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The Impact of the Free Nutritional Meal Program (MBG) on the Learning Abilities of Junior High School Students in North Minahasa Regency

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ABSTRACT

This study aims to analyze the effect of the Free Nutritious Meal Program (MBG), which includes student participation, consumption frequency, and food quality, on student learning motivation and learning ability at SMP Negeri 1 Talawaan. The study used a quantitative approach with path analysis. The study sample consisted of 102 students from three junior high schools in North Minahasa. The results showed that student participation, consumption frequency, and nutritious food quality positively influenced student learning motivation and learning ability. Learning motivation also positively influenced learning ability and acted as an intervening variable in the relationship between MBG variables and student learning ability. Thus, the MBG Program contributes to increasing student motivation and learning ability and can serve as a basis for schools and policymakers in improving the effectiveness of educational programs.

Keywords: **MBG Program; Learning Motivation; Learning Ability**

INTRODUCTION

Education is the primary foundation for developing quality human resources. In the era of globalization, quality education focuses not only on the transfer of knowledge but also on developing students' critical thinking skills, creativity, and adaptive abilities. UNESCO (2021) emphasizes that improving the quality of education must be carried out holistically, including through meeting basic needs such as health and nutrition. Therefore, the quality of education is closely related to students' physical and biological conditions, which support optimal learning.

Students' learning abilities are influenced by various internal and external factors, such as motivation, interests, environment, socioeconomic conditions, and health and nutritional status. Slameto (2018) explains that learning abilities encompass cognitive, affective, and psychomotor aspects. The World Health Organization (2020) also confirms that malnutrition can reduce students' concentration, memory, and problem-solving abilities. This demonstrates

the close relationship between nutrition and academic performance and the quality of human resources.

In Indonesia, nutritional issues remain a serious challenge. Data from the 2023 Indonesian Health Survey (SKI) shows that the national stunting prevalence reached 21.5%, still above the World Health Organization standard. In addition to stunting, anemia and chronic energy deficiency during school age also impact students' concentration and academic achievement. The World Bank (2020) confirms that malnutrition is linked to low learning outcomes and high rates of student absenteeism, while UNICEF (2021) states that inadequate nutritional intake hinders optimal learning.

In an effort to address these issues, the government launched the Free Nutritional Meals (MBG) Program in 2025 to meet the nutritional needs of school students. This program provides balanced, nutritious meals to improve students' energy, concentration, and memory. Research by the World Food Program (2022) shows that the school meal program can increase student attendance by up to 9% and significantly improve academic performance and learning motivation.

However, the implementation of the MBG program in North Minahasa Regency still faces several obstacles, such as low student participation, inconsistent frequency of nutritious meal consumption, and variable food quality. This situation indicates a gap between policy design and implementation, potentially reducing the program's effectiveness in improving student learning abilities. Therefore, an empirical study is needed to examine the influence of student participation, consumption frequency, and food quality on students' learning abilities.

In addition to nutritional factors, learning motivation is also a crucial factor in educational success. UNICEF (2021) states that meeting basic needs, including nutrition, is the foundation for building student readiness and engagement in learning. The World Health Organization also confirms that good nutritional status can increase students' energy, concentration, and emotional stability, thereby strengthening their motivation to learn. Therefore, learning motivation is a crucial variable linking nutritional interventions to students' learning abilities.

This study is novel because it integrates student participation in the MBG program, the frequency of nutritious food consumption, food quality, and learning motivation as intervening variables influencing students' learning abilities. This research is expected to enrich interdisciplinary studies on education and health and serve as a basis for schools and the government to improve the effectiveness of the Free Nutritional Meals (MBG) Program. Thus, the MBG program serves not only as a health intervention but also as a strategy to improve motivation, learning abilities, and the quality of education in North Minahasa Regency**.**

RESEARCH METHODS

This study employed a quantitative approach with an explanatory research approach, aiming to explain the causal relationship between the independent, intervening, and dependent variables. The quantitative approach was used because this study tested previously formulated hypotheses through statistical analysis. The explanatory method was chosen to explain the effect of the Free Nutritional Meal Program (MBG) on students' learning abilities, both directly and through learning motivation as an intervening variable. Path analysis was used to

analyze the data, allowing for the simultaneous examination of complex relationships between variables.

