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Effectiveness of Interactive Education in Improving Knowledge About Reproductive Health at Eskola Secundaria Geral 1912 Dom Boaventura and Colegio Sáo Miguel Arcanjo Same Year 2024

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Abstract

Adolescents who face reproductive health issues without adequate support or understanding are likely to experience stress, anxiety and depression, which can affect their overall quality of life. This study aims to analyse the effectiveness of interactive education in improving reproductive health knowledge of high school students at Eskola Secundaria Colegio Sáo Miguel Arcanjo and Eskola Secundaria Geral 1912 Dom Boaventura Same Manufahi Timor-Leste. This study used a quasi-experimental design with a pretest-posttest approach involving two groups of high school students, namely an experimental group from Eskola Secundaria Colegio Sáo Miguel Arcanjo Same that received interactive education and a control group from Eskola Secundaria Geral 1912 Dom Boaventura Same that received traditional teaching methods. Data were collected through a questionnaire that measured various student variables before and after the educational intervention. The results showed that interactive education significantly improved students' reproductive health knowledge. In Eskola Secundaria Colegio Sáo Miguel Arcanjo, 48.6% of students had increased knowledge after the education, compared to 42.9% before the intervention. In contrast, in the control group (Eskola Secundaria Geral 1912 Dom Boaventura), only 11.4% of students achieved adequate knowledge after traditional education, while 88.6% remained in the insufficient knowledge category. In addition, high motivation to learn, good understanding of the material, engagement in discussions and teacher support influenced the success of interactive education. Interactive education was found to be effective in improving reproductive health knowledge among students of Eskola Secundaria Colegio Sáo Miguel Arcanjo, compared to conventional teaching methods. Therefore, a more interactive educational approach that supports active student engagement is recommended to be implemented in reproductive health education programmes in schools.

Keywords: Interactive Education, Knowledge, Reproductive Health

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1. BACKGROUND

Adolescents who face reproductive health issues without adequate support or understanding are likely to experience stress, anxiety and depression, which can affect their overall quality of life. For example, adolescent girls who experience unwanted pregnancies often face social stigma and great psychological distress, which can lead to social isolation and serious mental health problems (UNICEF Timor Leste, 2023). In general, about 4.6% of adolescent girls aged 15-19 in the world experience anxiety disorders, and this figure is also reflected in Timor-Leste. Adolescents who become pregnant and parents at an early age are at greater risk of mental health problems due to factors such as social stigma, economic burden, and lack of health support (WHO, 2021b). In addition, approximately 31% of adolescent girls in Timor-Leste are married and 20% of them have given birth before the age of 20 (United Nations Timor-Leste, 2022).

(UNFPA, 2017) In general, Timorese people, especially young people, have a poor understanding of sexual and reproductive health, including knowledge about modern contraceptive methods, how to get pregnant, and Human Immunodeficiency Virus (HIV) prevention. Lack of sexual and reproductive health education has contributed to the incidence of unwanted pregnancies, early marriage and other consequences. Although Timor Leste's laws and policies broadly support reproductive health education, cultural taboos make it difficult to implement. The prevailing cultural view is that unmarried young people should abstain from sexual relations and should not be taught about sexual and reproductive health.

One of the most effective solutions to address reproductive health issues in adolescents is through comprehensive reproductive health education. This education not only provides necessary information about the body, sexuality, and reproductive health, but also equips adolescents with the skills to make informed and responsible decisions. Research shows that comprehensive education programs can reduce the risk of teenage pregnancy and sexually transmitted infections (Schneider & Hirsch, 2020).

Interactive education is an effective solution in improving student engagement and information retention, especially in complex topics such as reproductive health. Through this method, students are directly involved in discussions, simulations, role plays, and engaging

multimedia, so they can learn actively and collaboratively. Research shows that interactive approaches can improve students' understanding as they do not only passively receive information, but also apply it in a practical context (Brown, 2015).

Interactive education has a number of significant positive impacts on the learning process. One of the main impacts is increased student engagement, where students become more active in the learning process through participation in discussions, simulations and other interactive activities. This not only makes learning more engaging, but also improves information retention, as students are able to relate theory to practice. Interactive education also encourages the development of critical and collaborative thinking skills, as well as problem-solving abilities (Mayer, 2021).

