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## The Implementation of Integrated Video-Based Lectures in the Learning Management System

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### Abstract:

**Aim:** This study aimed to determine the effectiveness of video-based lectures integrated with the Learning Management System (LMS) among the Bachelor of Secondary Education major in Science students from the Caraga State University, Butuan City. Furthermore, the goal of the study was to identify the learning challenges that arise from the video lectures based on the multimedia design principle of the video materials.

**Methodology:** This study used the Sequential Explanatory Mixed Approach, which is a form of study design in which Qualitative and Quantitative techniques are applied to types of questions, research methodologies, data gathering, and analysis procedures, and findings to identify the learning challenges that arise from the video lectures based on the multimedia design principle of the video materials and how learning resources such as internet connectivity and educational technology influence the learners' learning experiences.

**Results:** Data showed that the video lectures' qualities are at a satisfactory level, while internet availability, and educational technology hampered video lectures. The average percentage viewed exhibits a significant negative association with the duration of the video lectures, indicating that the average percentage viewed falls as the duration of the video lectures increases. It suggests that shorter videos usually hold more attention. Four themes were thematically analyzed, which are: video lecture's duration in which the challenges encountered in the use of video-based lectures. Similarly, long video durations, such as a 50-minute lecture, are criticized as being long to maintain a student's attention, citing various researchers' statements that a student's attention span drops drastically after 10-15 minutes; Internet connectivity issues in which the challenges in viewing video lectures due to poor internet connectivity and limited data cap; Limited Gadget internal storage; Difficulty in understanding the content. But still, the students have a positive attitude toward utilizing the LMS.

**Conclusion:** The average percentage of video lectures viewed decreases as their length increases. Furthermore, this indicates that students are more likely to hold their attention while watching short video lectures. Lengthy video lectures pose a challenge to the transmission of information. It suggests that lengthy video lectures are detrimental to students' focus and attention. Internet access may be difficult if a student lives in a rural area. Many rural areas lack the necessary infrastructure to support high-speed internet access. When students use video lectures, they can run into problems with educational technology, especially with internal storage. If the video is too big, it will take up too much space on the device's internal storage. Also, LMS is inaccessible when the power goes out or when there is a sudden influx of users. The lack of monitoring and consultation regarding students' confusion about video lecture content may hinder their learning.

**Keywords:** *learning management system, video-based lectures*

### INTRODUCTION

Video-based lectures have long been an educational aid that assists the teaching and learning process. It revolutionized the process of teaching and learning, making abstract concepts and intangible objects be demonstrated comprehensively (Ho et al., 2017). The application of media within video lectures allows learners to process information received through visual and auditory channels (Lange & Costley, 2020; Amihan & Sanchez, 2023; Dizon & Sanchez, 2020; Salendab & Akmad, 2023; Salendab & Cogo, 2022; Sanchez, 2023a). These are accomplished by organizing information in working memory and shifting it to long-term memory. It should ideally result in more schema building and, as a result, a better grasp of the material (Mayer et al., 2014).



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Due to the considerable advances in technologies, most notably the growing convenience of internet connectivity at home and the massive use of institutional and personal devices such as cell phones and laptops (Muñoz & Sanchez, 2023; Salendab & Dapitan, 2021a; Salendab, 2023), the use of video for educational purposes has grown in acceleration (Mohammadi et al., 2020). Furthermore, open-source Learning Management Systems (LMS) such as Moodle make distanced learning meet its end (Perkins & Pfaffman, 2006). In fact, during the COVID-19 pandemic, video-based instruction was used in the Philippines and was disseminated online with the use of technology as support instructional resources for teachers and learners (Batilantes, 2021).

Although there are evident advantages to employing visual and auditory media in video lectures, online teachers must be aware of the possible problems associated with inefficient media distribution (Sanchez, 2023b; Sanchez, 2020a). Issues with information transmission might occur, mainly when the media presented restricts students' focus, attention, interest, and involvement (Koumi, 2013). Also, too much working memory load may contribute to inefficient delivery of information (Mayer et al., 2014).

In a study conducted by Casillano (2019), it turned out that a small percentage of students have an internet connection, making it difficult for them to use the e-learning platform. On the other hand, the educational technology required for online education was a further challenge experienced by some students. Students have trouble participating in online classes because they lack the necessary educational technology (Sarkar et al., 2021; Agustina et al., 2020; Carvajal & Sanchez, 2023; Salendab & Dapitan, 2021b; Salendab & Laguda, 2023). Nevertheless, instructors conducting online classes should evaluate course components owing to limited bandwidth, difficulties with internet access, and educational technologies.

