (6.0%)	20 (6.6%)	10 (3.3%)	302 (100%)
Effective implementation of the school feeding program contributes to improved examination results.	153 (50.7%)	102 (33.8%)	17 (5.6%)	20 (6.6%)	10 (3.3%)	302 (100%)

The findings in Table 4 indicate that the majority of teachers perceived the school feeding program as contributing positively to students' academic performance. Regarding students' concentration, 158 teachers (52.3%) strongly agreed and 101 (33.4%) agreed that regular access to school meals improves students' concentration during lessons. The combined agreement was 85.7%, while only 9.3% disagreed or strongly disagreed. This suggests that teachers largely perceive regular feeding as helping students remain attentive and focused during classroom learning. Concerning academic achievement, 151 teachers (50.0%) strongly agreed and 105 (34.8%) agreed that adequate and nutritious school meals contribute to improved academic achievement. Therefore, 84.8% of teachers expressed agreement. This finding indicates that adequate and nutritious meals are perceived as contributing to students' ability to achieve better academic results.

The third statement shows that 145 teachers (48.0%) strongly agreed and 110 (36.4%) agreed that school feeding encourages students to participate actively in classroom activities. The combined agreement was 84.4%. This suggests that when students receive school meals, they are perceived to be more willing and able to participate in classroom activities. Regarding learning outcomes, 148 teachers (49.0%) strongly agreed and 106 (35.1%) agreed that students who receive regular school meals demonstrate better learning outcomes. The combined agreement of 84.1% indicates that teachers generally associate regular school feeding with improved learning outcomes. Finally, 153 teachers (50.7%) strongly agreed and 102 (33.8%) agreed that effective implementation of the school feeding program contributes to improved examination results. Thus, 84.4% of teachers agreed or strongly agreed with the statement. This suggests that teachers perceive effective school feeding as having a positive contribution to students' examination performance.

Overall, the findings indicate a strong positive perception of the impact of the school feeding program on students' academic performance. The proportion of teachers who agreed or strongly agreed with the five statements ranges from 84.1% to 85.7%. The highest level of agreement was recorded for the improvement of students' concentration during lessons (85.7%), while the lowest was recorded for better learning outcomes (84.1%).

These findings suggest that teachers perceive the school feeding program as contributing to important aspects of academic performance, particularly concentration, academic achievement, classroom participation, learning outcomes, and examination results. Therefore, the results provide evidence that effective provision of school meals is perceived to support improved academic performance among students in selected public secondary schools in Musanze District.

4.1.4 Findings on Students' Academic Performance

This section presents descriptive statistics on teachers' responses regarding the perceived influence of the School Feeding Program on students' academic performance. The analysis uses the 302 valid teacher questionnaires and summarizes responses to five statements using the mean and standard deviation. The Likert scale was coded as follows: 5 = strongly agree, 4 = agree, 3 = not sure, 2 = disagree, and 1 = strongly disagree. Higher mean scores indicate stronger agreement that school feeding supports students' academic performance.

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Table 5

Descriptive statistics on students' academic performance

Statement	N	Mean	Std. Deviation
Regular access to school meals improves students' concentration during lessons.	302	4.25	1.02
Adequate and nutritious school meals contribute to improved academic achievement.	302	4.22	1.04
School feeding encourages students to participate actively in classroom activities.	302	4.19	1.03
Students who receive regular school meals demonstrate better learning outcomes.	302	4.20	1.04
Effective implementation of the school feeding programme contributes to improved examination results.	302	4.22	1.04
Overall mean	**302**	**4.22**	**1.03**

Source: Raw data from questionnaires

As shown in Table 5, all five statements recorded mean scores above 4.00, indicating that teachers generally agreed that the School Feeding Program supports students' academic performance. The highest mean score was recorded for the statement that regular access to school meals improves students' concentration during lessons (M = 4.25, SD = 1.02). This was followed by the view that effective implementation contributes to improved examination results (M = 4.22, SD = 1.04), and that adequate and nutritious meals contribute to improved academic achievement (M = 4.22, SD = 1.04).

