

FACTORS THAT INFLUENCE BASIC CHEMISTRY STUDENT SATISFACTION WITH INTERACTIVE LEARNING VIDEOS USING FACTOR ANALYSIS

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Abstract

Learning video media is one of the supporting media used to increase students' motivation in carrying out the learning process and can increase teacher satisfaction in the world of education. This study aims to analyze the factors that affect student satisfaction with interactive learning videos using descriptive statistical analysis and inferential statistics (factor analysis) and research data derived from filling out questionnaires for students taking the Basic Chemistry course (KIMD4110). The research scale used is the Likert scale with a total of 146 respondents who have filled out the questionnaire and consists of 15 indicators. Based on the level of satisfaction of participants, it was found that 12 of the 15 indicators of students gave an appreciation of agreeing and strongly agreed with a percentage of more than 80%. Whereas the other 3 indicators gave an appreciation of 68-75% and based on factor analysis formed 2 factors representing 15 indicators that affect satisfaction students to the (KIMD4110) interactive learning video namely the structure of video content and video innovation quality.

Keywords: factor analysis, learning video, online learning, student satisfaction

1 INTRODUCTION

Many universities are adapting and innovating using online media in delivering teaching to their students. According to (Dumford & Miller, 2018) there is a significant relationship between taking online learning systems and the involvement of students in the first year and above. Many students take online learning and are more involved in quantitative thinking than if they take part in collaborative learning.

According to (Alawamleh et al., 2022) shows that students prefer face-to-face classes compared to online classes because for them online classes have many obstacles such as low understanding of the content of the material, motivation, communication that exists between instructors and students, and their feelings of isolated when participating in online learning. Therefore teachers are encouraged to be more interactive with their students, for example applying various other media that are used optimally in conducting learning such as video, audio, online group instant messaging, and in parallel using online platform channels, email, and so on.

According to (Beheshti et al., 2018; Wardhana & Muhammad, 2021) Most students revealed that online learning with video media is a great way to increase their motivation in listening in addition to using audio media and can improve learning outcomes and can increase teacher satisfaction in education..

According to (Indrawari et al., 2020) states that teachers must be able to increase their professionalism through the development of learning media so that the development carried out can answer students' problems in the learning process such as making appropriate and fun learning video designs. This learning video is expected to serve as a guide for them to carry out learning both in the business and industrial world later.

Based on some of the results of the studies above, it can be concluded that the online learning system will be more effective if the online learning system is video-based because it will improve student learning outcomes. The effective use of video as an educational tool can be increased by considering three elements, namely how to manage cognitive content in videos, how to maximize student engagement with videos, and how to promote learning from videos. One university that is also developing learning videos is the Univeritas Terbuka (UT) (Hasanah et al., 2022).

Several interactive learning videos produced by UT are distributed to students, including by linking the videos to the student tutorial application page. Students who take part in online tutorials and have studied the contents of the material and videos linked on the UT e-learning page are asked for a certain period to respond to learning videos, especially in Basic Chemistry courses (KIMD4110). This response is used as evaluation material in the development of interactive learning videos for other subjects and as a way to improve the quality of interactive learning videos at UT. This study aims to analyze students' perceptions of interactive learning videos and establish latent factors that influence student satisfaction with interactive learning videos for Basic Chemistry courses (KIMD4110) using factor analysis.

2 METHODOLOGY

The research was conducted at the Univeritas Terbuka (UT) using a quantitative approach. The research respondents were students who took the Basic Chemistry course (KIMD4110) using an online questionnaire linked to the UT eLearning application in April-June 2022 and a total of 146 respondents who responded to the survey consisting of 15 variables. After the data was collected, descriptive and inferential statistical analysis was carried out, for inferential statistics using factor analysis. Descriptive statistical analysis is used to analyze the results of research on students' perceptions of interactive learning videos and factor analysis is used to establish latent factors that influence student satisfaction with interactive learning videos for Basic Chemistry courses (KIMD4110). Data characteristics and assessment criteria from this study can be seen in tables 1 and 2.

Table 1. Characteristics of Research Data

No	Variable	Scale	Category
1	Content		
2	Destination		
3	Interaction		
4	Motivation to learn		
5	Collaborative		
6	Case study		
7	Application	Ordinal	1 = strongly disagree
8	Video Size		2 = disagree
9	Letter		3 = neutral
10	Language		4 = agree
11	User Friendly		5 = strongly agree
12	Ease to Access		
13	Menu		
14	Information		
15	Independence		

Table 2. Assessment Criteria

Interval Class	Criteria
1,00 - 1,79	Very Bad
1,80 - 2,59	Bad
2,60 - 3,39	Enough
3,40 - 4,19	Well
4,20 - 5,00	Very good

Table 1 is the characteristics of the data with a total of 15 variables, this variable is used to analyze students' perceptions of interactive learning videos and establish latent factors using factor analysis. Meanwhile, table 2 shows that there are 5 classes of assessment criteria intervals.

3 FINDINGS AND DISCUSSION

The following is a descriptive statistical analysis which can be seen in Figure 1.

