



# Learning Media for High-Functioning Autistic Student Using Video Sharing Platform during the Pandemic

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**Abstract:** This research is motivated by a pandemic condition which has implications for the transformation of learning. Previously learning course was held face-to-face in offline class, however currently rely more on online learning media. This study analyzes the importance of learning media for students with special needs, especially in the HFA (High-Functioning Autistic) category. This research uses Cognitive Theory of Multimedia Learning and data collection using mix methods both qualitative and quantitative research, as well as exploring advanced analytical from the video sharing platform specifically provided for HFA students. This study shows that learning media using YouTube for HFA students is considered to be effective. This learning medium is easy to use, can be played repeatedly as a tutorial, videos help in practical assignments, also there is a subscribe feature which can be utilized to remind advanced materials or links to the previous learning materials. This study also shows the beneficial potential of YouTube as a learning medium as an application that is familiar to be used by students.

**Keywords:** Video Sharing Platform, eLearning, High Functions Autistic, Pandemic

## I. INTRODUCTION

On March 2, 2020, the Indonesian government announced the first Covid-19' case. On, September 23, 2020, there were 257,388 positive cases of Covid-19 in Indonesia [1]. The existence of the Covid-19's case certainly has an impact both government and society. All levels of societies are affected due to the limited space for prevention efforts undertaken by the government. One of them is learning adjustments. The way of learning in this pandemic period is directed at distance learning, as a priority for the health and safety of students, educators, education personnel, families and communities. It can be said that the face of education in Indonesia has changed drastically due to the Covid-19 pandemic.

However, it is not easy to adapt to this new habit. Apart from the need for personal discipline for learning, there are also learning facilities that need to be prepared such as devices that is connected with the internet. Autistic individuals who fall into several categories are also facing the adaptation in this new learning process. One of them is High Functioning Autism (HFA), which is an autistic individual who is able to do important things independently, such as maintaining body hygiene, managing daily schedules, joining groups, and studying independently. One of the categories of independent learning for a child with special needs is they receive very minimal assistance even almost unaccompanied while studying. In the conditions of a new learning method during a pandemic, it will certainly be a challenge for HFA teenagers.

Autism is a disorder in children who do not experience abnormal development, especially in terms of relationships with other humans[2].Developmental disorders affect the ability to communicate, the ability to interact socially and the behavior of living in the world itself [3].In Indonesia, based on data from the Ministry of Women's Empowerment and Child Protection, it is estimated that there are around 2.4 million

people with autism, with the addition of new cases of people with autism are around 500 people per year[4].

The adaptation process to a new learning model during the Covid-19 pandemic is certainly not easy for these autistic teenagers, where in general they need the same routine pattern every day. The changes in the learning atmosphere and the changing of learning techniques are also the challenges. Therefore, families and educational institutions are trying to find the best way to learn via online during the Covid-19 pandemic so that it can run smooth and provide comfort for students.

Online learning cannot be separated from the use of the internet. Indonesia is currently one of the countries with the largest number of Internet users in the world. As a country that is located in the Asia Pacific region, Indonesia is part of the 4.3 billion total populations in this region. More than half of the population, namely around 56% or 2.42 billion, have access to the Internet and the other half, around 2.14 billion people, used social media [5]. The result survey of the Hootsuite and “WeareSocial” in 2019, shows the social media platforms with the largest number of users in the world. Facebook is in the first place of social media platform with the most users, followed by YouTube, WhatsApp, Facebook Messenger, We Chat and the followed with the Instagram [6].

The use of video sharing platforms as a learning medium has also been implemented in various countries before the Covid-19 pandemic. One of them is the use of YouTube as a learning medium as one of learning medium for children, according to research conducted using YouTube can increase interest and confidence for further learning [7]. Educational institutions for teenagers with special needs use video sharing platforms such as YouTube as an alternative for media learning. The video platform sharing that can optimally display audio-visual is the main consideration. The goal is to help students with special needs who are classified as HFA in learning, as an additional of other alternative learning platforms such as digital classes, online learning and so on. Moreover, teachers can also create many video content creations independently.

