Use of corn maze educational game as a learning medium for rural communities to build food security behaviours

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Abstract. The purpose of this study is to develop food security behaviours in rural communities. The place of this research was conducted in the village of Banyubiru, Labuan district, Pandeglang regency, Banten Province, Indonesia. The method used in this study was an experiment with the design of forming three village community groups, each group consisting of 15 people. The instrument used in this study was a food security behaviours questionnaire test and an observation sheet during the implementation of the corn labyrinth educational game. The results of the questionnaire of resistance behaviours in the village community in Labuan Banten amounted to 66.83% or 0.67 in the good category. Furthermore, the observations during using the labyrinth educational game of 72.50% or 0.73 are in the good category. So it can be concluded that the behaviours of food security can be grown through learning activities through the design of a corn maze educational game.

1. Introduction
The importance of behavior change is very essential in agricultural development, a change in people's behavior towards food security will maintain food availability [1]. Food security behavior needs to be maintained and improved so that the community is able to manage food availability and be able to realize food security for households [2]. Food security in the household is defined as accessibility by all people at all times for adequate food for work and healthy living [3]. Food security includes, at least to a minimum the availability of guarantees for food and adequate nutrition and guarantees to be able to obtain food in a socially acceptable way [4]. Here it should be stressed that in providing guarantees for food, it is necessary to develop the agricultural sector, both with the development of farmers' capacity, technological support and policies oriented towards achieving comprehensive food security [5].

Food security is a major thing in development in order to achieve community welfare [6]. The effort to achieve food security has become a concern in the national and international scope [7]. Vulnerability to food can result in low quality of life of the community, both in the physical-health, social and economic aspects [8]. Seeing this, the effort to achieve food security in a country is indeed not a simple matter, which is related to policy orientation on comprehensive food priorities [9]. Food security contains two main elements, namely the availability of food and people's accessibility to the food [10]. One of the elements above is not fulfilled, a country cannot be said to have good food security [11]. Even though food is sufficient at the national and regional levels, if individual access to meet their food needs is uneven, then food security is still said to be fragile [12].

The concept of food security should be related to aspects of sustainability [13]. Therefore, the behavior of food security must be possessed by each individual village community, this is to ensure the
sustainability of food security while increasing the welfare of rural communities [14]. Food security behavior is essential to create household food security [15]. The formation of food security behavior can be influenced by factors internal and the external or the results of reflection on a number of learning experiences on the environment [16]. Internal factors are inherited factors inherited by parents, while external factors can be in the form of stimuli obtained from their environment, both family environment, community environment, schools and universities as education centers [17].

The position of education as a subject in the process of social change is closely related to the function of education as an agent of change [18]. Education is a process of transfer of knowledge, it can also be interpreted as a process of instilling value to individuals [19]. Through this process education can function as an agent of change [20]. Education can change the mindset of individuals, education can enlighten individuals about things that have not been widely known to the community, education can also overhaul various myths that have developed in society, education can correct various things that have been interpreted wrong by society [21], [22].

Sultan Ageng Tirtaya University as a center of education in Banten province and implementing community service needs to develop various learning models in accordance with the characteristics of agriculture, learning that focuses on organizing the learning process that really follows the rhythm of agricultural work. Learning activities in the community are inseparable from on-farm and off-farm activities.

The purpose of this study is to invite Banyubiru villagers to build better food security behavior towards learning through the use of corn maze educational games. The game can be interpreted as an arena of decision and action of the players [23]. There are certain targets and missions that must be achieved by players [24]. Games are played primarily for entertainment and fun, but can also function as a means of training, education and simulation [25]. Games that are combined with educational content are called educational games [26]. Based on this opinion it can be concluded, if in a game contains mathematical material then it can be called a math education game [27].

The type of game chosen by researchers is an educational game that is collaborated with the maze genre. The education genre was chosen because the game is used for educational purposes which can change food security behavior. Learning is defined as a behavior formation resulting from practices in the living environment [28].

2. Methods

This type of research is field research (field research), namely direct observation of the object under study in order to obtain relevant data. The following research design can be seen in Figure 1.

![Figure 1. Research design](image-url)
The method used in this research is to use quantitative analysis research methods, namely using in-depth data analysis in the form of numbers. In this study the data collection methods used were the Questionnaire Method and the Observation Method.

The questionnaire is a data collection technique that is done by giving a set of written statements to the respondent to answer. Questionnaire used in the form of a closed questionnaire, namely in the questionnaire has provided alternative answers so that respondents just choose an alternative answer in accordance with his situation. The questionnaire used in this study was in the form of a number of statements with answer options arranged in the form of a likert scale categorized on a scale of Strongly agree, Agree, Doubtful, Disagree, and Strongly disagree. The questionnaire was conducted to determine the food security behaviour of the Banyubiru village community that was used during the study by using the corn maze game. The questionnaire guidelines can be seen in Table 1.

