

The Development of Sustainable Reserve Food Garden Program's Video in Malang City

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Abstract—Food security is a priority to resolve hunger and malnutrition in society. One of the effort to increase food security and nutrition of family can be used with utilization of available resources and yard by households through the Sustainable Reserve Food Garden's Program. The purpose of this research was to produce a Sustainable Reserve Food Garden Program's video with valid criteria based on ASSURE development model and it can be used in large group. The small test group location of this research was conducted at Lowokwaru, Malang City. The data was obtained by using questionnaire on March to May 2016. Questionnaire are validated by an expert. The data were analyzed by analysis of percentages. The results showed that average of instrumental experts, matter expert, a media expert, and an environmental practitioner validation get 84,96% with a very valid category. Average of small test group (video legibility test) in Lowokwaru is 88,75% with a very valid category. This research implies that video is valid and it can be used in large group.

Key words—development, Sustainable Reserve Food Garden's Program, video

INTRODUCTION

Indonesia has great potential of biological resources, but this condition is different with the condition of society which is still below the recommended nutrition. We must optimize biological resources through the use of resources that are available in environment through the use of yard area [1]. The yard is a resource that is owned by households and it can be optimized to complete the food needs of the family [2].

The results of Research and Development Agency of Agriculture/Agricultural Research (2011) showed that total size of Indonesia yards is 14% of the total area of agricultural land, or about 10,3 million hectares of yard area but utilization is not optimum as a planting area of agricultural commodities. Utilization of the yard in a larger scale, based districts, villages or other areas called Sustainable Reserve Food Garden Program [2].

This program has a positive impact as improving access to healthy foods, save cost of living to complete their daily food, and the diversification of food consumption in households [2,3]. Based on the needs analysis on March 2016 in Bandungrejosari and Bareng in Malang City showed people who have size of the yard <100 m² around 100% in Bandungrejosari and Bareng, the yard area home that has been used for planting vegetables in Bandungrejosari around 25% and in the Bareng around 18,2%, and the society who know Sustainable Reserve Food Garden Program in Bandungrejosari is 0% and in Bareng is 0%.

The society who had attended socialization of Sustainable Reserve Food Garden Program in Bandungrejosari is 0% and in Bareng is 0%, the society who never receive socialization of catfish farming in tarp in Bandungrejosari is 0% and in Bareng is 18,2%, the society people who never receive socialization of process to make biogas in Bandungrejosari 8,3% and in Bareng 0%, the society who never receive socialization of process to make vertikultur in Bandungrejosari 16,6% and in Bareng 27,3%, the society who never receive socialization of process to make liquid fertilizer in Bandungrejosari is 0% and in Bareng 0%.

The society who never receive socialization of process to make composting in the Bandungrejosari is 16,6% and in Bareng is 27,3%, the society who have followed Sustainable Reserve Food Garden Program that presented in the form of video/booklet/modules in Bandungrejosari is 0% and in Bareng 0%, the society are interested to follow socialization of Sustainable Reserve Food Garden Program using video/ booklet/modules in Bandungrejosari is 100% and in Bareng 100%. The most suitable media to use in the public media is the video, because the video media in addition to the sense of hearing, the video also stimulates the sense of sight [4].

The video is useful to show information that requires a long time to understand it, to allow the people to be

able to redisplay the activity that has been observed in the video, to introduce interactive learning, and to expand the knowledge of learners [5,6]. The purpose of using the video for the community are people can easily learn and apply knowledge in life. Based on the this background need for research and development of Sustainable Reserve Food Garden Program's video in Malang City.

METHOD

The method of this research is research and development that uses ASSURE development model. The purpose of this research is to produce a Sustainable Reserve Food Garden Program's video with valid criteria that based on the ASSURE development model proposed by Heinich et al. [7] consists of (1) Analyze Learners, (2) State Objectives, (3) Select Methods, Media, and Materials, (4) Utilize Media and Materials, (5) Require Learner Participation, (6) Evaluate and Revise. The small test group location of this research was conducted at the Lowokwaru, Malang City. The data was obtained by using questionnaire on March to May 2016. The video is validated by an matter expert, a media a expert, and an environmental practitioners.

