

The Construction of Agricultural Extension Competencies in Cyber Media for Community Education

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Abstract. This study aims to analyze the capacity of agricultural instructors in developing cyber extension media, which consists of the characteristics of cyber extension media, cyber extension media design, characteristics of self-help extension workers, and the capacity of self-help agricultural extension workers, as well as analyzing the factors that affect the ability of extension workers in developing cyber media. This research uses quantitative research through a survey method. Data analysis was carried out descriptively and inferentially using Structural Equation Models. Correlational prescriptive results explored about 108 informants. The results of SEM modelling show a direct and indirect effect on the ability of independent agricultural instructors to develop CE media. So it can be said that there is an influence of media characteristics, media design, characteristics of self-help extension workers, and the capacity of self-help agricultural instructors on agricultural instructors' performance. The correlation test results have a significant relationship between the utilization of Cyber Extension by agricultural extension workers and the capability of agricultural extension workers to have an excellent significant value.

Key words: extension, agriculture, cyber, media, community education

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INTRODUCTION

Adult learning is a critical concept contributing to the empowerment of society (McCauley et al., 2017). Adult education comes through teaching activities to develop knowledge, attitudes, and skills through a community learning system (Dacholfany, 2018). One of the learning activities for the farming community to develop itself is extension activities (Kifli et al., 2021). As a reasonably large agricultural country, Indonesia is very closely related to extension activities, especially agricultural extension, as an activity of farmer community education has the characteristics of community empowerment (Wood et al., 2021). Counselling or extension comes from the root word *suluh*, which means giving light during darkness (Kusnadi, 2011). The extension is one form of non-formal education efforts for individuals or community groups (Siswanto, 2012). Counselling is systematic, planned, and directed to change sustainable behavior to increase production, income, and welfare (Hanarko, 2010). The explanation confirms that counselling is essential in adult learning (Conner et al., 2018). One of the current conditions, counselling continues to develop in the digital or cyber world (Praza, 2016).

Agricultural extension frees farmers from gripping poverty (Wado et al., 2019). Farmers can access

market information, technology, capital, and other resources, to increase productivity, business efficiency, income, and welfare (Tahitu, 2015). Agricultural self-help extension workers as community education educators have a contribution to help and facilitate the community to learn so that the community becomes more empowered (Rayuddin et al., 2021). Counselling is a learning process for the main agricultural actors and business actors so that they are willing and able to help themselves (Nnadi et al., 2013).

The current form of extension for agricultural extension workers has serious challenges, including the challenge of providing high-quality education and training that is in line with the times (Kifli et al., 2021). Extension workers now need to provide training to those who need it and take advantage of the activity and provide it most cost-effectively (Rusliyadi et al., 2018). Stakeholders involved in agricultural and rural development need to communicate, negotiate and arrive at communicable decisions to achieve results (Marsh & Pannell, 2000). The failures associated with various extension efforts are essentially the result of the extension's inability to address agricultural learning problems (Demenongu et al., 2015).

Self-help agricultural extension workers have a strategic role in helping farmers manage their agricultural products more productively in the

agribusiness sector (Kifli et al., 2021). Kendala yang sangat menghambat pada sektor bisnis pertanian ialah bagaimana seorang penyuluh pertanian swadaya memotivasi kaum milenial untuk bergabung disektor bisnis pertanian yang sangat amat menjanjikan (Haryanto et al., 2021). Several millennial farmers who have been engaged in agriculture stated that they are working as farmers because they have to. Wiyono & Ramadhan (2021) confirms that many millennials are not interested in being rice farmers (70%) or horticulture (73.3%).

Extension efforts to provide farmers with useful research-based agricultural technologies do not have the expected impact (Indraningsih et al., 2021). The majority of rural farmers are still tradition-bound in their production methods and, as a result, continue to suffer from low productivity, low incomes, and shortages (Demenongu et al., 2015). Therefore, extension workers as public education educators have a central role in motivating and educating millennial generations to manage agriculture well.

D. Darmawan; D.Yatimah; K. Sasmita; R. Syah (2020) emphasized that efforts to increase community motivation in learning, such as millennial farmers, require learning yeast that is following evaluation media or information media, one of which is the most familiar media for the learning community or millennial farmers is digital-based learning. According to Atrisiandy (2015), information technology can help the course of agricultural lighting. Amin et al. (2013) said that the particular focus of the ICT (Information and Communication Technologies) program in agriculture is meeting farmers' needs for information.