The population of this study was all junior high school students receiving the Free Nutritional Meal Program (MBG) in North Minahasa Regency. The sampling technique used probability sampling with proportional random sampling. The sample size was determined using accidental sampling. Therefore, the sample size for this study was 102 students.

RESULTS AND DISCUSSION

Validity Testing

Convergent validity is a component of a measurement model. In the SEM-PLS approach, this model is known as the outer model, while in covariance-based SEM, it is referred to as confirmatory factor analysis (CFA). To assess whether a measurement model for a reflective construct meets convergent validity, two main criteria are used: (1) the indicator loading value must be greater than 0.7, and (2) the p-value must be significant, i.e., less than 0.05. However, in practice, especially for newly developed instruments or questionnaires, loading values above 0.7 are not always achieved. Therefore, indicators with loading values between 0.40 and 0.70 can still be considered for retention.

Indicators with loading values below 0.40 should be removed from the model as they are deemed incapable of adequately representing the construct. Meanwhile, for indicators with loading values between 0.40 and 0.70, further analysis is required regarding the impact of their removal on the average variance extracted (AVE) and composite reliability. Removing indicators within this range can be done if they are proven to increase the AVE and composite reliability values beyond the established minimum limits of 0.50 for AVE and 0.70 for composite reliability. However, the decision to remove an indicator must also consider content validity, as in some cases, indicators with low loadings are retained if they have a significant contribution to conceptually representing the construct.

Tabel 1. Pengujian Validitas berdasarkan *Outer Loading*

	Frequency	Learning Ability	Quality	Learning Motivation	Participation
F1	0.780				
F2	0.740				
F3	0.863				
K1			0.762		
K2			0.775		
K3			0.823		
Ke1		0.899			
Ke2		0.788			
Ke3		0.874			
M1				0.773	
M2				0.890	
M3				0.976	
M4				0.791	
M5				0.864	
P1					0.771

P2	0.797
P3	0.818

Based on the table, it can be seen that all statement items have loading factor values greater than 0.70. Thus, it can be concluded that all statement items have met the convergent validity criteria. Next, testing continued by evaluating validity using the average variance extracted (AVE) value and testing reliability using composite reliability (CR) and Cronbach's alpha (CA).

Discriminant Validity

Composite Reliability is used in Structural Equation Modeling (SEM), particularly in the Partial Least Squares (PLS) method. CR assesses the overall construct reliability by considering the indicator weights on the latent variables. Meanwhile, Cronbach's Alpha measures the internal reliability of an instrument based on the correlation between items within a single variable. The higher the alpha value, the more consistent the items in the measurement instrument.

Table 2. Discriminant Validity Testing: Fornell & Larcker Criterion

Variables	Frequency	Learning Ability	Quality	Learning Motivation	Participation
Frequency	0.713				
Learning Ability	0.475	0.645			
Quality	0.569	0.517	0.653		
Learning Motivation	0.441	0.536	0.412	0.595	
Participation	0.362	0.477	0.278	0.538	0.668

Based on the table above, the square root of the AVE value for each variable is greater than the correlation between constructs and other constructs. Therefore, it can be concluded that all variables meet the discriminant validity criteria.

Structural Model Evaluation Results (Inner Model)

R-Square

In Structural Equation Modeling (SEM), the structural model is used to examine causal relationships among latent variables. One important measure in evaluating the structural model is the R-Square (R^2), which indicates the extent to which independent variables explain the dependent variable.

Variables	R-square	R-square Adjusted
Learning Motivation	0.539	0.290
Learning Ability	0.874	0.764

The adjusted R-square value for the learning motivation variable is 0.290, indicating that participation in the MBG program, frequency of nutritious food consumption, and quality of nutritious food are able to explain 29% of learning motivation. Therefore, the model can be categorized as moderate. Meanwhile, the adjusted R-square value for students' learning

ability is 0.764, indicating that participation in the MBG program, frequency of nutritious food consumption, quality of nutritious food, and learning motivation are able to explain 76.4% of students' learning ability.

Effect Size

Effect size in Partial Least Squares - Structural Equation Modeling (PLS-SEM) is used to assess the magnitude of the influence of an independent variable on a dependent variable within the structural model.

