Sigmagri

http://ojs.unwaha.ac.id/index.php/sigmagri

Vol. 04 No. 02 (2024) | Page: 140-147 | ISSN (Online): 2798-0901

Development of ICT-Based Learning Media as an Extension Tool for the Production of Liquid Organic Fertilizer

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Submitted: 14-08-2024 |Revisions: 19-12-2024 |Published: 22-12 -2024
DOI : 10.32764/sigmagri.v4i2.1250

ABSTRACT

This research aims to develop an agricultural learning media called Em Penyu (Media Penyuluhan Pertanian). It is an extension tool based on Information Communication and Technology (ICT) as an alternative solution in supporting agricultural extension activities dealing with liquid organic fertilizer. This study used the Research and Development method based on the ADDIE development model. The subjects of this research were 25% of the members of the Ngaren Farmers Group. The data collection techniques are interviews and questionnaires. Researchers designed agricultural extension media in the form of videos. The results of this study indicate that (1) the assessment of the validity of the media by material experts gets a percentage of 71.875% in the good category, and the assessment by media experts gets a percentage of 85.294% in the very good category. (2) Assessment of farmers' response to the media gets a percentage of 84.5% in the very good category. Based on these results, it can be interpreted that Em Penyu is suitable for use in agricultural extension activities and farmers have given a positive response regarding the development of this agricultural extension media. So it is hoped that it can also be a supporter in advancing the agricultural sector.

Keywords: Learning Media, Extension Tool, Em Penyu, Liquid Organic Fertilizer

INTRODUCTION

The development of the agricultural sector plays an important role in supporting the national economy, especially in an agrarian country like Indonesia. One of the main challenges faced by farmers is to improve the productivity and quality of agricultural products (Shodiq, 2022). The use of liquid organic fertilizers is one of the effective solutions to improve soil fertility and healthier and more sustainable crop yields. However, there are still many farmers who do not have adequate knowledge about the use and benefits of liquid organic fertilizers (Iqbal et al., 2023). To support the agricultural sector, it is necessary to empower the community. There are several ways that can be done to empower the community, one of which is through agricultural extension activities. With the existence of counseling, it will add insight to farmers related to agriculture. Extension is an activity as an educational process outside of school in order to improve or improve the welfare of the community so that people are willing, able, interested, to participate in the implementation of extension so as to realize the desired expectations, then the process and implementation of extension must be made in such a way (Leilani et al., 2015).

How to Cite:
Hidayat, R. Maulida, P. Nasirudin, M. (2024). Development of ICT-Based Learning Media as an Extension Tool for the Production of Liquid Organic Fertilizer. *Sigmagri, 4*(2),140-147. 10.32764/sigmagri.v4i2.1250

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Good counseling can provide understanding to farmers so that information can be received by farmers. Imran et al., (2019) also stated that extension is a process of giving others the ability they have so that the difficulties faced by others can be overcome. The extension method used will affect the success of the guidance. By mastering the skills and knowledge in carrying out counseling, counseling will be carried out in a more directed manner. When counseling can be delivered well, it is able to increase the knowledge and skills of farmers through the absorption of information that has been conveyed by the extension agent so that it can be applied in the farming business it develops. The use of media can help the course of extension activities to be maximized (Annisa et al., 2018). It can clarify what information is conveyed by the extension agent so that the information conveyed is clearer, more acceptable, can stimulate the mind, attention and ability of farmers.

To answer this challenge, Information and Communication Technology (ICT)-based agricultural extension media can be an effective tool in disseminating information and knowledge to farmers. ICT-based media is not only able to reach farmers in various regions quickly and efficiently, but can also present information in a more attractive and easy-to-understand form. This development can be utilized by extension workers to support extension activities by creating more innovative methods of delivering material, producing creative and interesting extension media (Rachmadtullah et al., 2022). The goal is to make farmers interested in the information presented, thus increasing their curiosity and interest in learning about the development of agricultural science. ICT-based extension media can also be utilized as an extension tool that can be accessed anytime and anywhere.

Plosogenuk is one of the villages in Kecamatan Perak that has an average production of 49 Kw/Ha of paddy and field rice from a net harvest area of 347 Ha. This average production is lower than that of Kepuh Kajang Village, which has a net harvest area of 560 ha with a production of 61 Kw/Ha (BPS, 2021); (Firmansah et al., 2021). This shows that rice productivity in Plosogenuk Village is relatively lower. Based on an interview with an extension worker assisting farmer groups in Plosogenuk Village (Arifin, personal communication, June 2022), it was revealed that farmers are currently facing the problem of reduced subsidized fertilizer allocations. The types and amounts of fertilizers that previously consisted of ZA, SP-36, Petroganik, Phonska, and Urea are now reduced to only Phonska and Urea. These fertilizers were previously relied upon by farmers to support the agricultural production process, especially rice. As a result, farmers must be creative in making their own fertilizers as an alternative to support their agricultural production. In the extension activities carried out by the Ngaren Farmer Group in Plosogenuk Village, the methods used are still conventional, namely direct delivery orally at meetings and going directly to the field. The media used in counseling is usually printed media such as paper leaflets.