Sadono (2008) said if the stagnation of development and agricultural information so far has occurred, it is hoped to be updated with ICT through access to market information, production inputs, customer trends, marketing, disease and pest control/livestock, market opportunities, prices. Market, and so on. So, because there is a transition of information through electronic equipment, it has revitalized the role of information services in information preparation, teaching, and assisting in the decision-making process.

Until lighting in the virtual world was born, which attempts to connect farmers with extension workers in real-time (Norton & Alwang, 2020), the idea was called cyber extension. The cyber extension came with the direction of emphasizing the sharing of information from extension workers to farmers to facilitate the acceptance of messages so that some farmers felt the ongoing increase in better attitudes as a community learning community teaching. Besides that, it is indispensable to have appropriate information media to support fast and effective information absorption. According to the character of the millennial farmer learning community, this is related to information media that can confirm the message said by the

extension worker. Based on the details listed above, this research will therefore describe several factors that affect the ability of self-help agricultural instructors to improve cyber extension media so that the results of this research can contribute to improving the ability of self-help agricultural extension workers.

Cyber Extension is an agricultural development communication process that combines computer-based information and communication technology programs with other communication elements to reach end-users. Through the implication of cyber extension by sharing obstacles and opportunities, prioritizing the development of agricultural development communication networks between all agricultural development actors, it is hoped that it can provide support for the revitalization of the lighting mechanism, which has been targeted since 2006 (Zulvera et al., 2014). In addition, the cyber extension is an agricultural lighting balcony that can be used for data service activities and the presentation of agricultural materials and information, especially in helping to make it easier and easier to provide information to information actors, especially field agricultural extension workers, whether civil servants, private, or self-help agricultural extension workers. Through this internet-based information media, an extension worker simply uploads the material he wants to tell the farmers, and in a few minutes, the material can be reached by several farmers to all corners of the village. Likewise, changes in agricultural technology, information on commodity prices, changes in agricultural development in various regions, and other agricultural information can be easily accessed through this online information media (Adjani, 2018).

METHOD

This research uses quantitative research through a survey method. The research population is self-help agricultural extension workers in West Java province aged 25 to 40 years, as many as 2195 people (BPPSDMP, 2016; (Indraningsih, 2018). Data analysis was carried out descriptively and inferentially using Structural Equation Models. The determination of the number of samples followed Slovin's calculation with an error of five percent. The sample is spread proportionally in three sub-districts, namely Sukamakmur 35, Gunung Putri 35, and Citereup 38, bringing 108 people. Determination of the sample using cluster random sampling technique (Sugiono, 2014).

This study has variables, namely the characteristics of the cyber extension media, the design of the cyber extension media and the characteristics of self-help extension workers as independent variables, and the capacity of independent agricultural extension workers as the dependent variable (Wijaya et al., 2019). The characteristics of cyber extension media are reflected

in complexity, compatibility, observability, and trialability. The characteristics of self-help extension workers are reflected in their age, gender, and educational background. The capacity of agricultural extension workers in developing extension media includes diagnosing the need for extension media for millennial farmers, designing cyber extension media, developing extension materials, designing extension media displays, and implementing cyber extension media.