Qualitative data are obtained by criticisms and suggestions by experts and Lowokwaru society. While quantitative data are obtained based on the results of questionnaire by experts and Lowokwaru society. The data were analyzed by analysis of percentages.

RESULT

The result of research and development Sustainable Reserve Food Garden Program's video that uses ASSURE development model proposed by Heinich et al. [7] consists of (1) Analyze Learners, (2) State Objectives, (3) Select Methods, Media, and Materials, (4) Utilize Media and Materials, (5) Require Learner Participation, (6) Evaluate and Revise.

a. Analyze Learners

Data in analyze learners are obtained from the results of interviews with Bandungrejosari and Bareng society with a total of 23 people that used for preparation of the products development. The results can be showed in Table 1.

b. State Objectives

The purpose of this step is to solve problems that found in needs analysis. The purpose is to produce a video that is valid and can be used in large groups.

c. Select Method, Media, and Materials

At this stage, the selection of methods, media, and teaching materials to be used. Product of video is packaged in DVD format. On the outside of the DVD cover there are 5 programs that will be showed in the

video. It consists of catfish farming in tarp, process of biogas, vertikutur, process to make liquid fertilizer and compost. There is the logo Universitas Negeri Malang, then text about study program and the name of the researcher. The outer cover is colored by blue in order to attract public attention to the video that has been developed. On the inside of video presents five programs that are described in the video.

Table 1. Need Analysis in Bandungrejosari and Bareng Society

Number	Indicator	Percentages (%)	
		Bandungrejosari	Bareng
1	People who have <100 m ² size of yard area	100	100
2	The yard area home that has been used for planting vegetables	25	18,2
3	The society who know Sustainable Reserve Food Garden Program	0	0
4	The society who had attended socialization of Sustainable Reserve Food Garden Program	0	0
5	The society who never receive socialization of catfish farming in tarp	0	18,2
6	The society people who never receive socialization of process to make biogas	8,3	0
7	The society who never receive socialization of process to make vertikutur	16,6	27,3
8	The society who never receive socialization of process to make liquid fertilizer	0	0
9	The society who never receive socialization of process to make composting	16,6	27,3
10	The society who have followed Sustainable Reserve Food Garden Program that presented in the form of video/booklet/modules	0	0
11	The society are interested to follow socialization of Sustainable Reserve Food Garden Program using video/ booklet/modules	100	100

d. Utilize Technology, Media and Materials

Utilize technology, media, and materials require an evaluation by expert (an instrumental expert, a matter expert, a media expert, and an environmental practitioner). The purpose of assessment by expert are to determine the quality of video. The process of validation uses a Likert scale and are analyzed based on the validation criteria in Table 2.

Table 2. The Validation Criteria of Sustainable Reserve Food Garden Program's Video

Percentages (%)	Categories Validity	Information
23,00-38,4	Very invalid	It should not be used
38,5-53,8	Invalid	It can be used with many revisions
53,9-69,2	Less valid	It can be used with little revisions
69,3-84,6	Valid	It is good to be used
84,7-100	Very valid	Excellent for use

Decision of validator is based on proficiency areas. Data of validation results of each validator can be showed in Table 3.

Table 3. Validation Results from Experts

Numb	Experts	Aspect	Percentages (%)	Criteria
1.	Instrumental experts	Instructional aspect	90	Very Valid
		Aspect of coverage	84	Valid
		Aspect of language	82,4	Valid
		Average of components	85,4	Very

Numb	Experts	Aspect	Percentages (%)	Criteria		
2.	Matter expert	Aspects of design quality	85	Valid		
		Aspects of video quality	80	Very Valid		
		Aspects of content quality	85	VeryValid		
		Aspects of audio quality	86,6	Very Valid		
		Aspect of usability	86,6	Very Valid		
		Average of components	84,64	Valid		
		3.	Media expert	Aspect of content	90	Very Valid
				Aspect of learning desain	90	Very Valid
				Aspect of media technique	80	Valid
				Average of components	87,5	Very Valid
4.	Environmental practitioner	Aspect of performing	86,7	Very Valid		
		Aspect of content	86,7	Very Valid		
		Aspect of usability	73,3	Valid		
		Average of components	82,3	Valid		
		Average of overall components	84,96	Very valid		

Table 3 shows average of overall experts validation 84,96% with very valid category, so the video can be used at small test group. The qualitative data get from suggestions and comments from the validator. Suggestions and comments from the validator can be showed in Table 4.