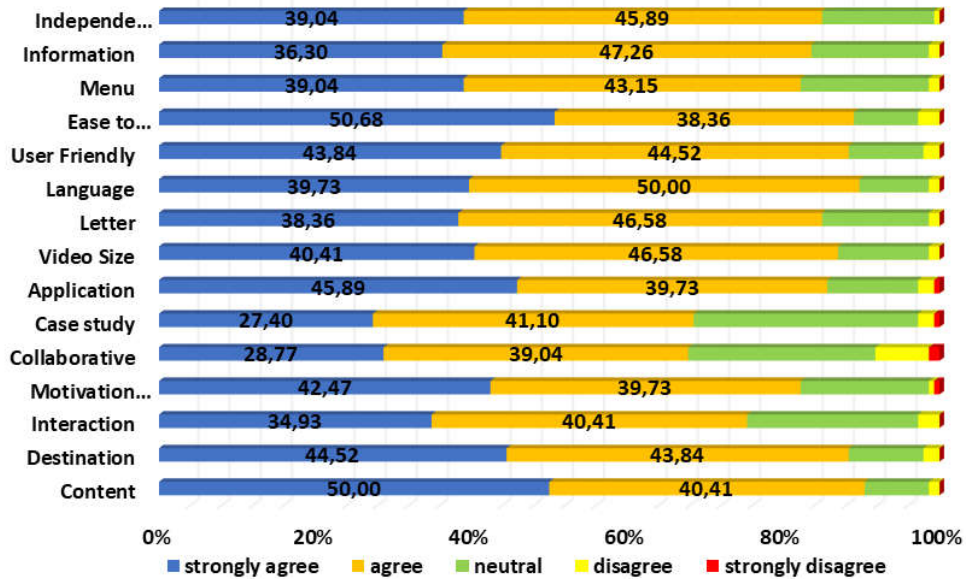


Figure 1. Percentage of assessment criteria on all variables

Based on the level of satisfaction of participants in figure 1, it was found that 12 of the 15 indicators of students gave an appreciation of agreeing and strongly agreed with a percentage of more than 80% yaitu Content, Destination, Motivation to learn, Application, Video Size, Letter, Language, User Friendly, Ease to Access, Menu, Information, and Independence. Whereas the other 3 indicators gave an appreciation of 68-75% yaitu Interaction, Collaborative, and Case study.

Validity and Reliability Test

The instruments in this study were tested for validity and reliability. The validity test is used so that the instruments in this study are valid. The results of the validity test decision if $r_{count} > r_{table}$, then the conclusion is that the item is valid and vice versa. The reliability test was carried out to test the consistency of the targets as measured by the Cronbach alpha formula. In general, Cronbach's alpha value is greater than 0,7, meaning it is reliable, and if the α value is high, it indicates that the items in the study are highly correlated (Shrestha, 2021).

Table 3. Validity Test

No	Variables	R Count
1	Content	0,762
2	Destination	0,748
3	Interaction	0,726
4	Motivation to learn	0,767
5	Collaborative	0,680
6	Case study	0,665
7	Application	0,628
8	Video Size	0,780
9	Letter	0,789
10	Language	0,853
11	User Friendly	0,799
12	Ease to Access	0,743
13	Menu	0,786
14	Information	0,808
15	Independence	0,833

Table 3 explains that the validity test of data is declared valid if the value of $r_{count} > r_{table}$, it is known that the value of $r_{table} = r_{146-2} = 144 = 0,1625$. Based on Table 3 the values of all variables have $r_{count} > r_{table}$, it can be concluded that the 15 variables are declared valid.

Table 4. Reliability test

Cronbach's Alpha	N of Variabels
0,945	15

Table 4 explains that the reliability test of data is stated to be reliable if the alpha value is $> 0,7$. In Table 4 it is found that the alpha value = $0,945 > 0,7$. So it can be concluded that the 15 variables are declared reliable.

Tabel 5. KMO and Bartlett's Test

Kaiser Meyer Olkin Measure of Sampling Adequacy.		0,918
Bartlett's Test of Sphericity	Approx. Chi-Square	1780,902
	df	105
	Sig.	0,000

Table 5 can be seen that the feasibility test of a variable in factor analysis is carried out by looking at the results of the KMO and Bartlett's Test values. In Table 5 it can be seen that the value of $KMO = 0,918 > 0,5$ and Bartlett's Test of Sphericity (Sig.) $0,000 < 0,05$ so it can be concluded that this factor analysis technique can be continued.