Table 1. Likert scale

| Strongly Disagree | Disagree | Neither Agree Nor Disagree | Agree | Strongly Agree |
|-------------------|----------|----------------------------|-------|----------------|
| 1                 | 2        | 3                          | 4     | 5              |

From the data obtained above then processed by multiplying each answer point with a predetermined weight with a weighted value table. The following likert scale calculation can be seen in Figure 2.

![Likert scale calculation](Figure 2)

Figure 2. Likert scale calculation

Then after getting the index value%, grouped into categories like Table 2.

Table 2. Value percentage criteria.

| Index %    | Information |
|------------|-------------|
| 0.00-19.99 | Very bad    |
| 20.00-39.99| Not good    |
| 40.00-59.99| Enough      |
| 60.00-79.99| Well        |
| 80.00-100.00| Very good  |

Furthermore, the data analysis technique uses the observation method. At this stage, it is carried out to obtain actual and direct data by systematically observing and recording the symptoms or phenomena that exist on the object of research. This method is used to directly observe the activities of village communities during the learning process. The assessment criteria from the results of observations are the same as shown in Table 2.

3. Result and Discussion

3.1 Food security behavior

This study uses 50 respondents to determine food security behaviour. Data collection was carried out by distributing offline questionnaires directly to capture respondents more according to the target based on the sample characteristics determined in this study. Following the results of the questionnaire distribution can be seen in Table 3.
Table 3. Results of questionnaire food security behaviour

| Likert Scale | Question Number |
|--------------|-----------------|
| 5            | 1  2  3  4  5  6  7 |
| 4            | 1  2  3  4  5  6  7 |
| 3            | 1  2  3  4  5  6  7 |
| 2            | 1  2  3  4  5  6  7 |
| 1            | 1  2  3  4  5  6  7 |

The assessment carried out in this study is an observation to find out students' science process skills obtained from students' answers on the pre-test and post-test question sheets. The test questions contain aspects of students' science process skills, including: observation, communication, classification, measurement, inference, prediction. The results of data analysis pre-test, post-test, and normal gain scores obtained by the experimental class and control class students are presented in Figure 3.

![Figure 3](image_url)

**Figure 3. Food security behaviour**

In Figure 3 it can be seen that the results of the average food security behaviour questionnaire towards the Banyubiru community were 66.83% or 0.67. This shows that the behaviour of food security towards Banyubiru people who received treatment from learning the corn maze educational game is included in both categories. Based on the results of the questionnaire, that learning through corn maze education is quite effective in developing food security behaviour.

Furthermore, the results of observations of each aspect of food security behavior can be seen in Figure 4. From Figure 4 it can be seen that the average results of observations show a value of 72.50%. This concludes that the learning process through the educational game of corn maze can build food security behaviour towards the Banyubiru community. At this stage there is a fun learning process for the village community, this can be said that the role of the game can make people more concentrated and can practice food security behaviours and also train to solve problems because in the game there are problems that must be resolved quickly and accurately. Games can be a source of learning if the game aims to achieve learning objectives.
In this research the game used is inviting the public to make concepts, make rules, and then apply them directly in the learning process. From a series of design activities, people will get used to building food security behavior. This is done so that people are familiar with what has been done continuously. Of course, the game that is built is a game that has educational content better known as the educational game. The design of this maze educational game is a learning tool for the community which is effective enough so that it will foster higher food security behavior. Fun learning process will make people become motivated to learn so that the learning process takes place more effectively and efficiently [29].

This is done in order to be able to build a village community's food security behavior. This is consistent with the results of research showing that human behavior can be changed with the learning process. Then the learning that is applied by using the corn maze game is aimed at building food security behavior towards a social group that is mutual awareness, interest, attitude, practice, evaluation, adaptation and commitment to behave positively. Food security behavior is rooted in human relations in accordance with the norms of group life. The emergence of this food security behavior arises from the presence of a corn maze game stimulus, the community conducts activities in response to the habit of performing positive behaviors to build food security behavior.

The behavior of food security that is formed in the community is caused by a stimulus from the corn maze game. Understanding the existing stimulus makes the villagers try to find out and ultimately produce a response. Corn maze game provides functions on awareness, interest, attitude, practice, evaluation, and adaptation to the consequences of behavior. This shows that food security behavior can be formed through the learning process.

4. Conclusion
Based on the results of the analysis of research data, the conclusion of this study is that learning through corn maze games can be used to build food security behaviour towards the community in the village of Banyubiru, sub-district of Labuan, Pandeglang district, Banten Province. This can be seen from the results of each aspect or indicator achieved from food security behaviour, namely from the results of a questionnaire of 66.83% or 0.67 in the good category. Furthermore, the observations during using the labyrinth educational game of 72.50% or 0.73 are in the good category. This shows that the corn maze game can build food security behaviour.
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