Table 4. Suggestions and Comments from Experts

No	Experts	Suggestions and comments	Revision
1.	Instrumental expert	At the beginning of the questionnaire instruments are given the identity of respondent	At the beginning of the questionnaire is given the identity of respondent such as name, address, gender, age, education, status, size of the yards, and the signature of the respondents
		Choice of the answers are true and false	Choice of answers are changed become true and false
		Questionnaire of motivation is given positive statements and negative statements	Motivation questionnaire statements consist of positive statements and negative statements
2.	Matter expert	At the beginning of the questionnaire of motivation instrument needs an information about scale of 1-5	At the beginning of the questionnaire of given the choice is very positive for 5 scale until very negative for scale 1
		The background of video needs to be reduced	The background of Sustainable Reserve Food Garden Program is reduced
		The title is placed at the beginning of the sentence	The title is placed after the background
3.	Media expert	The important explanation is added subtitle	Each important explanation in division of the strata in Sustainable Reserve Food Garden Program is given the subtitle and at the end of the frame is given a note
		The duration of the video needs to be reduced	The duration of video is reduced from 22 minutes to 16 minutes
		The voice at the beginning of video is less loud	The voice at the beginning of video is louder
		Video must be given purposes of video	Video is given the purpose of making video, the principles of Sustainable Reserve Food Garden Program, the division of strata in Sustainable Reserve Food Garden Program, and programs in

No	Experts	Suggestions and comments	Revision
			sustainable reserve food garden
		Directing of video is not showed	At the beginning, the division of strata and explanations in Sustainable Reserve Food Garden Program are more close-up on important parts
4.	Environmental practitioner	The title of video is made persuasive	The title and the visual display of video more persuasive
		Every image in video is adjusted to the character of the environment in order to it can be applied by society independently	Pictures that showed contains steps in Sustainable Reserve Food Garden Program from catfish farming in the tarp, biogas, vertivcultur, composting and liquid fertilizer that can be easily applied by the society
		Every aspect of Sustainable Reserve Food Garden Program is given the subtitle	Every explanation on Sustainable Reserve Food Garden Program from principle, division of strata, and programs sustainable reserve food garden program is given the subtitle
		The backsound is not just one type	Video is given some kind of backsounds

Based on the quantitative and qualitative data, the instruments of assessment and video are revised so instruments and video can be used for the next step.

e. Require Learner Participation

At this small test group test is applied. The purpose of small test group test is to test the legibility of a video to 10 people that consist of one person from Bareng, one person from Bandungrejosari, and 8 people from Lowokwaru that have implemented Sustainable Reserve Food Garden Program. Data of legibility test can be showed in Table 5.

Table 5. Video Legability Test

Number	Aspect	Percentages (%)
1.	Video of Sustainable Reserve Food Garden Program makes me easily understand the material in Sustainable Reserve Food Garden Program	96
2.	The material in video makes me interested me to learn Sustainable Reserve Food Garden Program	84
3.	Utilizing of illustrations, pictures, and an example are one of the supporters in video of Sustainable Reserve Food Garden Program	86
4.	The most recent information in the video makes me understand new things in utilizing the yard	88
5.	Video of Sustainable Reserve Food Garden Program is presented in an easily understandable	88
6.	Overall concept in video of Sustainable Reserve Food Garden Program are suitable with the purpose of Sustainable Reserve Food Garden Program	86
7.	The explanation in video of Sustainable Reserve Food Garden Program are easier to understand	90
8.	The existence of the video of Sustainable Reserve Food Garden Program is important for me to implement the Sustainable Reserve Food Garden Program	92
Average of aspects		88,75

Average of legability test shows video of Sustainable Reserve Food Garden Program is 88,75% with very valid criteria and can be used in large groups

f. Evaluate and Revise

Legibility test from small test group then used to evaluate and revise video Sustainable Reserve Food Garden Program. Suggest and comments are very important to video before video is used in large group in Malang City.