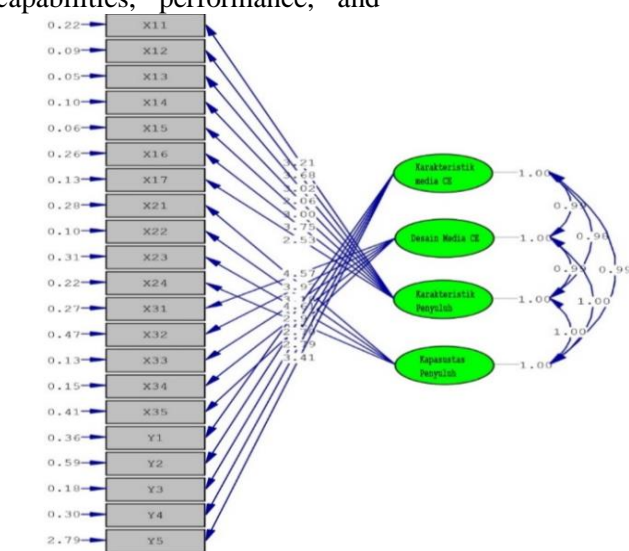
RESULTS AND DISCUSSION

The grouping of respondents in this study consisted of several independent extension workers who were spread from the guidance of the Jaya farmer group, Sukamakmur district, Bogor regency, West Java. In addition, there were extension workers under the guidance of the Thousand Islands KKP Service Sub-Department, which consisted of MSME movers and advanced farmers under the guidance of the Thousand Islands PKP Sub-dept. The number of respondents from the PKP Sub-dept. of self-help extension workers was 66.7%. Meanwhile, the number of respondents from the Bogor district, namely in the Sukamakmur sub-district, namely self-help extension workers from the Jaya farmer group, was 33.3%. Based on the quantitative prescriptive analysis results, it can be seen that of the 108 extension workers, most of the 75 extension workers (70%) said they could apply cyber extension media. This shows that the motivation to connect to Cyber Extension is high because there is environmental support where agricultural extension workers work.

Agricultural extension workers will be lazy to connect with Cyber Extension if the natural resources and human resources of farmers do not provide support in improving their capabilities, performance, and

profession as agricultural extension workers. Based on the theory described regarding several factors that affect the ability of extension workers to develop cyber extension media, therefore those that are exogenous are the characteristics of cyber extension media, cyber extension media design, characteristics of self-help extension workers, and the capacity of agricultural extension workers. The following is a description of the SEM analysis related to the ability of the instructor:

Figure 1 shows the CFA measuring mode, which has five constructions with 17 manifest dimensions for the ability of extension workers to develop cyber extension media. The loading factor value is directed towards the manifest factor in the middle of the line. The score behind the manifest factor is the standard error of each manifest factor. So that there is a systematic mode of characterizing the relationship between constructs or latent factors and describing latent factors that automatically or directly result in a shift in the value of other latent factors in the model (Byrne, 2013). A set of CFAs was developed as part of the analysis. The Prefix Strength Assessment presented earlier (see Figure 1) is the initial row of the theoretical array mode. The CFA results show that 2 of 3487.51 with 183 df means statistically $p < 0.05$, which recommends the suitability of using the SEM model. Byrne (2013) writes that two is very sensitive to sample size and often refers to poor concordance with large sample sizes. The extant concordance statistic reveals moderate concordance between the theoretical and data modes, slightly lower than the generally accepted score of 0.50 ($\chi^2/df = 1.13$). Figure 1 shows if there is a correlation between the five dimensions. The study has witnessed from the p-values. 0.000 or less than 0.05. Furthermore, the research results were analyzed by regression using several standards as follows:



Chi-Square=3487.51, df=183, P-value=0.00000, RMSEA=0.220

Figure 1. Structural Equation Models Characteristics of The Instructor's Ability

Table 1. Coefficients Statistic Substructural Model 1

Model	Standardized	t	sig.	r	r ²
<i>Sub Structural 1</i>					
(X ₁) media characteristics CE	0,16	1,84	0,03		
(X ₂) CE media design	0,24	2,61	0,01	0,59	0,35
(X ₃) characteristics of self-help extension workers	0,29	3,2	0,00		
<i>Sub Structural 2</i>					
(X ₁) CE media characteristics	0,27	3	0,00		
(X ₂) CE media design	0,32	4,07	0,00	0,83	0,69
(X ₃) characteristics of self-help extension workers	0,04	1,32	0,54		
(Y) Capacity of agricultural extension workers	0,4	6,32	0,00		

From the results of the analysis presented in table 1, the values obtained are: t1 = 1.84, p-value = 0.03 <0.05, or Ho is rejected. Thus there is an influence

between the characteristics of the CE media on the characteristics of self-help extension workers.

Table 2. Coefficients Statistic Substructural Model 1 & 2

Model	Unstandardized	
	B	Std. Error
<i>Sub Structural 1</i>		
(Constant)	3,49	0,94
(X ₁) media characteristics CE	0,18	0,11
(X ₂) CE media design	0,26	0,1
(X ₃) Characteristics of self-help extension workers	0,3	0,09
<i>Sub Structural 2</i>		
(Constant)	-50,9	6,12
(X ₁) CE media characteristics	2,62	0,65
(X ₂) CE media design	3,1	0,61
(X ₃) characteristics of self-help extension workers	0,37	0,61
(Y) Capacity of agricultural extension workers	3,62	0,57