The statements on students' learning outcomes (M = 4.20, SD = 1.04) and active classroom participation (M = 4.19, SD = 1.03) also recorded high mean scores. The overall mean across the five statements was 4.22 (SD = 1.03), showing a generally positive perception among the teachers surveyed.

4.2 Presentation of Findings from Interviews

4.2.1 The Findings on the Effect of the School Feeding Program on Students' Attendance and Punctuality

Based on the interviews carried out, the school feeding program has a positive impact on school attendance and timeliness of the students in the selected public secondary schools in Musanze District. Food in school is reported to motivate students to attend on a regular basis because they know they will receive food while at school. A teacher reported saying,

> *"We have noticed students are coming to school daily, particularly those in the low-income families as a result of the regular school feeding programme"* (teacher interviwed on 14 Jully 2026).

some head teachers said that children have previously been unable to attend school due to the lack of adequate food at home, noting that the provision of food at school has reduced this issue. The responses indicate that the provision of school meals encourages school-going and can play a role in decreasing school absenteeism, especially those of students from economically disadvantaged families. The respondents have also indicated that the regular supply of meals has helped to enhance students' punctuality. They explained that meals provided at a regular time are more likely to encourage students to get to school on time. Students are attempting to come to school early because they are aware meals are served on a time schedule and they do not want to miss the feeding time, was one respondent's comment. A head teachers noted,

> *"The feeding program has encouraged students to be more interested in arriving at school on time and as a result there has been a reduction in the number of students that are late to school"* (head teacher interviwed on 12 Jully 2026).

This suggests that routinely and promptly providing school meals may not just be a driver to school attendance, but to school timeliness as well. The interviews also confirmed that the program had a positive impact on the attendance and punctuality of students from vulnerable families. Students from low-income households are more likely to benefit because the school offers them a consistent meal during the school day, a teacher explained.

> *"The program is particularly beneficial for children from low-income families, as they are aware that they will receive food at the school if they lack it at home"* (teacher interviwed on 14 Jully 2026)

one respondent said. Attendance registers, teacher daily observations and school reports were also mentioned by respondents as evidence of improvements in attendance. A head teachers gave this explanation,

> "*From our registers and observations each day, it can be seen that there has been a decrease in the number of pupils absent since the food provision was less frequent*" (head teacher, 12 Jully 2026)

The overall interview results indicate that the school feeding program has a positive impact on students' attendance and punctuality by providing regular meals, minimizing absenteeism, and improving the students' motivation to come to school on time.

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4.2.2 Findings on the Effectiveness of the School Feeding Program

The results of the interviews reveal a positive school feeding program in selected public secondary schools in Musanze District. It was reported that there were generally no interruptions in meals on scheduled school days, but that interruptions may occur due to food supply or logistics concerns. A respondent reported, 'Meals are usually provided during scheduled school days but sometimes there may be difficulties if the food supply is late. This means that the programme has put in place arrangements to ensure meals are available, although it is important to ensure that meals are available without breaks in order to make the programme more effective. Respondents generally had positive comments on the provision of adequate food, but noted some challenges. They said the amount of food is generally adequate but can be influenced by the number of students being fed and available resources.

> "*The quantity of the food provided generally is sufficient but at times is a challenge due to the growing number of students*," said one of the respondents (teacher interviewed on 14 Jully 2026).

One of the other respondents commented,

> "*Adequacy is based on the resources available and the number of learners being served"* (teacher, 14 Jully 2026).

These responses indicate that the program is serving meals to students, yet adequate serving sizes to all students is a key element in the success of the program. The respondents also reported that generally, meals are fed regularly following the school feeding schedule. The feeding program is regular and students are now familiar with the feeding time, one interviewee explained. Respondents also stressed the relevance of food quality, food safety, and food nutritional value. One respondent said, "The meals are a service to students in that they give them food during the school day, but need to be nutritionally sound and varied." Another respondent said, "Food safety and hygiene issues are critical because a successful program requires more than just the food; it also requires safe and nutritious meals. The results show that not only the availability of food, but also its adequacy, nutritional content, safety and quality, are important for effectiveness.