The main objective of this research is to develop effective and efficient extension media in improving farmers' knowledge and skills on Liquid Organic Fertilizer. In addition, this research also aims to evaluate the extent to which ICT-based media can be accepted and utilized by farmers in agricultural extension activities. Thus, this research is expected to make a significant contribution in efforts to improve the quality of agriculture in Indonesia through the utilization of ICT.

RESEARCH METHOD

This research uses the R&D (Research and Development) method which is based on the ADDIE development model. The Research and Development (R&D) method is a research method used to produce new products or improve existing products. The R&D process involves systematic and structured stages to design, develop, test, and evaluate products or systems until they reach a final form that is ready for use (Waruwu, 2024). This method aims to solve specific problems and produce solutions that can be practically implemented. The ADDIE model, which is often used in research and development, consists of five stages: analysis, design, development, implementation, and evaluation. These stages ensure a systematic and thorough research process. Through this systematic approach, it is expected that the extension media produced can meet the needs of farmers and be effective in conveying the desired information (Narassati et al., 2021).

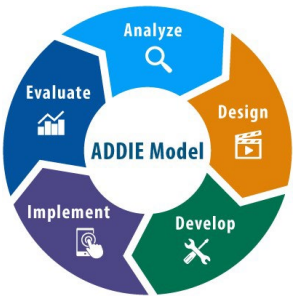


Figure 1.
Phase of ADDIE Model

The subjects of this study were 25% of the members of the Ngaren Farmer Group, who were selected to represent the farmer population. The research instrument used was a questionnaire, which enabled effective data collection from the respondents. The ADDIE model helps in designing and developing appropriate and effective extension media, as well as ensuring successful implementation and in-depth evaluation for continuous improvement. With this approach, the research aims to produce liquid organic fertilizer extension media that is beneficial to farmers, improving their knowledge and practices in the use of liquid organic fertilizers.

Data Analysis Technique

This research uses qualitative and quantitative data. Qualitative data is obtained from observations, interviews and also input from validators, while quantitative data comes from validation scores given by validators (Adcock & Collier, 2001; Brod et al., 2009). The validation assessment was carried out using a Likert scale. The results of the analysis of quantitative and qualitative data are used as the basis for assessing the feasibility of the media developed. The formula used is as follows:

$$P = \frac{f}{N} x100\%$$

P = Percentage of goods
f = Collected score/observed frequency
N = Number of cases/expected frequency

After validation, the results can be seen on a Likert scale to evaluate the media that has been designed. The following is a Likert scale table used as a reference for media assessment.

Table. 1
Likert Scale Table as a Reference for Media Assessment

Percentage Score	Category
81% - 100%	Very good
61% - 80%	Good
41% - 60%	Fair
21% - 40%	Not good
≤ 20%	Poor

RESULT AND DISCUSSION

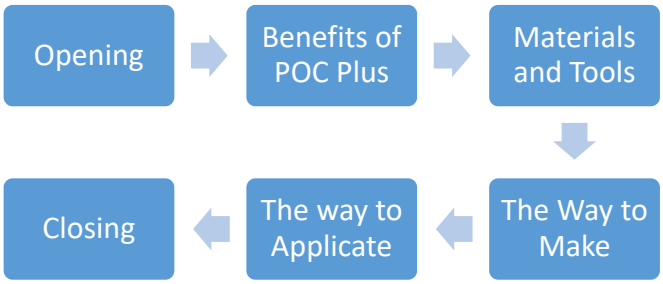
Result of Need Analysis

In the analysis stage, researchers used interviews and questionnaires as instruments. Interviews were conducted with the head of the Ngaren Farmer Group and the Extension Assistant of the Ngaren Farmer Group. The information obtained shows that the extension methods used are conventional, namely direct delivery to farmers without using media. Sometimes, the media used is printed media such as paper leaflets. A needs questionnaire was distributed to find out how easy it is for farmers to understand the material delivered through the media and their interest in learning agricultural material using the media. The results of the data obtained are 60% of farmers agree and 20% of farmers strongly agree that they more easily understand the extension material delivered using the media.

As for the interest of farmers in learning agricultural material using the media can be seen that 65.7% of farmers agree and 14.3% of farmers strongly agree, which means that most of them are more interested in learning agricultural material using media. On the other hand, most farmers have a personal android, as many as 62.9%, even if they do not have a personal android, there are family members who have an android. This is the reason for the development of Em Penyu. With Em Penyu, information dissemination in extension activities is easier. If farmers are unable to attend extension activities, information can be accessed easily through the android they have. As for if there is forgetfulness related to the material delivered during extension activities can also be minimized.

Result of Design

The material contained in the media is related to liquid organic fertilizer (POC) Plus, with the consideration that the allocation of subsidized fertilizers is decreasing. Where farmers have been dependent on subsidized fertilizers. Meanwhile, fertilizer is a nutrient provider for plants. So that farmers are required to be active to be able to make their own fertilizer. However, the limited time will also have an impact on the lack of maximum agricultural extension activities. The storyboard of Em Penyu is as follows:



After creating the storyboard, the researcher designed the ICT-based Em Penyu (Agricultural Extension Media) using the Canva application.