Guo et al. (2014) claim that shorter videos are usually more interesting. Their research was based on data from 6.9 million video viewing sessions and revealed that the most concise videos had the most engagement. In another study by Nielsen (2020), it was found that the length of the video lectures strongly correlates negatively with the students' watch per viewing setting. It suggests that shorter videos generally hold the attention of the students viewing the videos.

With the emergence of video-based lectures for online learning, there must be considerations among learners equipped with various technological tools for online classes. Educators must consider the quality of video-based lectures, internet connectivity, and educational technology available to their learners.

## Research Questions

This study identified the effectiveness of video-based lectures for online learning among the Bachelor of Secondary Education, Major in Science students. Particularly, it sought answers to the following questions:

1. What is the level of challenges encountered in the use of online video lectures in terms of: (i) educational technology; and (ii) internet connectivity?
2. What is the student's level of learning satisfaction in the use of online video lectures in terms of: (i) qualities of the video lectures; and (ii) learner-to-content interaction?
3. What is the YouTube Analytics of the video lectures in terms of: (i) duration of the videos; and (ii) average percentage viewed?
4. Is there a significant association between the duration of the videos and the average percentage viewed?
5. What are the challenges encountered in the use of video-based lectures?
6. Based on the study's result, what are the supplementary inputs for the continuing development and enhancement of the LMS?

## Hypothesis

Given the stated research problem, the following hypotheses were tested on 0.05 level of significance:

$H_0$ : There is no significant association between the duration of the videos and the average percentage viewed.

$H_a$ : There is a significant association between the duration of the videos and the average percentage viewed.

## METHODS

### Research Design

Quantitative and qualitative data were collected and analyzed utilizing a sequential explanatory mixed methodology. It is the corroboration of the quantitative and qualitative methods (Dhanapati, 2016). It is a form of study design in which qualitative and quantitative techniques are applied in types of questions, research methodologies, data gathering and analysis procedures, and findings. It helps explain the quantitative data by using qualitative follow-up data at a more in-depth level.



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### Population and Participants of the Study

This study was conducted at Caraga State University during the academic year 2022-2023 in two semesters. The 54 participants of the study were selected from BSED Science enrolled in Meteorology (Physics 108).

### Sampling Design

Purposive sampling was used by the researcher. Purposive sampling is a non-probability approach in which the researchers judge the participants for the sample. The sampling technique was employed as only a few primary data sources can contribute to the study with the criteria that the participants are BSED Science enrolled in Meteorology (Physics 108). The class platforms are in synchronous and asynchronous classes using the institutionalized Learning Management System.

### Instrument

The research instrument has undergone expert validation as the researchers adapted online survey questionnaires, interview questions, and focused group discussions. After obtaining quantitative results, a qualitative phase was conducted to understand the quantitative data better. The researchers formulated open-ended questions to interpret and explain the quantitative data analysis outcomes of the participants' learning experiences in video-based lectures. These questions elicited narrative responses from the participants. The questions also asked about the participants' experiences with how these challenges influence their learning. Additional questions were asked, including how these learning challenges were addressed, how educators can best improve the video-based lectures for online classes, and their thoughts about using them for online learning. The research tool was administered to the selected Bachelor of Secondary Science students at Caraga State University, Butuan City. Survey questionnaire validation is significant to confirm that the instrument meets the study's goals.

### Data Collection

The quantitative and qualitative data were gathered, collated, analyzed, and corroborated following the study's objectives and abiding by the protocols in the conduct of research and ethical considerations. The researchers wrote a letter requesting permission to conduct the study to the Bachelor of Secondary Education Chairperson. After receiving approval, the researchers asked permission from the students to partake in the data gathering of this study. Next, research questionnaires were administered to the participants through Google Forms. The students' Youtube analytics was obtained with the students' permission and the chairperson of the Bachelor of Secondary Education. After collecting the quantitative data, the researchers obtained the qualitative data. Focus Group Discussion (FGD), a qualitative research method and data-gathering approach, was employed in the study. A group of participants discussed their learning experiences about using video-based lectures for online learning in-depth, supervised by the researchers.