Manufahi is one of the districts in the southern part of Timor-Leste, with relatively limited access to health facilities, especially in rural areas. Based on the overall situation in Timor-Leste, there is a gap in reproductive health knowledge among adolescents. High teenage pregnancy rates and lack of access to appropriate information on sexual and reproductive health have become significant problems (UNFPA, 2021). As is the case in many other districts in Timor-Leste, adolescents in Manufahi face various challenges related to reproductive health, including a high risk of teenage pregnancy and a lack of knowledge about preventing sexually transmitted infections (UNFPA, 2021). Against a backdrop that is less accessible to large-scale reproductive health programs, Manufahi is an ideal location to measure the effectiveness of interactive educational methods that can have significant results in improving adolescent knowledge (UNFPA, 2021).

The above data can illustrate the importance of developing and implementing interactive educational methods in improving students' knowledge of reproductive health in Timor-Leste. Given the challenges faced by adolescents in understanding reproductive health issues, this approach is not only relevant but also urgent to implement. This research aims to measure the effectiveness of the method, in the hope that it can make a positive contribution to the health and well-being of the younger generation in the country.

2. METHODS

This study uses a quasi-intervention design, with a pre-test and post-test design

involving two groups: an intervention group and a control group. which means it involves testing the effect of the intervention on the intervention group compared to the control group. However, there is no full randomization as in a pure intervention, but this design still allows to see the impact of the intervention.1)The independent variable is the education method, which is the type of teaching method used, namely interactive education for the intervention group and traditional education for the control group, while the dependent variable is knowledge about reproductive health, which is the level of knowledge of students about reproductive health, which is measured through pre-test and post-test. Furthermore, the moderator variables are learning motivation, student involvement, material understanding and teacher support.

Based on the field situation, not all students from all three grades were accessible. The researcher could only reach 30% to 60% of the total target population at each grade level, which is estimated to be 376 to 752 students. In this study, the sample size is high school students in Manufahi District who attend the two selected schools, with a total number of participants of 70 students. The study will include 35 students from one school, Eskola Secundaria Colegio São Miguel Arcanjo Same for the intervention group, and 35 students from the other school, Eskola Secundaria Geral 1912 Dom Boaventura Same for the control group.

Data is collected directly from respondents using pre-designed instruments, such as questionnaires, and written tests (pre-test and post-test). Data collection methods should be consistent with the research objectives and design used, ensuring the data is valid and reliable. This data collection ensures that all relevant variables have been accurately measured.

In this study, univariate analyses will be conducted for all variables that have been defined in the operational definition, including independent, dependent, and moderator variables. Bivariate analysis is an analysis that involves two variables to see the relationship or influence between variables. In the context of this study, bivariate analysis is used to answer questions regarding the effectiveness of interactive education methods in improving knowledge about reproductive health, as well as to identify factors that influence the success of interactive education.

3. RESULTS

Based on the fitting information model, the applied logistic regression model gave significant results with Chi-Square = 57,500, df = 15, and Sig. = 0.000, which indicates that the variables in this model have a significant effect on changes in students' knowledge and motivation. In addition, the Goodness-of-Fit test shows the Pearson Chi-Square = 0.087 and Deviance = 0.172, both of which have Sig. = 1,000, which shows that this model fits the data used. In Pseudo R-Square, the results of Cox and Snell = 0.807, Nagelkerke = 0.974, and McFadden = 0.933 indicate that this model is able to explain most of the variance in the data and has good predictive quality.

Table 1. Summary of Case Processing Based on Factors that Influence the Success of Interactive Education

Variable	Categories	N	Marginal Percentage
Knowledge Change	No changes	3	8.6%
	Enough Change	21	60.0%
	Good Change	11	31.4%
Motivation for Intervention After Interactive Education	Currently	12	34.3%
	High	23	65.7%
Motivational Control After Conventional Education	Currently	8	22.9%
	High	27	77.1%
Understanding Material After Interactive Education	Not Enough	3	8.6%
	Enough	16	45.7%
	Enough	16	45.7%
Understanding Material After Conventional Education	High	29	82.9%
	Currently	6	17.1%
Teacher Support After Interactive Education	Not Enough	1	2.9%
	Enough	17	48.6%
	Enough	17	48.6%
Teacher Support After Conventional Education	High	28	80.0%
	Currently	7	20.0%

Based on the results of the analysis, the majority of respondents experienced an increase in knowledge after participating in interactive education. As many as 60% (21 people) of respondents experienced a sufficient increase in knowledge, 31.4% (11 people) experienced a good increase, while 8.6% (3 people) showed no change in knowledge after education. Logistic regression analysis shows that the model

used can significantly explain variations in changes in knowledge. Chi-Square value = 57,500 with df = 15 and Sig. = 0.000 confirms that factors such as motivation, understanding of the material, and teacher support play an important role in increasing reproductive health knowledge.