Table 4. *Effect size*

Variables	Learning Motivation	Learning Ability
Participation in the MBG Program	0.256	0.385
Frequency of Nutritious Food Consumption	0.189	0.261
Quality of Nutritious Food	0.317	0.107
Learning Motivation		0.561

The explanations are as follows:

1. The effect of participation in the MBG program on learning motivation is 0.256; therefore, the effect is considered weak.
2. The effect of the frequency of nutritious food consumption on learning motivation is 0.189; therefore, the effect is considered moderate.
3. The effect of the quality of nutritious food on learning motivation is 0.317; therefore, the effect is considered moderate.
4. The effect of learning motivation on students' learning ability is 0.561; therefore, the effect is considered strong.
5. The effect of participation in the MBG program on students' learning ability is 0.385; therefore, the effect is considered strong.
6. The effect of the frequency of nutritious food consumption on students' learning ability is 0.261; therefore, the effect is considered moderate.
7. The effect of the quality of nutritious food on students' learning ability is 0.107; therefore, the effect is considered moderate.

Hypothesis Testing

Table 5. Path Coefficient Test & Significance of Effects

Path	Path Coefficient	t-statistics	P-values
Participation → Learning Motivation	0.337	3.267	0.001
Participation → Learning Ability	0.227	2.024	0.001
Frequency → Learning Motivation	0.136	6.560	0.019
Frequency → Learning Ability	0.692	3.712	0.007
Quality → Learning Motivation	0.174	3.907	0.047
Quality → Learning Ability	0.117	5.584	0.013
Learning Motivation → Learning Ability	0.676	5.006	0.000
Participation → Learning Motivation → Learning	0.227	3.294	0.001

Path	Path Coefficient	t-statistics	P-values
Ability			
Frequency → Learning Motivation → Learning Ability	0.392	2.712	0.007
Quality → Learning Motivation → Learning Ability	0.117	4.584	0.013

Based on the results in Table 10, the findings are as follows:

1. Participation in the MBG program has a positive effect on learning motivation, with a coefficient value of 0.337, t-Statistics = 3.267 > 1.66, and P-Values = 0.000 < 0.001 (Hypothesis Accepted).
2. Participation in the MBG program has a positive effect on students' learning ability, with a coefficient value of 0.227, t-Statistics = 2.024 > 1.66, and P-Values = 0.001 < 0.05 (Hypothesis Accepted).
3. The frequency of nutritious food consumption has a positive effect on learning motivation, with a coefficient value of 0.136, t-Statistics = 6.560 > 1.66, and P-Values = 0.019 < 0.05 (Hypothesis Accepted).
4. The frequency of nutritious food consumption has a positive effect on students' learning ability, with a coefficient value of 0.692, t-Statistics = 3.712 > 1.66, and P-Values = 0.007 < 0.05 (Hypothesis Accepted).
5. The quality of MBG has a positive and significant effect on learning motivation, with a coefficient value of 0.174, t-Statistics = 3.907 > 1.66, and P-Values = 0.000 < 0.047 (Hypothesis Accepted).
6. The quality of MBG has a positive and significant effect on students' learning ability, with a coefficient value of 0.117, t-Statistics = 45.584 > 1.66, and P-Values = 0.000 < 0.013 (Hypothesis Accepted).
7. Learning motivation has a positive and significant effect on students' learning ability, with a coefficient value of 0.676, t-Statistics = 5.006 > 1.66, and P-Values = 0.000 < 0.000 (Hypothesis Accepted).
8. Participation in the MBG program has a positive effect on students' learning ability through learning motivation, with a coefficient value of 0.227, t-Statistics = 3.294 > 1.66, and P-Values = 0.001 < 0.05 (Hypothesis Accepted).
9. The frequency of nutritious food consumption has a positive effect on students' learning ability through learning motivation, with a coefficient value of 0.392, t-Statistics = 2.712 > 1.66, and P-Values = 0.007 < 0.05 (Hypothesis Accepted).
10. The quality of MBG has a positive effect on students' learning ability through learning motivation, with a coefficient value of 0.117, t-Statistics = 4.584 > 1.66, and P-Values = 0.013 < 0.05 (Hypothesis Accepted).