### Treatment of Data

The following statistical tools were used to gather the data:

Pearson's correlation coefficient ( $r$ ) this tool was used to treat the significant association between the students' Youtube analytics regarding the video-based lectures' duration and the average percentage viewed.

Mean. This tool was utilized to determine the level of satisfaction with video-based lectures and the level of challenges encountered in terms of the student's educational technology and internet connectivity.

Assessed indicators for the student's level of difficulty with their internet connectivity and educational technology used for the online class and the students' learning satisfaction with the qualities of the video-based lectures and their interaction with these instructional materials, ranging from 1 (lowest score: very low) to 5 (highest score: very high).

The database from the student's responses to the survey and FGD was assembled for data analysis. The qualitative methodological assumption supplied several forms of information, including extensive views on the participants' remarks and output. Moreover, the researchers defined them in detail as the step of the technique when the researcher extracted themes from qualitative data sources.

### Ethical Considerations

The researcher followed the basic research protocols in conducting the research involving ethics in the study complied with to protect the participant's identity and confidentiality and institutions engaged in conducting the study. The researchers wrote a letter of permission and an interview consent letter to the participants and let them sign the letters before conducting the study. Furthermore, the researchers conducted orientation and focused group discussions with the participants upon conducting the study.



## RESULTS and DISCUSSION

### The level of challenges encountered in the use of online video lectures in terms of educational technology.

**Table 1**

*Mean Distribution of the level of challenges encountered in the use of online video lectures in terms of educational technology*

Indicators	Mean	Description
1. Educational technology is unavailable for viewing video-based lectures.	2.62	Neither agree nor disagree
2. Educational technology features are not compatible with the format of video-based lectures.	2.47	Disagree
3. Viewing video-based lectures is difficult due to the educational technology's screen size.	2.56	Neither agree nor disagree
4. Educational technology's storage is insufficient to store the video-based lectures or applications required to view them.	2.85	Neither agree nor disagree
5. Access to video-based lectures is interrupted due to the educational technology's short-lived battery life.	2.71	Neither agree nor disagree
<b>Overall Mean</b>	<b>2.62</b>	<b>Neither agree nor disagree</b>

Legend: 4.50-5.00 Strongly agree    3.50-4.49 Agree    2.50-3.49 Neither agree nor disagree  
 1.50-2.49 Disagree    1.00-1.49 Strongly disagree

Table 1 shows the level of challenges encountered in the use of online video lectures in terms of educational technology. Data shows that "Access to video-based lectures is interrupted due to the educational technology's short-lived battery life" which has the mean of 2.71. This connects to the study of Gocotano et al., (2021) that the learners' educational technologies were not entirely conducive to viewing the online video lectures. Reliable educational technology is necessary for online education (Salendab, 2021; Sanchez, 2020b; Sanchez, et al., 2022). Students must have access to high-quality smartphones, laptops, and PCs to keep up with the activities.

### The level of challenges encountered in the use of online video lectures in terms of internet connectivity.

**Table 2**

*Mean Distribution of the level of challenges encountered in the use of online video lectures in terms of internet connectivity*

Indicators	Mean	Description
1. An unstable internet connection interrupts me from accessing the online video-based lectures.	3.21	Neither agree nor disagree
2. Data balance is insufficient for viewing the online video-based lectures.	3.15	Neither agree nor disagree
3. Slow internet connectivity due to geographic location or weather conditions made it difficult for me to access the online video-based lectures.	3.56	Neither agree nor disagree
4. Internet connectivity is available far from home only.	2.82	Neither agree nor disagree



5. Internet connectivity is disrupted when a power interruption occurs 3.76 Neither agree nor disagree

**Overall Mean****3.30****Neither agree nor disagree**

Legend: 4.50-5.00 Strongly agree 3.50-4.49 Agree 2.50-3.49 Neither agree nor disagree  
 1.50-2.49 Disagree 1.00-1.49 Strongly disagree

Table 2 shows the level of challenges encountered in the use of online video lectures in terms of internet connectivity. Result show that "Slow internet connectivity due to geographic location or weather conditions made it difficult for me to access the online video-based lectures" which has the mean 3.76. Which connects to the study of Dridi et al. (2020) online class difficulties may be attributed to limited bandwidth and weak internet access. Online instructors have been forced to evaluate course components to compromise with this challenge.