Result of Development

Em Penyu Media (Agricultural Extension Media) has been completed. To develop the product, researchers validated the product to material experts and media experts. Mrs. Anggi Indah Yuliana, S.P., M.P. is one of the Agriculture Lecturers at the Faculty of Agriculture Universitas KH. A. Wahab Hasbullah as a material expert and Mr. Moh. Anshori Aris Widya, M. Kom is an Information and Technology Lecturer at the Faculty of Technology Universitas KH. A. Wahab Hasbullah as a media expert. The results of the validation were in the form of assessments and suggestions related to the products developed in the form of questionnaires. From the material validation stage, the following results were obtained:

Table 2.
The Results of the Material Validation

Assessment Point	**Score**
Clarity of material	3
Completeness of material	2
Suitability of material to the needs of farmers	3
Clarity of supporting photos / videos	3
Ease of language/sentences to understand	3
Clarity of text	3
Voice clarity	4
Attractiveness of display	2
Total Score	**23**
Percentage	**71.875%**

Table 3.
The Results of Media Validation

Aspect	**Item**	**Score Acquisition**
Layout	2	7
Text/Typography	3	9
Picture	2	7
Video	4	14
Audio	3	12
Packaging	3	39
Total	**17**	**58**
Percentage		**85.294%**

The total score (N) obtained from the material validation results is 23. With the maximum score (Y) obtained on the Likert scale used is 32. While the index percentage value (P) obtained is 71.875%, which can be categorized as "Good" and means that Em Penyu is "Suitable for testing with Revisions as Suggested" according to the material expert.

The total score (N) obtained from the media validation results is 58. With the maximum score (Y) obtained on the Likert scale used is 68. While the index percentage value (P) obtained is 85.294%, which can be categorized as "Very Good" and means that Em Penyu is "Suitable for Trial with Revisions as Suggested" according to media experts.

Result of Implementation

After the Em Penyu product has been validated and revised, the product is ready to be tested on farmers who are members of the Plosogenuk Village Farmer Group. Previously, the product was uploaded to the YouTube site. The video was shown to farmers and then given a questionnaire to determine the practicality of the product developed. The following are the results of the calculation of the farmer's response from the questionnaire that has been distributed:

Based on the results of the trial questionnaire to farmers, the total score (N) obtained from the farmer response assessment is 1183. With the maximum score (Y) obtained on the Likert scale used is 1400. While the index percentage value (P) obtained is 84.5%, so that Em Penyu can be categorized as very good.

Table 4.
The Result of Farmer's Response through the Media

Statement	Total Score
The design of this agricultural extension media is attractive	115
The material presented in this agricultural extension media is easy to understand	119
This agricultural extension media helps me to understand about Liquid Organic Fertilizer plus	127
The existence of this agricultural extension media can motivate me to practice making Liquid Organic Fertilizer plus myself	116
I am happy with the existence of this agricultural extension media	120
This agricultural extension media uses language that is easy to understand	118
Images and videos in this agricultural extension media can be seen clearly	119
The voice in this agricultural extension media can be heard clearly	118
The text presented can be read clearly	114
This agricultural extension media is in accordance with what I want and need	117
Total	**1183**
Percentage	**84.5%**

Result of Evaluation

Based on the calculation results, this product proved to be suitable for use as supporting media in agricultural extension. The material validator assessed the media containing this POC material with a good category, while the media validator gave an excellent assessment. The assessment of farmer responses also showed a very good category. This positive assessment shows that the media is effective and well received by all parties involved, from validators to farmers who are the end users. Thus, the use of this media can increase the effectiveness of agricultural extension, help farmers understand the material better, and provide significant support in the extension process. The positive

evaluation results from various parties indicate that this media has great potential to be widely implemented in agricultural extension activities.

Final Product

This research and development resulted a learning media that used as extension tool for the production of Liquid Organic Fertilizer. The media discusses several points as figures bellow:

Figure 2. Opening

Figure 3. The benefit of liquid organic fertilizer

Figure 4. Materials and tools

Figure 5. Creation method

Figure 6. Application method

Figure 7. Closing

CONCLUSION

Based on research and development that has been carried out on the basis of the ADDIE development model, a product called Em Penyu (Agricultural Extension Media) is produced. Em Penyu is an ICT-based agricultural extension media in the form of a video that contains material about liquid organic fertilizer plus. As for the making, it is designed using the Canva application and contains material about liquid organic fertilizer plus. Which has previously been carried out in the analysis stage related to the needs of farmers. In its development, it has passed the validation stage from material experts and media experts. The feasibility assessment by material experts received a percentage of 71.875% in the good category. Meanwhile, the feasibility assessment by media experts obtained a percentage of 85.294% in the very good category. The percentage value of feasibility indicates that the product developed is feasible to use with revisions and suggestions that have been given by the validator. At the trial stage, based on the results of filling out the farmer response questionnaire, the

practicality value was in the very good category, with a percentage of 84.5%. So it can be evaluated that Em Penyu is feasible to be applied as an alternative in supporting agricultural extension activities and has a positive response from farmers. It is also expected to be a supporter in the progress of the agricultural sector.

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