Table 2. Model of Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	57.500	57.500	15	0.000
Final	0.000			

Table 3. Goodness of Fit

Test	Chi-Square	df	Sig.
Pearson	0.087	39	1.000
Deviance	0.172	39	1.000

Motivation (OR = 3.20, p = 0.002): Motivation has a significant influence on increasing knowledge. Respondents with high motivation have a 3.20 times greater chance of experiencing increased knowledge than those with low motivation. Understanding of the material (OR = 2.50, p = 0.005): Good understanding of the material plays a role in increasing knowledge of reproductive health. Respondents who understand the material well have a 2.50 times greater chance of experiencing an increase in knowledge than those who understand the material less. Teacher Support (OR = 1.80, p = 0.010): Support from teachers also shows a positive influence on increasing knowledge. Respondents who received good teacher support were 1.80 times more likely to experience an increase in knowledge than those who did not receive sufficient support.

Table 4. Pseudo R-Square

Mehods	Value
Cox and Snell	0.807
Nagelkerke	0.974
McFadden	0.933

Based on the results of logistic regression, the predictive model used succeeded in explaining the variability of changes in knowledge very well. Chi-Square of 57,500 with df = 15 and a significance value of 0.000 indicates that the model is statistically significant, indicating that the factors analyzed (motivation, understanding of the material, and teacher support) collectively play an

important role in increasing respondents' knowledge about reproductive health.

The results of the analysis show that motivation, understanding of the material, and teacher support are the main factors that influence the success of interactive education in increasing reproductive health knowledge. All of these factors contributed significantly to changes in respondents' knowledge, with the model used being able to explain variations in significant increases in knowledge.

4. DISCUSSION

Based on the results of Model Fitting Information in logistic regression analysis, the model applied shows significant results with Chi-Square = 57.500, df = 15, and Sig. = 0.000. These results indicate that the model used is very good at explaining changes in student knowledge and motivation after the interactive education was conducted. The high Chi-Square value and p-value <0.05 indicate that the variables in this model have a significant effect on students' knowledge and motivation.

The significant Chi-Square test results indicate that the type of education, teacher support, student motivation and material understanding are the main factors that play a role in improving student knowledge after interactive education. Interactive education allows students to be more involved in the learning process, which contributes to their understanding of the material being taught. Interactive Education often relies on discussion, simulation and question and answer, which allows students to apply concepts in real situations.

These results are in line with the findings of (Hurix, 2023) who emphasized that interactive approaches in education can result in a significant improvement in students' understanding. Hurix (2023) argues that interactive learning methods allow students to actively participate, which facilitates better understanding and deeper processing of information.

In addition, the Goodness-of-Fit Test results show that the model fits the data, with Pearson Chi-Square = 0.087 and Deviance = 0.172, both having Sig. = 1.000. This indicates there are no problems in the fit of the model. The model is able to describe the data well, and the results of this fit test indicate that the logistic regression model applied is good enough to describe the change in students' knowledge after the interactive education.

The Goodness-of-Fit value showing a p-value of 1.000 indicates that the logistic regression model used is reliable in describing the relationship between the

variables tested. The model is able to accurately represent changes in students' knowledge and can be used to analyze factors that influence educational outcomes. In other words, the model provides a very good fit to the data, indicating that the variables included have a considerable influence on students' knowledge.

Previous research has shown that an interactive approach to education can result in significant improvements in student understanding and motivation. (WHO, n.d.-a) states that interactive education focuses on the active engagement of students, which in turn helps them develop a deeper understanding of reproductive health issues. In this context, Interactive Education does not only focus on delivering information, but also engaging students in an experiential learning process.

Similarly, (Hurix, 2023) revealed that an interactive approach is one way to motivate students to be more engaged in learning, which ultimately increases their knowledge on important topics, including reproductive health. This is reinforced by (Echo, 2022) who explained that interactive learning provides opportunities for students to discuss, ask questions, and explain concepts to their peers, which deepens their understanding.

This model shows that Interactive Education plays a significant role in improving students' knowledge about reproductive health. Student motivation, material comprehension, and teacher support proved to be the main factors influencing changes in student knowledge after interactive education. The logistic regression model applied showed excellent predictive quality, with a high Pseudo R-Square, indicating that the model can explain most of the variance in the data.

By using the Interactive Education approach, which actively engages students in the learning process, learning outcomes can be significantly improved, especially in topics that require in-depth understanding, such as reproductive health. Teacher support and student motivation are also important factors in the success of interactive education. Therefore, it is important for educators to adopt interactive methods that can increase student motivation and provide a deeper understanding of the material being taught.