### The student's level of learning satisfaction in the use of online video lectures in terms of the quality of the video lectures.

**Table 3**

*Mean Distribution of the student's level of learning satisfaction in using online video lectures in terms of the qualities of the video lectures*

Indicators	Mean	Description
1. The videos were of enough length.	3.74	Agree
2. Pre-viewing activities were provided to help me understand new concepts.	3.79	Agree
3. Post-viewing activities were provided, which extended and consolidated my learning.	3.88	Agree
4. The narration messages of the video are audible.	3.94	Agree
5. Music and sound effects for instructional purposes are effective and appropriate.	3.94	Agree
6. Visual effects to highlight story and topic are used appropriately.	3.94	Agree
7. Captions were provided for sufficient length of time.	3.79	Agree
8. Caption or text is visibly presented.	3.76	Agree
9. The lesson presentation is varied and logical.	3.91	Agree
10. The video lectures' pacing is enough to hold my attention and stimulate my interest.	3.88	Agree
<b>Overall Mean</b>	<b>3.86</b>	<b>Agree</b>

Legend: 4.50-5.00 Strongly agree 3.50-4.49 Agree 2.50-3.49 Neither agree nor disagree 1.50-2.49 Disagree 1.00-1.49 Strongly disagree

Table 3 shows the student's level of learning satisfaction in the use of online video lectures in terms of the quality of the video lectures. Results show that the narration messages of the video are audible, Music and sound effects for instructional purposes are effective and appropriate, Visual effects to highlight story and topic are used appropriately which has the mean of 3.94. which connects to the study of Nielsen, (2020) that students were most concerned about the videos' length among the other video criteria. Shorter videos tend to hold the attention of the students. Thus, if students were provided with lengthy videos, it might drain their attention. They were subsequently causing problems with transmitting information effectively.



### The student's level of learning satisfaction in the use of online video lectures in terms of learner-to-content interaction.

**Table 4**

*Mean Distribution of the students' level of learning satisfaction in the use of online video lectures in terms of the learner-to-content interaction*

Indicators	Mean	Description
1. It is easy understanding the class content	3.88	Agree
2. It stimulates my interest in the lesson.	3.82	Agree
3. It bridges the relevance between the new concepts or knowledge with my experience or existing knowledge.	3.79	Agree
4. It is appropriate to my level of knowledge.	4.00	Agree
5. It helps me in focusing on the lesson.	3.76	Agree
<b>Overall Mean</b>	<b>3.85</b>	<b>Agree</b>

Legend: 4.50-5.00 Strongly agree 3.50-4.49 Agree 2.50-3.49 Neither agree nor disagree 1.50-2.49 Disagree  
1.00-1.49 Strongly disagree

Table 4 indicates the student's level of learning satisfaction in the use of online video lectures in terms of learner-to-content interaction. Results show that "It is appropriate to my level of knowledge". Which has the mean of 4.00. which connects to the study of Mayer (2014). Most students believed video lectures were valuable and practical for online classes. In his study, the multimedia element of the video lectures results in a better grasp of the material.

### The Youtube Analytics of the video lectures in terms of duration of the videos and average percentage viewed.

**Table 5**

*Youtube Analytics of the video lectures in terms of duration and average percentage viewed of the videos*

Lessons	Lesson Videos	Duration (minutes)	Average Percentage Viewed (%)
1	Introduction to Meteorology	21.03	38.2
2	Radiant Energy and Temperature	15.25	39.4
	Energy and Energy Transfer	9.97	47.4
	Absorption, Emission, and Equilibrium	7.5	47
3	Air Temperature	41.23	19
4	Humidity	14.88	36.7
	Condensation	12.37	46.5
	Clouds	14.77	34.8

Table 5 shows the Youtube Analytics of the video lectures in terms of duration of the videos and average percentage viewed. Results show that among the video lectures, "Energy and Energy Transfer," with a video duration of 9.97 minutes, has the greatest of 47.4 average percentage viewed. Which connects to the study of



Guo et al. (2014), which indicates that the length of video lectures is critical. According to the study's findings, shorter videos are usually more interesting because they do not bore the viewers. Furthermore, in another study conducted by Nielsen (2020), it was found that the length of the video lectures has a strong negative correlation with the students' watched per viewing setting. It suggests that shorter videos generally hold the attention of the students viewing the videos.