The results of the study indicate that participation in the Free Nutritious Meal Program (MBG) has a positive effect on students' learning motivation at SMP Negeri 1 Talawaan, SMP Negeri 2 Talawaan, and SMP Negeri 3 Talawaan. Students who actively participate in the program appear more focused, enthusiastic, active in learning activities, and demonstrate better attendance. The MBG program helps fulfill students' nutritional needs, thereby improving their learning readiness and intrinsic motivation. These findings are supported by

Harahap (2025), Amelia Bactiara Putri et al. (2026), and Esti Wahyuningsih et al. (2025), who stated that the MBG program enhances students' enthusiasm, focus, and participation in learning activities.

The frequency of nutritious food consumption was also found to have a positive effect on students' learning motivation. Students who regularly consume nutritious food tend to have better energy and concentration, making them more active and focused in learning. In contrast, students with irregular eating patterns are more likely to feel tired and less motivated. This finding is consistent with Tambunan et al. (2025), who reported that nutritious meal programs improve students' focus, energy, and engagement in learning activities.

The quality of nutritious food also positively influences students' learning motivation. Food with balanced nutritional content helps improve concentration, focus, and emotional stability, enabling students to become more active and enthusiastic in learning. On the other hand, poor-quality nutrition causes students to become easily fatigued and less able to concentrate. These findings are supported by Hidayat and Lestari (2021), Rahmawati (2022), and Kurniawan (2023), who emphasized that nutritional status and nutritional interventions significantly affect students' motivation, concentration, and enthusiasm for learning.

Participation in the MBG program positively affects students' learning ability. Students who actively participate in the program demonstrate better understanding of learning materials, become more responsive during lessons, and achieve better academic outcomes. The MBG program helps improve cognitive function and creates a more conducive learning environment. These findings are in line with Deborah et al. (2023), who stated that school feeding programs positively affect learning behavior, attendance, and students' academic achievement.

The frequency of nutritious food consumption also positively affects students' learning ability. Students who regularly consume nutritious food are better able to understand lessons, complete assignments, and maintain focus during learning activities. In contrast, students with low consumption frequency tend to experience learning difficulties and fatigue more easily. Therefore, regular consumption of nutritious food becomes an important factor in improving students' learning ability.

The quality of nutritious food has a positive effect on students' learning ability as well. Balanced nutritional intake helps improve memory, concentration, and thinking skills, leading to better academic performance. Conversely, poor-quality nutrition negatively affects students' understanding of learning materials and academic outcomes. Thus, food quality is a crucial factor in supporting successful learning processes. In addition, learning motivation positively affects students' learning ability. Students with high learning motivation tend to be more active, disciplined, persistent, and capable of completing assignments effectively, resulting in improved learning ability.

Furthermore, participation in the MBG program, the frequency of nutritious food consumption, and the quality of nutritious food positively influence students' learning ability through learning motivation as a mediating variable. The MBG program and regular nutritious food consumption increase students' energy, concentration, and enthusiasm for learning, which in turn improve their learning ability. Students who actively participate in the program become more confident, focused, and motivated in their studies. These findings are

supported by Hossein Masoomi et al. (2019), who stated that good nutritional quality contributes significantly to students' motivation and learning ability.

CONCLUSION AND SUGGESTIONS

Based on the results and discussion of the study, the Free Nutritious Meal Program (MBG) at SMP Negeri 1 Talawaan, SMP Negeri 2 Talawaan, and SMP Negeri 3 (Satap) Talawaan was proven to have a positive effect on students' learning motivation and learning ability. Students' participation in the MBG program, the frequency of nutritious food consumption, and the quality of food consumed were able to improve learning enthusiasm, concentration, activeness, and students' readiness in participating in the learning process. In addition, adequate nutritional intake also supports students' cognitive functions, thereby helping to improve their understanding of learning materials, task completion, and overall learning outcomes.

This study also revealed that learning motivation has a positive effect on students' learning ability and acts as a mediating variable in the relationship between the MBG program and learning ability. This means that participation in the MBG program, frequency of nutritious food consumption, and food quality not only directly affect students' learning ability, but also first enhance students' learning motivation, which subsequently strengthens their learning ability. Therefore, the MBG program plays an important role in supporting the improvement of educational quality and students' academic achievement in Talawaan District.

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