Furthermore, the use of the video sharing platform as a learning medium for autistic teenagers during the Covid-19 pandemic; would relate to their characteristics who often do activities, act and are attracted to something that is repeated. For example, they like to repeat a scene from a film or video continuously[3]. It is expected that the teaching and learning process can run smooth and the messages to be delivered can be received well by using the video sharing platform as a learning medium for autistic teenagers who can see or play repeatedly the learning delivered compared to using other learning media.

The principle of user friendly on every social media platform for HFA teenagers is highly expected in order for them to be able to operate without assistance. Interest in visuals can be maximized in forming an understanding of the learning material provided through videos. In addition, the sensitivity to sound can be adjusted according to the sensitivity of each child.

This research was conducted by referring to previous studies that have also tested multimedia functions for autistic children, in this study the results showed that the effect of multimedia on autistic children learners although they have many different characteristics, the results have shown that the efficiency of new innovation technology and multimedia are considerable important for special disabilities [8]. In previous studies, it discussed more about the use of multimedia in the computer-based program category by analyzing the effectiveness of colors, images, text and language in children with the autism spectrum disorders (ASD) category.

Based on description above, this research is expected to be able to further explore the implementation of the use of YouTube as a learning medium for autistic teenagers, especially those who are included in the High Functioning Autism group during the Covid-19 pandemic.

## II. LITERATURE REVIEW

### A. Video Sharing Platform

Based on the Council of Audio-Visual Media Services (AVMSD) in 2017, The Commission defined “video-sharing platform services” as follows: [9] the service consists of the storage of programs or user-generated videos, for which the video-sharing platform provider does not have editorial responsibility and the organization of the stored programs or user generated videos is determined by the video sharing platform provider including by automatic means or algorithms, in particular by displaying, tagging and sequencing. Video sharing platform service can also be defined as the principal purpose of the service, a dissociable

section of that service or an essential functionality of the service is devoted to providing programs or user-generated videos to the general public, in order to inform, entertain or educate and this service is provided by an electronic communication network.

### B. Video Sharing Platform as a learning medium.

Based on previous research found that video-sharing websites like YouTube, Facebook, Dailymotion, Vimeo and many others can be a source of valuable information that can be used to increase the effectiveness of learning processes. That research also underlines that the YouTube platform is very easy to use for both viewers and content developers. It allows users to easily search and also upload content, add comments, create, manage and share their multimedia materials or playlists and gives access to many users. Therefore can be used by teachers and students after a short 1-2 hour training [10].

Video Sharing Platform is considered suitable as one of multimedia learning instructions based on Cognitive Theory of Multimedia Learning (CTML).CTML has the idea that both auditory and visual channels to process the information and building memory.The active process learning is more successfully obtained when both the auditory and the visual channels are stimulated simultaneously, also known as the dual channel assumption [11].Cognitive theory offers three theory-based assumptions about how people learn from words and pictures: the dual channel assumption, the limited capacity assumption, and the active processing assumption [12]. First,*Dual Channel Assumption*; the human cognitive system consists of two distinct channels for representing and manipulating knowledge: a visual-pictorial channel and an auditory-verbal channel. Second, *Limited Capacity Assumption*; each channel in the human cognitive system has a limited capacity for holding and manipulating knowledge. Third, *Active Processing Assumption*;meaningful learning occurs when learners engage in active processing within the channels, including selecting relevant words and pictures, organizing them into coherent pictorial and verbal models, and integrating them with each other and appropriate prior knowledge.

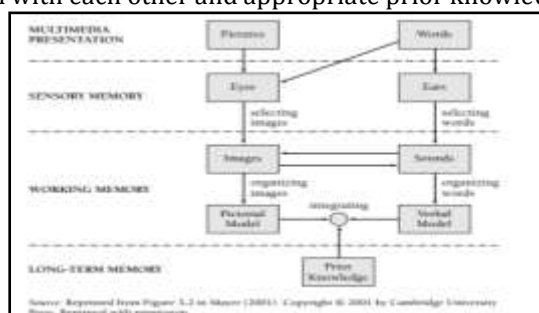


Figure 1.Cognitive Theory of Multimedia Learning [12]

### C. Video Sharing Platform for HFA learning medium.

This research study and investigate more on enriched multimedia categories as a medium of learning communication through a video sharing platform. Some of the typical aspects of a video sharing platform that will be observed including the (audio, visual, or audio-visuals) video content, content repetition, and the ability to operate the platform. Furthermore, the analysis will consider the characteristic aspects of students with High-Functioning Autism classification as below.