### The correlation analysis between the duration of the videos and the average percentage viewed.

**Table 6**

*Correlation Analysis between the duration of the videos and the average percentage viewed*

Variables	r-value	p-value	Interpretation	Decision
Duration of the videos				
Average percentage viewed	-.932*	.0007*	Significant	Reject $H_0$

Level of significance at 0.05

Table 6 presents the test result of a significant association between the duration of the video lectures and the average percentage viewed. The test revealed that the duration of the video lectures has a significant negative relationship with the average percentage viewed ( $r = -.932$ ,  $p < 0.005$ ). It means that as the duration of the video lectures increases, the average percentage viewed decreases. The same finding is also reflected in the study conducted by Nielsen (2020), where it was found that there is a negative link between the length of video lectures and the watch time of the students. This finding may explain why students tend to pay more attention to shorter videos. Moreover, Guo et al. (2014) claim that the length of the video lectures is essential. Their study showed that shorter videos are usually more interesting as it does not drain the viewers' interest.

### Theme 1: Video Lectures duration

**Table 7**

*Initial Codes No. 1 and 2*

Initial Code	No. of Participants Contributing (N = 9)	No. of Transcript Excerpts Assigned	Sample Quote
Short attention span and loss of interest	1	3 - 4	"My attention span will only last for 20 mins to 30 minutes, so usually I got bored watching those video lectures." (R1)
Video lectures that are complex and have too much information covered	2	28 - 31	"Since it is too lengthy, it's hard for us to comprehend the transition of lessons from start to end. Also, because there is too much information that needs to assimilate, we tend to lose interest in further discussions and lose interest on further watching it." (R2)

The respondents conveyed that one of the significant challenges in using video lectures is when it is lengthy. As stated by respondent 1,

"My attention span will only last for 20 mins to 30 minutes, so usually I got bored watching those video lectures" (R1, Line 3 - 4).

Due to the long duration of the video lectures, students had a hard time processing the information covered. It resulted in cognitive overload for the learners. As mentioned by respondent 2



"Since it is too lengthy, it is hard for us to comprehend the transition of lessons from start to end. Also, because there is too much information that needs to assimilate, we tend to lose interest in further discussions and lose interest on further watching it" (R2, Line 28 - 31).

As to the challenges encountered in the use of video-based lectures. Similarly, long video durations, such as a 50-minute lecture, are criticized as being long to maintain a student's attention, citing various researchers' statements that a student's attention span drops drastically after 10-15 minutes (Bradbury, 2016). Such findings would justify the TED (Technology, Entertainment, and Design) strategy of an 18-min time constraint. It would seem illogical and ineffective to subject students to a 50-minute lecture if, as suggested, a student can only concentrate intellectually for 15 minutes. Thus, the students are struggling with containing their interest and attention towards lengthy video lectures. It resulted in students just plainly watching instructional videos, which could unlikely foster deep learning.

## Theme 2. Internet connectivity issues

**Table 8**

*Initial Codes No. 3, 4, and 5*

Initial Code	No. of Participants Contributing (N = 9)	No. of Transcript Excerpts Assigned	Sample Quote
Problems with internet connection	2	26 - 27	"Due to slow internet, I cannot access it immediately, and sometimes it kept on loading mode which I hate the most and affected my focus." (R2)
Problems with Geographical location	2	52 - 53	"Unlike the internet connectivity I had during my time studying at the campus, which is fair, I had difficulty securing an internet connection at our home when distance learning started." (R3)
Limited internet bandwidth	2	77 - 78	"There are some lengthy videos that can't be finished in one seating. Sometimes, I get interrupted in viewing these videos when my data connection run out." (R4)

Table 8 shows the theme in Challenges in viewing video lectures due to poor internet connectivity and limited data cap. Respondent respondents 2 and 3 that "Due to slow internet, I cannot access it immediately, and sometimes it kept on loading mode which I hate the most and affected my focus" (R2, Line 26 - 27).

Furthermore, "It distracts me when I do not have the stable internet connection, especially when browsing several videos" (R3, Line 58 - 59).

Furthermore, respondent 4 stated that "There are some lengthy videos that can't be finished in one seating. Sometimes, I get interrupted in viewing these videos when my data connection run out" (R4, Line 77 - 78).

