Development of android-based counseling media oriented problem solving in sheep livestock groups

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Abstract. Goats are commodities that have good development prospects that can play a dual role as dairy producers and meat, but in their operations in farmer groups usually do not take into account the feasibility of their business so that farmers never know whether their business is in a profit or loss position. The price simulation application is expected to be used to calculate business feasibility, which is practical and easy to use. Such conditions encourage to provide counseling about price simulation applications with Android-based smartphone media. The study was conducted to find out (1) describing Android-based electronic counseling products as an interactive media; (2) knowing the farmers' response to the use of an Android-based smartphone as an interactive media. (3) determine the effect of internal and external factors on the response. This type of research is Research & Development using the 4D model. The sample used was 33 respondents with a purposive random sampling method. Measurement of responses using a questionnaire containing knowledge, attitudes, and skills with analysis using descriptive statistics followed by inferential statistics. Research Results that the response of farmers to the use of smartphones as interactive media is 1,809 and included in the high category. The results of the study show that exogenous variables (i.e. age with a coefficient value of 0.205, education with a coefficient value of 0.293, breeding experience with a coefficient of -0.185, and innovation characteristics with a coefficient value of 0.209) directly influence endogenous variables (response). The educational variable has a significant effect through the innovation characteristic variable with a coefficient value of 0.177. That is, the variable characteristic of innovation as an intervening/intermediary between education to farmers' responses, while the other variables do not pass through the innovation characteristic variable as an intervening variable.

1. Introduction
Goat is a commodity that has good prospects for development and has a dual role as a producer of milk and meat. Giripurno village has a population of 2,641 goats, with a total of 566 breeders. The population is mostly dairy goats that are in accordance with the conditions of the villages in the highlands.

Goat livestock business in the village of Girimulyo is generally managed as a family business or small-scale community farming business. Namely, the number of livestock ownership is around 1 – 5 cattle, and cattle business is only a side business that is kept as a savings (investment) that can be sold when there is a need. In raising sheep, sheep need good maintenance management to get good quality
and quantity of sheep. The economic picture in the sheep business is expected to be able to explain that the business that is run is getting profits in accordance with the costs, time, and labor that was sacrificed during livestock raising. One of the government’s efforts to motivate farmers to increase livestock production is to provide information on efficient and effective maintenance. Innovation with Price simulation application is an application of a smartphone that is made to collect all prices both from input and output in goat livestock business and then analyze the profit and sensitivity so that breeders can easily calculate the business being run experiencing profit or loss.

In line with the development of science and technology in agriculture, the spread of information through print and electronic media is increasing. Information is two inseparable things related to the role of instructors in the activities of collecting, processing, and despairing agricultural information from and for farmers [1]. While the results of Wijaya’s (2015) research found that the ability of instructors in the use of Cyber Extension will be supported by the smoothness of the instructors in carrying out the stage of information search [2]. Elian (2015) found that there was an imbalance in the use of agricultural information by extension agents because the information obtained was not at the stage of being distributed to farmers [3]. More than half of the instructors only share it with fellow instructors, and there are even extension agents who use the information to be kept private. From several studies that have been done that the media used for counseling is Android-based smartphone is still in the level of information available. In this study, the authors make/design calculations/simulations of input-output prices in goat livestock businesses that can be used to determine business analysis at various price levels. Based on the above problems, the authors raise the title of Android-Based Counseling Development Media Oriented Problem Solving in Sheep Livestock Groups To overcome the problems faced, it is necessary to design an application simulation of dairy goat business prices to calculate business analysis with various price options both input and output. The research objective is to determine the response of farmers to the use of an android-based dairy goat business simulation application. Besides that, it is also necessary to analyze the effect of respondent characteristics (breeders age, breeder’s education, number of livestock, the experience of breeders, and innovation characteristics) on the response of breeders, and the effect of innovation characteristics as mediating variables on responses.

2. Methods
The study was designed as descriptive correlational survey research by describing data obtained from respondents through questionnaires and interviews. The activity has been carried out May 3 to Juni 30, 2019 in Giripurno Village, Borobudur District, Magelang Regency. The study design was carried out by giving questionnaires to 33 respondents taken using the purposive random sampling method. The data in this study are primary data and secondary data. Primary data was collected through interviews and observations using the questionnaire provided. Secondary data obtained from monographs and data that is already available in relevant agencies. Analysis of the data used is descriptive statistics to determine breeders’ responses to the application of goat business price simulation, and inferential statistics use path analysis to determine the direct and indirect effects of exogenous variables on endogenous variables.