Tabel.1 Characteristics for High-Functioning Autism with teaching and communication methods: [13]

No	Characteristic HFA	Teaching Methods
1	Have trouble with organizational skills	Always praise the student when he remembers something has previously forgotten.
2	Problems with abstract and conceptual thinking	Communicate as concrete as possible in all your interactions with these students.
3	An increase in unusual or difficult behaviours probably	Set up to assist the student in re-entering and/or staying in the

	indicates an increase in stress.	stressful situation.
4	Not a manipulative, scheming person who is trying to make life difficult.	Do not take misbehaviour personally.
5	The use and interpret speech literally.	Avoid communication with idioms, double meanings, sarcasm, nicknames.
6	Difficulty reading facial expressions and interpreting.	Have to communicate verbally or directly give instructions.
7	Student does not seem to be learning a task.	Break it down into smaller steps or present the task in several ways (e.g., visually, verbally, and physically).
8	Have difficulty understanding your main point and identifying important information.	Avoid verbal overload, be clear. Use shorter sentences.
9	They cannot accept environmental and routine change.	Prepare the student for all environmental and/or changes in routine, use a written or visual schedule.
10	Encourage robot-like behaviour, provide only a short term behaviour change, or result in some form of aggression.	Use positive communication and chronologically age-appropriate behaviour procedures.
11	Levels of auditory and visual input can be perceived by the student as too much or too little.	Consider environmental changes such as removing "visual clutter"
12	Uses repetitive verbal arguments and/or repetitive verbal questions,	Continually responding in a logical manner or arguing back seldom stops this behaviour.
13	These individuals experience various communication difficulties.	Frequent and accurate communication between the teacher and parent (or primary care-giver) is very important.

Based on the characteristics of the HFA that have been presented above, this study discusses the effectiveness of using multimedia based on video sharing platforms, to illustrate that the learning communication process has been reviewed in accordance with the characteristics and limitations of HFA students. This study also outlines the advantages and disadvantages of using video sharing platform for HFA, and evaluate how this media can be utilized as an alternative learning medium during the pandemic period.

The significance of this research is also a concern that as in several multidisciplinary research is being carried out to assess the usefulness of computer-assisted education for autism. There are projects have been focusing on the communicative and social disorders. This study also exploring characteristic (advantages and disadvantages) of video sharing platform for HFA. In addition, this study was conducted based on the results of experimental tests from previous studies which discussed that humans, despite their limitations, have the ability to operate the human-computer interface [14].

### III. RESEARCH METHOD

To measure the effectiveness of the use of video sharing platforms by high function autism students, this study uses a mix method, between quantitative and qualitative. Quantitatively, questionnaires were distributed to 98 students with HFA category, who during the pandemic access and use a video sharing platform for learning which is provided from their schools. Respondents for quantitative data are autistic adolescents with HFA category, elderly adolescents, and aged 18-21 years and are studying at educational and skills institutions for students with special needs. All respondents assisted by parents/shadow-teachers. This study brings three dimensions of measurement: uses of learning communication media; understanding and Implementing Tasks; Evaluation of Learning Outcomes.

To complement the quantitative data obtained and associated with using the mixed research method is to get a more complete and comprehensive research result compared to using only one approach, interviews are conducted with the parents/shadow-teachers or teachers regarding the improvement of learning outcomes after using multimedia. The data from this interview is intended to explore qualitative data. This study also investigates the advanced analytical from the video sharing platform using YouTube specifically for HFA students. This study uses a mix method with a concurrent model, this combination model will complement each other between methods, especially because this HFA has limitations, so it can provide supportive research findings.