This is related to the study conducted by Casillano (2019). It turned out that a large percentage of the students have difficulty with internet connectivity. On top of that, according to the ABS-CBN News (2020), the Department of Education reported that unstable mobile or internet connection is the main factor that could hinder a child's ability to learn through remote education. In the DepEd's Learner Enrollment and Survey Form, 6.9 million parents and guardians voiced displeasure with their mobile or internet connection. Throughout the 45-day enrollment process in public schools, which ended on July 15, parents and guardians filled out the survey form. Private school parents' reactions were also noted. It implies that accessibility to the video lectures uploaded online by the instructors heavily relies on the strength of the internet connectivity of the students, thus, affecting the students' quality of learning.





**Theme 3. Limited Gadget internal storage**

Table 9 shows the Difficulty with accessing the video lectures due to issues with limited internal storage and LMS. Respondents 6 states that,

*"I had trouble with the specification of the mobile phone, such as the phone storage. I cannot download videos all at once, especially if the video has a large file size"* (R6, Line 117 – 118).

Respondents 5 also stated that *"My cellphone has limited storage. Whenever I had video lessons to download, I had to delete some of my files to reserve space. Also, fully stored mobile phone storage makes the*

**Table 9**  
**Initial Codes No. 6, 7, and 8**

Initial Code	No. of Participants Contributing (N = 9)	No. of Transcript Excerpts Assigned	Sample Quote
The limited internal storage of educational technology	2	117 - 118	<i>"I had trouble with the specification of the mobile phone, such as the phone storage. I cannot download videos all at once, especially if the video has a large file size."</i> (R6)
Interrupted viewing and inaccessible lecture videos	3	135 - 137	<i>"Video lectures are unavailable sometimes when the LMS crashes. When this happens, I would be delayed in viewing the video lectures. Hence, I had to take extra time to view the missed video lectures."</i> (R7)
Delayed learning	1	155 - 158	<i>"There are some instances when I get interrupted when watching video lectures. When the LMS site crashed, my activity in the learning platform would be halted, including watching the video lectures. I get frustrated when this happens because I get lost in processing the information the videos elaborated."</i> (R8)

*gadget laggy"* (R5, Line 100 – 101).

Respondent 7 also stated that *"Video lectures are unavailable sometimes when the LMS crashes. When this happens, I would be delayed in viewing the video lectures. Hence, I had to take extra time to view the missed video lectures"* (R7, Line 135 – 137).



Furthermore respondents 8 also stated that *"There are some instances when I get interrupted when watching video lectures. When the LMS site crashed, my activity in the learning platform would be halted, including watching the video lectures. I get frustrated when this happens because I get lost in processing the information the videos elaborated"* (R8, Line 155 – 158).

This is related to the study of Cabrera (2022). There are several leads as to why LMS crashed. Such factors may include external issues beyond the LMS site administrator. When there is a power interruption in the area at which LMS components are monitored by the LMS site administrator, which is inside the campus, in this case, the internet address of the LMS site will not be discoverable. Also, the sudden influx of users would make it hard for the LMS site to manage the data traffic.