The results indicate that time-liness is one of the factors contributing to the effectiveness of the school feeding program. The majority indicated the meals are served generally on schedule, but on an occasional basis may be late. One respondent stated,

> "*Usually the meals are served at the correct time, but sometimes it takes longer due to preparation, delivery or other logistical issues*" (head teacher, 12th Jully 2026).

In general, the findings of the interviews show that the School feeding program has a relatively good performance in the aspects of availability, adequacy, regularity, quality and nutritional value and timeliness of feeding. But the respondents pointed out that the need to have sufficient quantity of foodstuff, continuous supply of food and reduce delays in preparing and serving food.

4.2.3 Findings on the Impact of the School Feeding Program on Students' Academic Performance

Based on the answers provided in the interviews, the school feeding programme has positive perceived effects on students' school performance. Participants strongly linked having access to school meals regularly to having their concentration during lessons improved. They reported that when students are fed, they are less distracted by hunger and can focus more on the work that is being done in the classroom. A teacher said,

> "*There is a time when students focused more in class after eating their meals because they have no hunger* (teacher, on 14 Jully 2026).

Another teacher reported that,

> *"Hunger was reported by some of the students during lessons prior to regular feeding, whereas with school feeding, they are able to follow the teacher more attentively*" (teacher interviewed on 15th Jully 2026).

The responses indicate that the meals are a good support to enable pupils to focus and engage with learning. The respondents added that school feeding improves students' learning performance, through its contribution to their attendance in school, concentration and participation in school-based activities.

> "*Regular attendance and access to meal times appear to have an impact on pupils' performance, as they are able to take part fully in learning*. Another commenter stated: *"The feeding program is not a program in itself, but acts to facilitate learning, as students need the energy to learn and to participate in academic learning activities*" (head teacher, 12/2026).

The result suggests that school feeding is seen as a crucial enabling factor for achievement but that other aspects of the education system are also seen to have an impact on students' performance.

The interviews also showed that school feeding promotes active involvement in class. Students who have eaten meals are more likely to answer questions, engage in discussion, collaborate in groups and do tasks in class, respondents noted. One teacher said,

> *"When students are not hungry they ask questions, they work in groups and they take part in activities of the class"* (teacher, 15 Jully 2026).

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Regular feeding was also linked with better learning outcomes as pupils could follow lessons better.

> *"If pupils are well fed, they are focused and it helps them to grasp the subject being taught"* said one respondent (teacher explained, 15 Jully 2026).

Finally, respondents reported a positive effect of the school feeding program on students' exam performance. One of the respondents said,

> *"We have noticed that academic outcomes have improved, but the level of achievement in exams is also shaped by the quality of teaching and learners' effort, as well as other factors*" (head teacher said, 11 Jully 2026).

Another respondent commented,

> *"Regular feeding is good to support learners' learning and such can be seen in learners' performance during exams*" (head teacher said on 11 Jully 2026).

This is because respondents perceived school feeding as a contributing input to school performance but recognise that a number of factors affect academic achievement. The overall results of the interviews indicated that the school feeding program is having a positive impact on the concentration and learning performance of the students, their participation in class, their learning outcomes and their examination performance in some public secondary schools in Musanze District.

4.3 Discussion of Findings

On attendance and punctuality, the present study found that 83.4% to 85.4% of teachers agreed or strongly agreed that school meals encourage regular attendance and punctuality. This is in line Wang et al. (2021), reported an average increase of 2.56 percentage points in the proportion of school days attended by learners receiving school meals. Wall et al. (2022) similarly found that most studies included in their review reported improvement in at least one educational outcome, including attendance. However, Kazianga et al. (2012) reported that the effect on attendance among learners already enrolled was not consistently positive, suggesting that the influence of school feeding may depend on local conditions and programme implementation. This qualification is relevant to the present study because the interview findings identified occasional supply and logistical challenges.