3. Result and Discussion
Farmers’ response to the application simulates the price of goats. Descriptive statistics are used to calculate or describe farmers’ responses to the application of goat business price simulation in Giripurno Village. The tabulated results from aspects of knowledge, attitudes, and skills can be seen in Table 1.
Table 1. Results of the tabulation of goat business responses in Giripurno Village.

| Variable  | Score | Category         |
|-----------|-------|------------------|
| Knowledge | 883   | Quite Know       |
| Attitude  | 529   | Agree            |
| Skills    | 399   | Skilled Enough   |
| Amount    | 1811  | High             |

Source: Processed Data (2019)

Based on Table 1, it can be seen that the value for the aspect of knowledge is 883 in the sufficient criteria. In the aspect of attitude have a value of 529 with the agreed category. The aspect of skills has a value of 399, with quite a skilled category.

Farmer responses are a combination of values from aspects of knowledge, attitudes, and skills with the results in Figure 1:

Figure 1. Continuous line of farmer responses.

Figure 1 the continuum line of breeder response can be seen that the breeder’s response to the application of goat business price simulation is in the skilled category, it is caused by the suitability of the extension material provided by lecture, discussion, and demonstration methods. Submission of material also uses extension media in the form of powerpoint shows and folders that make it easy for respondents to understand the contents of the material. Afrianto (2014) states that by providing information to increase knowledge so as to cause awareness and ultimately, people will behave in accordance with their knowledge [4]. One effort to provide information obtained is by counseling. This is in accordance with the opinion of Mardikanto (2009) that the media extension is a tool needed by an instructor to expedite the teaching process during the extension activities carried out [5].

Path analysis is used to determine the effect of endogenous variables and exogenous variables (response)

3.1. Stage 1 (Indirect effect of exogenous variables on endogenous variables)

The first step is to create a concept of equality to find out the significant influence between age (X1), education (X2), number of family members (X3), and livestock experience (X4), on the characteristics of innovation (X5). The equation is:

\[ X_5 = p_1 X_1 + p_2 X_2 + p_3 X_3 + p_4 X_4 + p_5 X_5 + e_1 \]

3.1.1. Test the coefficient of determination \((R^2)\). The results of the analysis of the coefficient of determination show the number 0.524, which means that exogenous variables can explain the characteristics of innovation (intervening variables) of 52.4%, while the remaining 47.6% is explained by other variables outside the model.

3.1.2. Test F. F test results show that exogenous variables simultaneously or simultaneously have a very significant effect on the innovation variable (intervening characteristics).

3.1.3. Test T. The analysis shows partial effect of each variable on the variable characteristic of innovation:
3.1.3.1. Age (X1). Age has no significant effect on the characteristics of innovation. This is because the age of young and old farmers does not have an influence on their opinions on the characteristics of innovation.

3.1.3.2. Education (X2). Education has a significant effect (p<0.05) on the characteristics of innovation. The magnitude of the coefficient of 0.561 can be interpreted that if education increases by 1%, it will increase the variable characteristics of innovation to rise by 56.1%. The higher the education, the more opinion about the characteristics of innovation is higher. Farmers who have a higher level of education will be able to easily accept and understand explanations. In accordance with the opinion of Novia (2009), farmers who have higher education will usually be more active both in asking questions, issuing opinions, and looking for available information [6].

3.1.3.3. Number of family members (X3). The number of family members does not significantly influence the characteristics of innovation. That is because a large number of family members of the breeders does not mean that it will ease the work in the livestock business, but not all family members want to do it. They assume that the goat livestock business carried out is only a side. This is different from the opinion that farmers who have large family dependents will also have a large economic burden to meet their family's living needs. The increasing number of family members is a burden on one side, but from the other side is a source of family labor [7].

3.1.3.4. Breeding experience (X4). The experience of raising no significant effect on the characteristics of innovation. That is because a little experience of breeders does not mean their opinions on the characteristics of high innovation.

3.2. Stage 2 (Direct influence of exogenous variables on endogenous variables)

The second step is to create a concept of equality to find out the significant influence between age (X1), education (X2), number of family members (X3), the experience of raising livestock (X4), and innovation characteristics (X5) on responses (Y):

\[ Y = pYX_1 + pYX_2 + pYX_3 + pYX_4 + pXY_5 + pYe2 \]

3.2.1. Determination test (R2). The results of the analysis of the coefficient of determination show the number 0.892, which means that the exogenous variable can explain the endogenous variable (response) of 89.2%, while the remaining 10.8% is explained by other variables outside the model.

3.2.2. Test F. The results of the analysis show that exogenous variables together have a very significant effect on endogenous variables (response).