#### Theme 4. Difficulty in understanding the content

**Table 10**

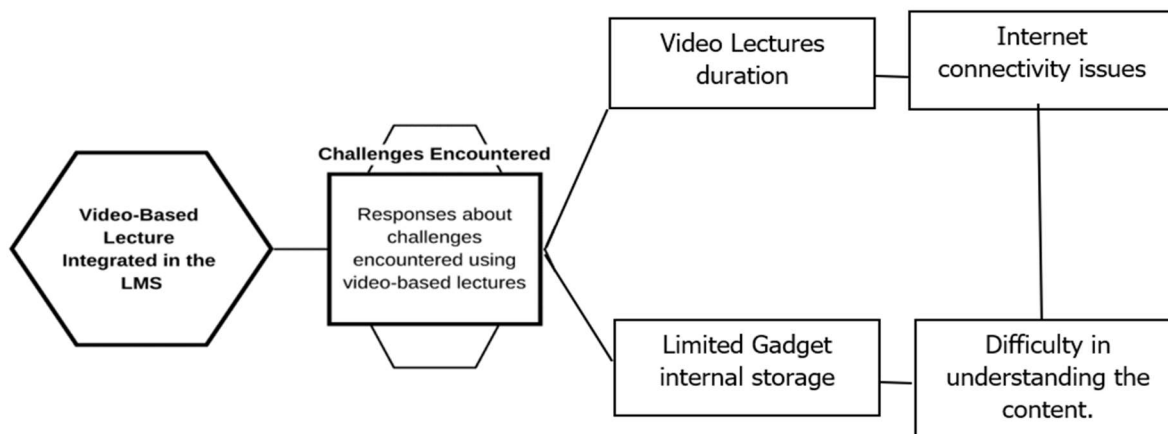
*Initial Codes No. 9 and 10*

Initial Code	No. of Participants Contributing (N = 9)	No. of Transcript Excerpts Assigned	Sample Quote
Learning confusion	2	6 - 8	<i>"You cannot ask questions and concerns about the certain part that I cannot understand well. Throughout the video, the confusion tends to pile up until our interest from the beginning starts to fade out."</i> (R1)
Problems with addressing learning confusion	1	176 - 179	<i>"There are some video contents that I need help understanding. Instead of consulting our instructor, I would replay the videos multiple times, hoping I would understand eventually. If the numerous replays of the videos didn't work, I would resort to researching the information I found confusing."</i> (R9)

Table 10 shows the Issues with addressing confusion in the content. Respondents 1 states *"You cannot ask questions and concerns about the certain part that I cannot understand well. Throughout the video, the confusion tends to pile up until our interest from the beginning starts to fade out"* (R1, Line 6-8). Respondents 9 states that *"There are some video contents that I need help understanding. Instead of consulting our instructor, I would replay the videos multiple times, hoping I would understand eventually. If the numerous replays of the videos didn't work, I would resort to researching the information I found confusing"* (R9, Line 176 - 179). This connects to the study of Simamora (2020). Although flexibility is something that online learning may give both students and lecturers, there are several difficulties that could limit instructors and even disqualify students. Replicating the dynamics of face-to-face instruction is one endeavor, but it's not always easy to execute, especially when it comes to online learning constraints. Because the lecturer explains how and why students feel anxious about the material they are studying, the interaction between students and lecturers is crucial for student achievement. putting an end to this unusual and massive engagement in Indonesia. This may affect the lecturer's teaching style and the manner that the students learn in a variety of ways.



**Figure 7**  
*Thematic Map*



The thematic map concept shows the video-based lecture integrated into the LMS. The map shows that the challenges encountered by the participants are video lecture duration, internet connectivity issues, limited gadget internal storage, and difficulty understanding the content.

**Based on the result of the study, what are the supplementary inputs for the I.T. specialists' continuing development and enhancement of the LMS?**

This section presents the supplementary inputs for the continuing development and enhancement of the LMS. Furthermore, the following supplementary inputs were based on the learning challenges identified in the results and findings of this study. The results subsequently applied to a limited data cap and trouble acquiring an internet connection owing to geographical location. Students have limited internal storage for educational technologies and encounter challenges with the LMS that cause viewing delays and problems. The students' difficulty focusing and cognitive load was exacerbated by the length of the video lectures. It was also discovered that students struggle to overcome learning confusion.

**Table 11**  
*Supplementary inputs for the I.T. specialists' continuing development and enhancement of the LMS*

Objective/ Targets	Strategies/ Activities	Timeframe of Implementation	Person Involved	Expected Outcome	Remarks
To address challenges with addressing learning confusion.	Consultation on the lesson be carried out is recommended, at which time, the "Forum" features available on the LMS should be make used of to solicit students for their questions.	Twice a week	Instructor	Students' confusion in learning is addressed.	



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<p>To make the video lectures integrated with the LMS more accessible in times of power interruption.</p> <p>To make the video lectures integrated with the LMS more accessible when there is a sudden influx of users.</p>	<p>Securing an electric generator for an interrupted accessibility of the LMS when there is a power interruption.</p> <p>Cooperating and planning when conducting an assessment or activity to manage the influx of LMS users.</p>	<p>One-time follow-up for implementation</p> <p>Every exam, quiz, and other activity</p>	<p>Institution</p> <p>Instructors and I.T. specialists</p>	<p>Uninterrupted accession of the uploaded video lectures during power interruption/busy traffic of LMS users.</p> <p>Access to the video lectures that have been posted without interruption, even when the power is down or there is much traffic on the LMS.</p>
<p>To minimize the internal storage and data cap requirement in viewing the video lectures.</p>	<p>Downsizing or compressing the videos' file size without compromising the visibility and quality of the material.</p>	<p>When crafting videos as an instructional material</p>	<p>Instructors</p>	<p>Video lectures will be downloadable. Also, the video will require fewer internet data.</p>
<p>For students who have limited internet bandwidth and poor internet connection</p>	<p>Programming a more simplified version of the LMS that do not require too much internet bandwidth.</p>	<p>One-time follow-up for implementation</p>	<p>I.T. Specialists</p>	<p>LMS requires minimal internet bandwidth to access the video lectures</p>