The Pseudo R-Square results provide a clear picture of the quality of the model applied in this study. Overall, the Pseudo R-Square values indicate that the model used has excellent predictive ability in explaining changes in students' knowledge after interactive education. The values

found are as follows: Cox and Snell = 0.807, Nagelkerke = 0.974, McFadden = 0.933.

The value of Cox and Snell = 0.807 indicates that the model is able to explain about 80% of the variance in student knowledge. Although slightly lower than Nagelkerke, this value still indicates that this logistic regression model can accommodate most of the variation in the data, with the variables in the model having a strong contribution to student knowledge. This value suggests that although not perfect, the model is good enough at explaining changes in students' knowledge. This result also shows that although the factors tested are very important, there are still other variables that may play a role in changes in students' knowledge, such as social environmental factors or students' personal experiences. As stated by (Echo360, 2022) that interactive methods involving discussion and question and answer not only help students understand the material, but also give them the opportunity to connect the material with their personal experiences.

The Nagelkerke value = 0.974 indicates that the model is able to explain about 97% of the variation in students' knowledge. This is a very high value and indicates that the independent variables, such as type of education, motivation, teacher support and material understanding, have a very large influence on students' knowledge. The model is very strong in describing how these factors work together to improve students' knowledge of reproductive health.

This result is very encouraging as it shows that the model used is not only significant, but also consistent and robust in explaining the variability in students' knowledge. This suggests that the factors included in the model are highly relevant and contribute greatly to changes in students' knowledge. According to (Hurix, 2023) learning that uses interactive methods can increase student engagement, which in turn increases their understanding and knowledge. This finding supports Nagelkerke's results, which show that the use of interactive approaches in education has a significant influence in improving students' knowledge. (Burke, 2023) explains that constructivism-based approaches allow students to construct their knowledge in a more in-depth and relevant way, which underlies the finding that the variables in this model can explain most of the variance in students' knowledge.

McFadden value = 0.933 indicates that this model has very good prediction quality. McFadden measures the model's ability to differentiate between different groups in terms of the dependent variable

(in this case, student knowledge). A value close to 1 indicates that this model has very accurate predictions about changes in student knowledge based on the variables entered into the model. These results show that this model is very reliable for predicting changes in student knowledge that occur after interactive education. This shows that factors such as motivation, teacher support, and understanding of the material have a strong influence in the process of increasing knowledge. (Kritik, 2023) highlights that constructivist activities in learning, which encourage discussion, collaboration and questions and answers, can increase students' active participation, which is instrumental in increasing their knowledge about complex topics such as reproductive health.

The results of the analysis show that 60% of students experienced a sufficient increase in knowledge after participating in interactive education, 31.4% of students experienced a good increase in knowledge, while 8.6% of students experienced no change in knowledge at all. These findings provide a clear picture that Interactive Education has a significant impact in increasing students' knowledge about the topics taught, in this case reproductive health.

Based on this data, Interactive Education is proven to be effective in increasing student understanding. By using methods that actively involve students, they are better able to understand and absorb the material compared to more passive learning methods. Discussions, questions and answers, and simulations provide opportunities for students to interact directly with the material and their peers, allowing them to build a deeper understanding. (Echo360, 2022) explains that interactive learning encourages active student involvement, which facilitates better understanding and retention of information. This is in line with research results which show that learning that actively involves students tends to increase their understanding of the material being taught. (Burke, 2023) also notes that the constructivist approach based on interactivity allows students to construct their own knowledge through direct experience, which in turn increase their knowledge significantly.

The fairly good increase in knowledge in the majority of students after interactive education shows that various factors, including student motivation, teacher support, and understanding of the material, greatly influence student learning outcomes. Student motivation plays a major role in increasing knowledge. Students who are more motivated tend to participate more actively in learning

activities, which allows them to acquire more knowledge than students who are Highly motivated contribute to students' active involvement in the learning process, which influences how much knowledge they can absorb. When students feel inspired or interested in the material being taught, they will try more to understand and apply it in everyday life. They will be less motivated.

Understanding the material being taught is also proven to have a direct influence on changes in knowledge. Students who better understand the material being taught tend to find it easier to integrate and apply this knowledge in various contexts. A deep understanding of the material allows students to understand concepts more thoroughly and connect information obtained from various sources. This improves their analytical skills in dealing with complex questions related to the material.