Data analysis was carried out simultaneously based on quantitative and qualitative data that had been collected and interpreted as a research process and compared. Quantitative data analysis uses the frequency percentage value of each indicator and analyzes the media sharing platform channel analytic statistics; by Occurrence frequency, percentage, and mode. While qualitative data analysis uses: written description, develop meaning statement, develop meaning into cluster/theme, extract significant statements related to study, use member check validation, document and verify interpretation, and exhaustive description [15].

### IV. FINDINGS AND ANALYSIS

#### *A. Ease of use in using video sharing platform by HFA.*

The research results show that YouTube is considered to be a medium of communication between teachers and students with special needs, especially for the HFA (High Function Autistic) category. From the survey results to a number of HFA students, it can be seen several indicators that they find that YouTube is easy to use and can be used as an effective learning communication medium during a pandemic. The following are the results of a survey that shows the ease of using YouTube by HFA students:

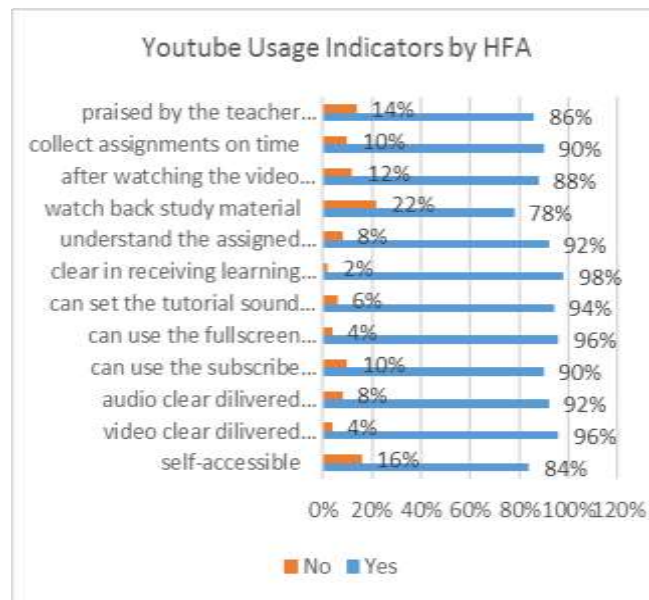


Figure 2. YouTube Usage Indicators by HFA

The data shows that more than 75% of the answers of HFA students feel capable of using YouTube in three dimensions of learning:

#### *Uses of learning communication media*

HFA students can easily use video sharing platforms, especially YouTube, such as the ability to access YouTube themselves through the link that the teacher has provided independently, then they feel that the delivery of material through YouTube is clear both in video and voice, they find learning more interesting like seeing video tutorial making works. In addition, they can use some of YouTube's features properly, such as turning down and increasing the volume, displaying the full screen and some of these uses are done by the students themselves with a little help from a companion. This convenience provides the benefit that the video sharing platform, in this case YouTube, can help the independence of HFA students to be able to access learning materials.

Some of the advantages that can also be seen are, on the HFA student indicator, they can use the subscribe feature, so they can repeat learning videos, see previous learning videos, and can get the latest information on the latest learning materials from their teachers. This is also a form of convenience for HFA students with one of their limitations, they tend to always ask repeatedly, through this learning video, they can repeat material that is not clear they don't need to ask repeatedly to the teacher.

#### *Understanding and Implementing Tasks*

Whereas in the second dimension, students feel learning through YouTube can provide a clear sequence of tutorials. This is as conveyed by the teacher, where to make learning videos on YouTube they will prepare in detail and use straightforward words and sentences, so that they can be easily understood by HFA students. Students assess that by viewing the YouTube video sharing platform as a multimedia learning, they can easily understand the teaching material, and can do assignments according to the task sequence. According to the HFA student assistant said that each student can follow the learning tutorial on YouTube according to their abilities, some are seen as a whole then repeat the video and some stop and run the video according to the sequence of material and assignments given. This is considered to be an advantage of YouTube as a medium that can be utilized according to the level of ability and specific characteristics of HFA.