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<p>To minimize the cognitive load and maximize the focus of the students.</p>	<p>Segmenting long lessons into logical chunks where crafting of video lectures can be based to help students in keeping their interests.</p>	<p>When crafting videos as an instructional material</p>	<p>Instructors</p>	<p>Students can hold their focus and interest throughout the video lectures while requiring minimal cognitive load.</p>
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The researchers have developed the following intervention programs. These programs are appropriate and applicable for the new normal learning, as well as for the ongoing development and improvement of the LMS. Specifically, the program is intended to fill in the gaps in the educational experience that students have had through the use of video lectures. Additionally, this solves the problem with the difficulty of resolving learning confusion, maintaining focus, too much cognitive load, poor and limited internet bandwidth, and the issues with the students' internal storage and the LMS. Therefore, these supplementary inputs suggest ideas in the student's learning experience using video lectures that require improvement and continuing development and enhancement of the LMS. It is done to improve the student's learning experience using video lectures.

The intervention program has several sections: Objectives/Targets, Strategies/Activities, Time Frame of Implementation, Person Involved, Expected Output, and Remarks. These sections are designed to clarify the time frame, expected outcome, and who is/are involved in the intervention program.

**Conclusions**

The researchers reached the following conclusions after analyzing the data as a result of the findings:

Most of the students have impartial experience with having difficulty viewing the video lectures uploaded on the LMS in terms of their internet connectivity and the educational technology they have. They were still hampered by their limited internet access and technical issues with their educational technologies.

Video lectures helped students learn, as shown by their positive attitude toward them. It may be due to the multimedia component of the video lectures demonstrating abstract concepts and intangible objects in detail, resulting in a better understanding of the subject matter.

The average percentage of video lectures viewed decreases as their length increases. Furthermore, this indicates that students are likelier to hold their attention watching short video lectures.

Lengthy video lectures pose a challenge in the transmission of information. It suggests that lengthy video lectures are detrimental to students' focus and attention. Internet access may be difficult if a student lives in a rural area. Many rural areas lack the necessary infrastructure to support high-speed internet access. When students use video lectures, they can run into problems with educational technology, especially with internal storage. If the video is too big, it will take up too much space on the device's internal storage. Also, LMS is inaccessible when the power goes out or when there is a sudden influx of users. The lack of monitoring and consultation regarding students' confusion about video lecture content may hinder their learning.

**Recommendations**

These recommendations can be made in light of the findings and inferences drawn from the research.

1. To reduce the amount of space and internet data needed for storing and viewing the video lectures, the file sizes of the videos may be shrunk or compressed as much as possible, but this should not be done at the expense of the material's intelligibility or quality. I.T. specialists may develop a more basic version of the LMS that does not demand excessive internet data to accommodate students with restricted internet bandwidth or a poor internet connection.



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2. Instructors may conduct consultation on the lesson be carried out to solve the issues associated with addressing learning confusion. At this point, it is recommended that the "Forum" feature available on the LMS be used to solicit students for their queries.

3. The instructors may segment lengthy lessons into logical chunks. They may base it on the production of video lectures to assist them in maintaining their students' interests, which may reduce the amount of mental effort required and increase the focus students put into their studies. Make sure the videos are concise and direct to the point.

4. The institution may secure an electric generator for uninterrupted accessibility of the LMS during a power outage to make the video lectures integrated into the LMS more accessible during power interruption. When there is an unexpected increase in the number of users of the learning management system (LMS), the instructors and I.T. specialists may work together and develop plans to handle the inflow of users effectively. It will make the video lectures integrated into the LMS easier to access.

5. Lastly, future researchers may conduct related studies with other variables to evaluate the effectiveness of video lectures integrated into the LMS. They may conduct a study identifying the relationship between students' academic performance in watching videos of various lengths, considering short video lectures are generally interesting – in regards that of the crucial components of learning is interest.

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