Regression Model obtained:

$$Y = 3,49 + 0,18x_1 + 0,26x_2 + 0,3x_3$$

$$Z = -50,90 + 2,62x_1 + 3,10x_2 + 0,37x_3 + 3,62x_4$$

Hipotesis 1:

$$H_0 : \beta_1 \leq 0$$

$$H_1 : \beta_1 > 0$$

Table 3. ANOVA^a

Model	Regression	Residual	Total
SS	48.419,71	21.302,15	69.721,87
df	4	115,00	119,00
MS	12.104,93	185,24	
F	65,35		
Sig.	0.000 ^b		

$$H_0 : \beta_1 - \beta_2 - \beta_3 \leq 0$$

$$H_1 : \beta_1 - \beta_2 - \beta_3 > 0$$

From the table, it is obtained that the value of Fo = 65.35, DB = (4.00) p-value = 0.000 <0.05, Ho is rejected: Thus, the characteristics of the media, media design, characteristics of self-help extension workers, and the capacity of self-help agricultural instructors affect the ability of the instructor in developing media cyber extension.

From the results of the analysis presented in the Model Summary table, it is obtained that the value of R2 = 0.694, thus the characteristics of the media,

media design, characteristics of self-help extension workers, and the capacity of self-help agricultural instructors on the ability of extension workers in developing cyber extension media is 0.69 or 69% so that it can be it is said that 31% is influenced by other factors not found in this study.

Furthermore, this research is continued with path analysis modelling to test the contribution shown by the path coefficients on each path diagram of the causal relationship between variables or to determine the

direct and indirect dependence relationships between a set of variables.

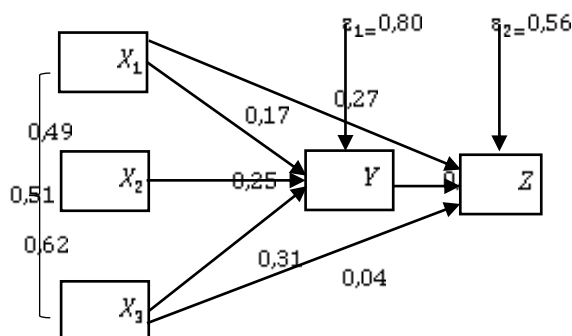


Figure 2. Path Analysis Results

$$\varepsilon_1 = \sqrt{1 - r_{Y,123}^2} = \sqrt{1 - 0,35} = 0,80$$

$$\varepsilon_2 = \sqrt{1 - r_{Z,Y,X123}^2} = \sqrt{1 - 0,69} = 0,56$$

The path analysis modelling used gets the following results: The direct effect between variables using online media (X1) on (Y) is 0.17. Based on these results, it means that the characteristics of this media have an impact of 17% on the capacity of the instructor. The media design variable (X2) on the capacity of the instructor (Y) has a direct effect of 0.25. Based on these results, the characteristics of this media have an impact of 25% on the ability of the instructor to develop CE. The family role variable (X3) on the capacity of the extension worker (Y) has a direct effect of 0.31. Based on these results, it means that online media impacts 31% of the instructor's ability to develop CE. The variable of using online media (X1) on the instructor's ability to develop CE (Z) has a direct effect of 0.27.

Indirect influence. Based on these results, it means that the characteristics of this media impact 20% on the instructor's ability in developing CE and the family role variable (X3) on the ability of the instructor in developing CE (Z) has a direct effect of 0.04. Based on these results, it means that the characteristics of this media have an impact of 4% on the instructor's ability to develop CE. The variable (X1) (X2) (X3) has an indirect effect through the Y variable of 0.41 or 41% (Z).

The extension is social engineering to make changes in society and change people's behavior to develop the soft skills of business actors (Siswanto, 2012). Self-help extension workers are public education educators who can develop cyber extension media. The use of cyber extension media can change social conditions in society (Fatimah, 2014). Media cyber extension makes it easy for extension workers in various aspects and to find information and more than that. Media cyber extension is a media that has information material on technological innovations that can be accessed by farmers and extension workers

wherever they are (Hendri et al., 2021). In addition to obtaining information, extension workers can send feedback on technological innovations by informing them of the successes and constraints of using these innovations in their location (Pengkajian et al., 2019).

The data from the study shows that self-help extension workers are dominated by productive age and have the opportunity to utilize cyber extension media, or as many as 63% of self-help extension workers are aged 30-58 years. This shows that productive age is the most significant part of using cyber extension media. So that the use of cyber extension media can be maximized, this finding is also following the research of D. Dzakiroh et al. (2021), which explains that there is a significant relationship between the age of the instructor who uses the media, non-formal education, personal experience, and the influence of other people who are considered necessary with the instructor's affective attitude towards cyber extension media. But there is no significant relationship between formal education and the affective attitude of the extension worker to the cyber extension website.