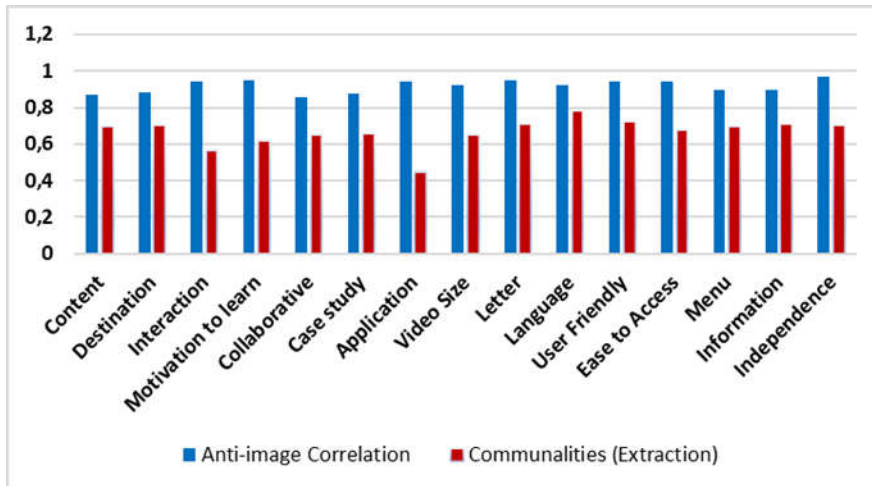


Figure 2. Anti-image Correlation and Communalities

The results of the anti-image correlation in Figure 2 are used to determine which variables are appropriate for use in factor analysis, provided that the resulting MSA value is $> 0,5$. Based on Figure 2, it is found that the MSA values for all variables are $> 0,5$, so it can be concluded that the 15 variables are feasible for factor analysis. In addition, when viewed from the Extraction value, all variables have an Extraction value $> 0,5$ so it can be concluded that all variables can be used to explain factors.

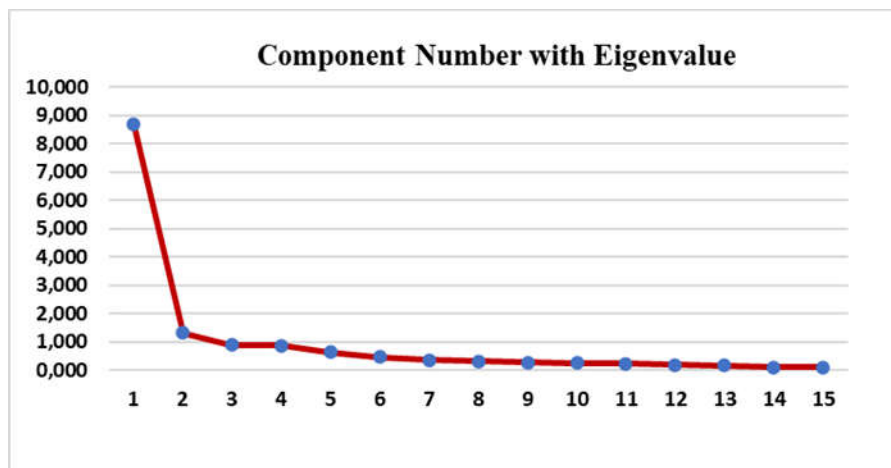


Figure 3. Scree Plot

Figure 3 the scree plot results show that the number of factors formed is 2 (two) component points that have an Eigenvalue > 1 so that 2 factors can be formed in the data.

Table 6. Rotated Komponen Matrix

Variables	Component	
	1	2
Content	0,376	0,748
Destination	0,335	0,769
Interaction	0,419	0,626
Motivation to learn	0,489	0,619
Collaborative	0,204	0,780
Case study	0,179	0,792
Application	0,635	0,200
Video Size	0,732	0,345
Letter	0,786	0,303
Language	0,787	0,407
User Friendly	0,787	0,320
Ease to Access	0,795	0,210
Menu	0,787	0,285
Information	0,770	0,341
Independence	0,647	0,537

Table 6 it can be explained that the 15 variables above are divided into 2-factor groups with the group division as follows:

1. Factor group 1 has a strong and positive correlation with the variables Application, Video Size, Letter, Language, User Friendly, Ease to Access, Menu, Information, and Independence. This factor can be called the video innovation quality factor
2. Factor group 2 has a strong and positive correlation with the variables Content, Destination, Interaction, Motivation to learn, Collaborative, and Case study. This factor can be called the structure of video content.

Table 7. Transformation Matrix Components

Components	1	2
1	0,780	0,626
2	-0,626	0,780

Table 7 shows the correlation value in components 1 and 2 of 0,780 and because the 2 components have a correlation value of $> 0,5$, the 2 factors formed are worthy of being summarized into the variables analyzed.

4 CONCLUSION

Based on the level of satisfaction of participants, it was found that 12 of the 15 indicators of students gave an appreciation of agreeing and strongly agreed with a percentage of more than 80%. Whereas the other 3 indicators gave an appreciation of 68-75%. The results of the analysis using factor analysis obtained 2 groups of latent factors that influence student satisfaction with interactive learning videos for Basic Chemistry courses (KIM4110), namely Group 1 is called the video innovation quality factor which consists of the variables Application, Video Size, Letter, Language, User Friendly, Ease to Access, Menu, Information, and Independence. Factor group 2 is called structure of video content which consists of the variables Content, Destination, Interaction, Motivation to learn, Collaborative, and Case study. This factor can be called the structure of video content.

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