DISCUSSION

Average of instrument validation is 85,4% that includes the aspect of user, aspect of coverage, and aspect of language. Aspect of guideline consists of several indicators such as guide the using of instruments and criteria of assessment. Aspect of coverage consists of five indicators such as clarity of purpose, the appropriate of type of assessment with Sustainable Reserve Food Garden Program, the appropriate of instruments with the cognitive level of society, the adequacy of the space is provided to answer the instrument, and the availability of answer key.

Aspect of language consists of three indicators such as the clarity of writing the language, the using of Indonesia language, simple, communicative, the using of the sentences that is easy to understand, and do not give multiple interpretations. Validation of Sustainable Reserve Food Garden Program's video by matter expert, media expert, and practitioner can be showed in Figure 1.

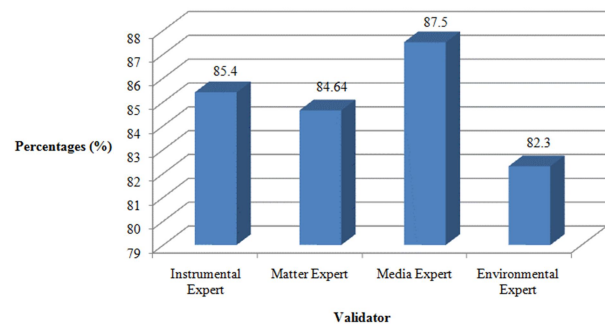


Fig 1. Average of Validation results from Every Validator

The matter expert validates about aspect of design quality, video quality, content quality, audio quality, and usability. The aspect of design consists of evaluation of the background of the Sustainable Reserve Food Garden Program, title of video, display of video support Sustainable Reserve Food Garden Program materials, and information on the video contains Sustainable Reserve Food Garden Program. Aspect of design related to the implementation of storyboard [8]. Aspect of video quality includes the video contains an explanation of Sustainable Reserve Food Garden Program, the size of the video is suitable with the content of video, the duration of the materials is suitable with content of video, the suitability of speed video, the video contains enough information, and mark important part of the video. Indicators should be noted that the video size is not too large. It is important when the program is uploaded [9].

Adjustment duration of the video and the time allocation should be noted because it is related with application of video to learn as much as possible [10]. The duration of the video must be adjusted by the amount of information [11]. The speed of video display is related with frame rate video images that are read sequentially in a time with a certain speed. The merged images called frames and image reading speed is called the frame rate, and measured as fps (frames per second). Because it is played in a high speed, it will create the illusion of smooth motion. The greater the value of the frame rate the smoother movements. The process produces a smooth picture movement required a minimum frame rate of 10 fps. The films in theaters has a frame rate of 24 fps, and the video that we see on television have a frame rate of 30 fps [12].

Video must contain enough information that related to purpose, the suitability characteristics of goals with the characteristics of the media [13]. Aspect of quality includes four indicators such as the material in the video is easy to follow, complete material according to media, a systematic material displaying, and integration of the content in the video. The material on video should match

with goals and it is not in long descriptions [14]. Indicator of a systematic material displaying helps the understanding of a material on the video [15]. Indicator of integration of contents in video refers to the relationship between the visual elements and instructional media [13]. Aspect of audio quality includes three indicators such as clear and suitable narrator voice, background music supports content of video, and the voice of the narrator supports content of video.

Indicator of narrator voice associated with the addition of sound effects (audio) that uses music and dubbing [16]. Indicator of background music related with the function of music that creates a situation that makes it easy to understand the information. Music also generates interest, reduces boredom, and affects psychological listeners [14]. Aspects of usability includes six indicators such as the accuracy of the content organization in the video, the video is easy to use, video can be repeated if there is a material that is difficult to understand, the video is easy to operate, this video is useful, interest, easy to understand, and the video can be recommended to others. Indicator of the content organization accuracy in the video related to delivering of content. Indicator of ease of video media related to media selection accuracy to achieve goals. Indicators of interesting and easy related to content of video that contains interesting idea and it is supported by visual media such as layout design, typography (font style), the color, the style of display media, laying images and text must be suitable, and the reader can receive the information easily [13]. Average of overall experts validation 84,96% with very valid category, so the video can be used at small test group. The purpose of the small test group is to anticipate errors that can occur during the application of the product [17].