The teacher's role in interactive education is very important to create an environment that supports students' active learning. Teachers who provide guidance and constructive feedback can strengthen students' understanding and facilitate the application of knowledge. Teacher support is one factor that allows students to understand the material better. Teachers who act as facilitators not only convey information, but also help students to apply the knowledge they gain in real life situations.

Interactive education has a significant impact on increasing student knowledge. Most students showed moderate or good improvement in their knowledge, which proves that Interactive Education is more effective compared to more passive, traditional learning approaches. Student motivation, understanding of the material, and teacher support have proven to play an important role in the success of interactive education in increasing students' knowledge of reproductive health. Therefore, the use of interactive methods in learning is highly recommended to improve student learning outcomes.

Based on the results of logistic regression analysis, this model shows that Interactive Education plays a significant role in increasing students' knowledge about reproductive health. Student motivation, understanding of the material, and teacher support are the main factors that influence changes in student knowledge. The applied logistic regression model showed excellent predictive quality, with a high Pseudo R-Square, indicating that it could explain most of the variance in the data.

5. CONCLUSION

The level of knowledge of reproductive health of students of Eskola Secundaria Colegio São Miguel Arcanjo before interactive education is sufficient, with 15 students (42.9%) and after interactive education is 17 students (48.6%) have sufficient knowledge, while 15 students (42.9%), 3 students (8.6%) who still have less knowledge. The level of knowledge of reproductive health among students of Eskola Secundaria Geral 1912 Dom Boaventura before conventional education was 35 students (100%) in the insufficient category and after conventional education was 31 students (88.6%) in the insufficient category, while only 4 students (11.4%) achieved sufficient knowledge.

The motivation to learn Reproductive Health of Eskola Secundaria Colegio São Miguel Arcanjo students before the interactive education was 35 students (100%) with moderate motivation and after the interactive education, 17 students (48.6%) had moderate motivation, while another 17 students (48.6%) showed an increase in motivation to high. Only 1 student (2.9%) had low motivation after education. Motivation to learn reproductive health among students of Eskola Secundaria Geral 1912 Dom Boaventura before conventional education 35 students (100%) were in the low motivation category and after conventional education most of the 30 students (85.7%) were still in low motivation.

The engagement of students learning about reproductive health at Eskola Secundaria Colegio São Miguel Arcanjo before interactive education was 33 students (94.3%) in the moderate category and after interactive education 34 students (97.1%) were actively involved. The engagement of students learning about reproductive health at Eskola Secundaria Geral 1912 Dom Boaventura before conventional education was 31 students (88.6%) in the passive category and after conventional education 31 students (88.6%) were still in the passive category. The understanding of the material of students learning Reproductive Health at Eskola Secundaria Colegio São Miguel Arcanjo before education as many as (51.4%) had an understanding in the 'Poor' category and after interactive education 45.7% (16 people), were in the category 'Fair,' and another 45.7% were also in the category 'Good' (16 people). Students' material understanding of Reproductive Health among students of Eskola Secundaria Geral 1912 Dom Boaventura before the conventional education was 100% lack of understanding and after the

implementation (82.9%) had material understanding in the "Lack" category.

Teacher support for students learning about reproductive health in Colegio Secundaria São Miguel Arcanjo students before the implementation of interactive education was 100% of respondents felt a moderate level of support and after the implementation of interactive education almost half 17 students (48.6%) felt moderate teacher support, half as many as 17 other students (48.6%) felt high teacher support. Teacher Support to students learning about Reproductive Health in students of Eskola Secundaria Geral 1912 Dom Boaventura before the implementation of conventional education 100% of students felt they received a low level of support and after the implementation of conventional education more than half 28 students (80%) still reported receiving Low Teacher Support.

Motivation: Although it was expected that the group receiving the interactive education would have higher motivation, the results showed that the control group with conventional education had higher motivation. Material Comprehension: The group receiving interactive education showed better comprehension of the material compared to the group receiving conventional education, with a significant difference between the two groups. Teacher Support: There was a significant difference in teacher support, with stronger support in the interactive education group, which contributed to the success of knowledge improvement. Student engagement was also an important factor, with students who received interactive education tending to be more actively engaged in learning compared to students who received conventional education. Interactive education proved to be more effective in improving reproductive health knowledge compared to conventional education.

AUTHOR CONTRIBUTIONS

The author contribute all research activity such as conceptualization, data curation, analysis, writing & editing, manuscript revisions.

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CONFLICT OF INTEREST

This research does not have a conflict of interest with any party, because it is a scientific study for health development in Timor Leste.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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