3.2.3. Test t. To see the effect individually or partially, each variable will be described as follows:

3.2.3.1. Age (X1). Age has a significant effect (p <0.05) on farmers' responses. The magnitude of the path coefficient of 0.764, which means that if the age of farmers increases by 1%, the response of farmers will increase or increase by 76.4%. The younger the age of the farmer, the response to the price simulation application will be higher, because young people usually have the enthusiasm to want to know what has never been known. Price simulation application is an application that is easily understood and supported by some very interesting and supportive information in the field of animal husbandry. According to Maryani et al. (2014), in the productive age a person has optimal physical abilities and has a good response in accepting new things in improving his farming [8].

3.2.3.2. Education (X2). Education has a very significant effect of 0,000 (p <0.01) on responses. The magnitude of the path coefficient is 0.562, which means that if the education of farmers increases by 1%, the response of farmers will increase or increase by 56.2%. The more farmer's education, the higher the response will be.
3.2.3.3. Number of family members (X3). The number of family members has an insignificant effect on the response. That is because the small number of family members of the farmer does not mean their opinion of the high response.

3.2.3.4. Breeding experience (X4). Breeding experience has a very significant effect (p <0.01) on responses. The magnitude of the path coefficient of 0.175, which means that if the experience of raising livestock increases by 1%, the response of farmers will increase or decrease by 17.5%. The more experience of raising animals, the lower the response will be.

3.2.3.5. Characteristics of innovation (X5). The magnitude of the path coefficient of 0.208, which means that if the assessment of innovation characteristics increases by 1%, the response of farmers will increase by 20.8%. The path coefficient is substituted into equation 1 viz 

\[ X_5 = \rho X_2 X_1 + \rho X_3 X_2 + \rho X_4 + e_1 \]

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\[ Y = \rho Y X_1 + \rho Y X_2 + \rho Y X_3 + \rho Y X_4 + e_2 \]

Path coefficient values outside the model (e) are calculated using the formula:

\[ \rho(y,x)e = \sqrt{1 - R^2} \]

Equation 1

\[ = \rho e_1 = \sqrt{1 - 0.524} = 0.689 \]

Equation 2

\[ = \rho e_2 = \sqrt{1 - 0.892} = 0.329 \]

1) Equation 1

Equation 1 there are age variables (X1), number of family members (X3), and livestock experience (X4) which are not significant, then the distribution of the equation becomes:

\[ X_5 = 0.561 X_2 + 0.689 e_1 \]

2) Equation 2

Equation 2 variable number of family members (X3) is not significant then the equation:

\[ Y = 0.205 X_1 + 0.763 X_2 - 0.185 X_4 + 0.209 X_5 + 0.330 e_2 \]

From the two equations that have been made, the results of the path analysis model design can be explained in Figure 3

![Diagram](image)

**Note:** has insignificant influence

**Figure 2.** The results of the path analysis model design.
3.3. Direct and indirect influence
The last step is to calculate the magnitude of the direct influence or indirect effect, and the total effect of the path analysis. The results are:

3.3.1. Indirect effect (indirect effect). The indirect effect between education (X2) on response (Y) through the characteristics of innovation (X5) can be seen as the results as follows:

\[ X2 = \rho X_5 X_2 \times \rho Y X_5 = 0.561 \times 0.209 = 0.117 \]

Based on the calculation results, it can be seen the size of the indirect effect between education on response through the characteristics of innovation by 0.117. That is, the intervening variable (innovation characteristics) can only be an intermediary variable between education and farmers' responses, while the other variables do not go through the intervening variable.

3.3.2. Direct effect. Exogenous variables that directly influence endogenous variables are age (X1) with a path coefficient value of 0.205, education (X2) with a path coefficient value of 0.293, breeding experience (X4) with a path coefficient of -0.185, and innovation characteristics with a path coefficient value of 0.209.

3.3.3. Total effect. The variable that can be calculated is the total effect of education because it has a direct and indirect effect. The magnitude of the total effect is 0.41 (DE + IE). Other variables (age and experience of breeding) cannot be calculated the total effect because there are variables that can only have a direct effect without going through intervening variables (innovation characteristics).

4. Conclusions

4.1. The response of farmers to the simulation application of goat business prices in the village of Giripurno is in the high category.

4.2. Exogenous variables that directly influence endogenous variables are age (X1) with a path coefficient value of 0.205, education (X2) with a path coefficient value of 0.293, breeding experience (X4) with a path coefficient of -0.185, and innovation characteristics with a path coefficient value of 0.209.

4.3. The indirect effect of education on response through the characteristics of innovation is 0.117. That is, the intervening variable (characteristic of innovation) can only be an intermediary variable between education and farmers' responses, while the other variables do not go through the intervening variable.

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