The subsequent finding describes the age of self-help extension workers, which has a very significant influence on the quality of the information provided to farmers or the community in changing the behavior of farmers. The age of self-help extension workers utilizing cyber extension media contributes to farmers' packaging messages and straightforward delivery methods. The cyber extension agent provides clear information on extension services to farmers, and the more excellent the opportunity to improve farmers' knowledge, attitudes, and skills to achieve better farming. Achieving the objectives of the agricultural extension will have an impact on increasing agricultural productivity, especially in the context of achieving community food security.

The use of gadgets/smartphones in increasing knowledge in agriculture can undoubtedly be very helpful in getting information quickly. However, the situation is insufficient, especially for farmers to admit that the work that requires them to continue in the agricultural field also makes it difficult for them to open their gadgets/smartphones. So farmers do not have enough time to surf the internet (Cahyono et al., 2020). The results of the data obtained also explain that the rural communication network system uses a comprehensive system to build effective communication but is constrained by the user. Therefore what is needed is an agricultural extension and non-formal education that must continue to accompany farmers in the village. By developing a rural communication system, farmers will have good access to information to increase their capacity to increase their agricultural productivity quickly.

The situation that arises because of intensive extension is an activity that is most expected to be able to replace the understanding, knowledge, and attitudes of farmers in making decisions (Sabir et al., 2018). Based on the research results in the field, data obtained if the intensity of lighting is lacking; therefore, the farmers' knowledge is slightly developed and optimal. In reality, many farmers still underestimate extension activities, so they do not optimize the strength of their human resources and want to improve and increase their respective knowledge. According to Perlof (2017), if lighting-intensive activities are an efficient step in increasing farmer knowledge, an increase in one's knowledge will improve one's attitude and understanding. This indicates that knowledge is necessary to develop citizen understanding following the research findings in the field. This research shows that understanding and knowledge partially together impact farmers' learning independence. Intensive lighting can affect a person in his perception shift depending on good knowledge based on the theory and experience of that person; therefore, lighting activities called facilities for farmers to get the information must be improved conceptually and adequately.

From the results of the study obtained, Cyber Extension has an effect on innovation in the use of extension media, which is quite efficient and effective because once uploading the extension material, a second later, the material can be read or downloaded by users around the world (Purwiyati et al., 2020). Cyber Extension still needs concrete and realistic steps to make this extension media effective to improve farmers' welfare (Kenkre et al., 2009). The existence of this internet-based extension media is a tool to facilitate work (Whitaker et al., 2018). extension workers but also a challenge to be studied and

explored more deeply by agricultural extension workers (Listiana et al., 2019).

CONCLUSION

Improvement of the working mechanism of cyber extension is one of the processes of efficiently improving the communication information network for agricultural development. The cyber extension can confront research, development, and discussion agencies with development disseminators (extensions), teachers, farmers, and other stakeholders who have information needs of other types and forms. Each stakeholder can be equally equipped to process, match, document, and synergize agricultural development users' needs on time and related. The information/development required by each stakeholder varies significantly in terms of the types (issues, resource strength, problem-solving, appropriate technology, and market price information), the form of the information (journals, news, mass media, leaflets, circulars) or streams (internet/mass media, libraries, publishers/publishers, extension workers, related agencies, or agencies integrating mechanisms) Some of the problems that stakeholders encounter in their opportunity to implement cyber extensions are: 1) Management (loyalty and regulations are not stable and limited managerial strength in ICT); 2) Infrastructure/facilities (unstable electricity supply and limited communication network, wide coverage area, and limited budget); 3) Human Resources (limited human resource capabilities in information and communication technology programs); and 4) Culture, namely the low culture of sharing and low awareness of documenting data. The implication of cyber extension tactics is to focus on optimizing the role of the Regency Information Agency as a centre for access to information based on information technology programs. The District Information Body acts as an intermediary between information sources at the centre and local stakeholders and integrating mechanisms. In addition to providing facilities for users and local stakeholders to access agricultural information, the Regency Information Agency can act as a collector of information (indigenous knowledge) from local information sources through the District Information Agency, which collects information while providing information material facilities for field extension workers in each hamlet.

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