Average of video legibility test is 88,75% with a very valid category and it can be used on a large group test. Sustainable Reserve Food Garden Program is not new program in the community, because the practice of planting on a limited scale (in pots) and many types of plants (plant diversity) has been long run by both rural and urban communities. The pattern and process system are still carried out by individual households and do not notice about food and nutrition and sustainability [18]. Utilization of houses yard optimally is used with a variety of local resources that developed on a larger scale, based districts, villages or other areas called Sustainable Reserve Food Garden Program [13].

Sustainable Reserve Food Garden Program is divided according to size of yard such as strata 1 with total area <100 m², strata 2 with total area of 100-300 m², and strata 3 with total area of > 300 m² [13]. Sustainable Reserve Food Garden Program have positive impacts such as improving access to healthy foods, economizing of daily food and diversification of food consumption in households [13]. Sustainable Reserve Food Garden Programs in the videos include a catfish in a tarp, biogas, verticulture, liquid fertilizer and compost. Cultivation of catfish in a tarp is one solution to solve non-productive land into productive land [19]. Cultivation of catfish in a tarp has advantage such as it can be moved as desired, save costs, catfish easily controlled, and the water relatively clean [20].

Biogas is gas from the fermentation process of organic material such as waste with the help of anaerobic bacteria in anaerob condition. The composition of the biogas are CH₄ (55-75%) and CO₂ (25-45%), H₂S (0-3%), N₂ (0 to 0,3%), H₂ (1-5%) and O₂ (0,1-0,5%) [21]. Production of biogas is a process of renewable resource and environmental friendly. Biogas has several advantages, the influence of greenhouse gases can be reduced, pollution of gas can be reduced, as a fertilizer, and produces power and heat [22]. Secondary product of biogas is organic sludge that is processed into compost [21].

Verticulture is farming patterns that use a container vertically to solve the limitations of narrow land [23]. Types of cultivated plants are plants that have high economic value, short-lived, and have a short root system. Medium of verticulture are pipes that are positioned vertically or upright [24]. Then each side are alternately perforated for growth of plants and in the middle is given pipe so the water flows evenly [23]. One type of organic fertilizer is compost from organic materials that decay due to microorganisms. Compost is the result of a perfect mixture of organic matter decomposition that is accelerated by a variety of microbes in a warm and moist environment and it requires O₂ (aerobic) or without O₂ (anaerobic) [25]. Using of various organic fertilizers such as compost on agricultural land is proven to increase production [26]. Process of making organic fertilizer is added bacteria starter or bioaktivator form Effective Microorganisms₄ solution (EM₄). The solution EM₄ consists of many microorganisms that help speed up the process of decomposition of organic material so it can increase the decomposition of waste and organic waste, suppresses the activity of insect pests and pathogens, and increase the availability of plant nutrients [27]. Media video is one example of an effective media in the form of multimedia that is used in order to improve knowledge. Video provides visual access to a variety of interesting information [28]. Result of research [29] that makes the video media such as DVD 6M about waste management that enclosed pocket book shows that the video is effective as a learning media to the community. The video is also useful to show information that requires a long time to understand it, to give opportunity the observer to play back the activity that has been observed, and to introduce an interactive learning [5,6,30]. Research conducted by Thomas [31] indicates that the video can motivate farmers to imitate the activity of how to use fertilizer that contained in the video. Making the video must pay attention to the interest, understanding, implementation difficulties, and the impact [32].

CONCLUSION

Average of instrumental experts, matter expert, a media expert, and an environmental practitioner get 84,96% with a very valid category. Average of small test group (video legibility test) in Lowokwaru is 88,75% with a very valid category. This research implies that video is valid and it can be used in large group.

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