Regarding programme effectiveness, the present findings show that teachers generally viewed meal availability, regularity, adequacy, quality, and timeliness positively, although the mean level of agreement was comparatively lower for timely meal service and the questionnaire results identified concerns about food quantity and quality. This finding partly agrees with Habyarimana et al. (2023), who identified insufficient food quantity and quality, inadequate cooking materials and infrastructure, and high food prices as challenges to school feeding implementation in Rwanda. It also corresponds with Niyonsaba et al. (2025), who highlighted resource limitations, limited stakeholder involvement, and weak monitoring. Liguori et al. (2024) similarly emphasized the importance of food quantity, quality, diversity, preparation, distribution, infrastructure, funding, and coordination. Thus, although teachers in the present study generally considered the programme effective, the challenges reported by interviewees show that effectiveness is not uniform and requires continued attention to resources, supply arrangements, and monitoring.

The findings on academic performance indicate that teachers perceived school feeding as supporting concentration, classroom participation, learning outcomes, and examination performance. This is consistent with Desalegn et al. (2021), who reported better academic scores among learners benefiting from school feeding, and with Kazianga et al. (2012), whose intervention in Burkina Faso improved mathematics performance. Abotsi (2013) also reported positive effects of school feeding on academic performance and classroom attentiveness. Mensah and Nsabimana (2025), also found a positive impact of the Home-Grown School Feeding Programme on students' cognitive performance.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

Regarding the first objective, which sought to assess the effect of the school feeding program on students' attendance and punctuality in selected public secondary schools in Musanze District, the study concludes that the school feeding program has a positive effect on both attendance and punctuality. The findings indicate that school feeding helps reduce absenteeism and late arrival, particularly by reducing students' concerns about hunger during the school day. Regarding the the effectiveness of the school feeding program in selected public secondary schools in Musanze District, the study concludes that the program is generally effective. The effectiveness is reflected in the availability, adequacy, regularity, quality and nutritional value, and timeliness of meals provided to students. Although the program generally meets students' feeding needs, occasional challenges related to food supply, quantity, nutritional variety, and delays in meal provision remain. Therefore, strengthening food supply systems, ensuring adequate quantities, maintaining nutritional quality, and improving timely meal service can further enhance the effectiveness of the school feeding program.

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Regarding the third objective, the study concludes that the school feeding program makes a positive contribution to students' academic performance. Regular access to adequate and nutritious meals improves students' concentration, classroom participation, learning outcomes, academic achievement, and examination performance. However, academic performance is also influenced by other factors such as teaching quality, students' effort, learning resources, and school environment. Therefore, school feeding should be considered an important supportive intervention that creates favorable conditions for effective teaching and learning and contributes to improved academic performance.

5.2 Recommendations

The Government of Rwanda should strengthen the use of locally produced food by prioritizing and expanding the procurement of agricultural products from farmers. This strategy would not only support the local economy but also ensure that students receive fresh and high-quality food. Additionally, there is an urgent need to increase and stabilize funding for the program. The government should allocate adequate and sustainable financial resources that are responsive to market realities, particularly food price fluctuations. The Ministry of Education should prioritize improving the nutritional standards of school meals to ensure that meals served are balanced, safe, and appropriate for the dietary needs of growing school children. MINEDUC should also strengthen the monitoring and evaluation framework of the School Feeding Program.

Head teachers should effectively manage program resources by keeping accurate records, monitoring inventory, and optimizing resource use. To ensure the success of the School Feeding Program, parents and the community should work with schools to ensure their child's well-being and any concerns regarding the feeding program. Additionally, parents should practice effective family planning and fulfill their contributions promptly to support the program's sustainability and ensure continued benefits for all students.

Declaration of Interest

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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