In addition, HFA students in understanding the assignments, they can also use the comment feature to be able to ask questions to the teacher. So that they can actively ask questions directly to the teacher, and the teacher can provide answers directly via video. If the learning material is delivered in the form of a video recording, students can make a statement via the comments feature. Referring to these findings, it indicates that the YouTube video sharing platform can be used as a learning medium that is not one-way, but can facilitate students to be active. So these findings also show that this learning media is in accordance with the assumptions of multimedia theory that can arouse student cognitive, namely the third assumption of Active Processing Assumption; Meaningful learning occurs when learners engage in active processing within the channels [12].

*Evaluation of Learning Outcomes*

The survey also indicates that HFA students can understand and do assignments well after seeing learning materials through YouTube. The adaptation of the learning process from face to face to through an intermediary medium is considered effective, because there are indicators that HFA students can do their assignments well, then they can still collect assignments on time, as well as good learning scores by looking at the results of the answers to questions from indicators they get praise from teachers for learning outcomes.

Based on the research findings, it can be mapped as follows, the advantages and disadvantages of YouTube as a learning communication medium for HFA students based adapted by process of Cognitive Theory of Multimedia Learning and Previous Studies:

**Table 2. Advantages and Challenges of Using the YouTube Video Sharing Platform for HFA**

<b>Steps/Process</b>	<b>Advantages</b>	<b>Challenges</b>
Multimedia Presentation	YouTube as a learning medium as one of learning medium for HFA, using YouTube can increase interest related to previous study that mentioned YouTube as one of media sharing platform that popular because it displays visuals and audio.	The duration of the learning video should not be too long.
	Text, words, sentences in video tutorial/learning can be designed as concrete as possible by teacher.	
	Not only Picture, but student can learn from video that more complex visualisation.	
	The variety of features, and easy to operate.	
Sensory Memory	Students able to receive learning messages through a combination of hearing and sight.	Unable To Monitor Student Responses
	The teacher can break down into smaller steps or present the assignment.	
Working Memory	Integration of video, visuals, effects, narrative, as a	Cannot confirm student interpretation.

	comprehensive communication medium to stimulate learning.	
	Students can organize learning such as doing simulations repeatedly. Related to the previous study that explained teaching and learning process can run smooth and the messages to be delivered can be received well by using the video sharing platform as a learning medium for autistic teenagers who can see or play repeatedly the learning delivered compared to using other learning media.	
Long Term Memory	Audio-visuals can help improve long-term memory.	Cannot Continually responding in manner or attitude.

*B. Statistical Analysis of YouTube Channel for HFA.*

In order to observe the characteristics of learning in terms of the use of a Video Sharing Platform, this study also analyzed a certain YouTube channel specifically provided for HFA classes. This channel was created in 2015, and is currently being used more frequently during the pandemic. The data shows that number of views drastically increased on April 2020, which is the initial time to study from home because of the pandemic. During the pandemic, course materials for HFA student are presented in the form of a video and delivered using this channel. More videos contain practical tutorials. However, there are also several videos showing the general information about autistic or the performance of HFA students. Further analysis will be emphasized on the video which are the learning materials for the HFA class. The usage statistic of YouTube channel as a learning media for HFA is presented on Table 3.

*Table 3. YouTube usage statistic by HFA*

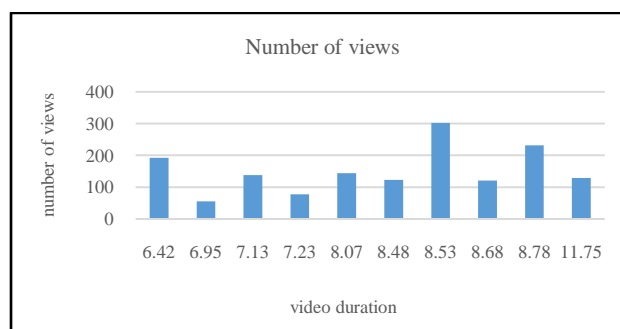
<b>Parameter</b>	<b>Results</b>
YouTube channel name	London School Centre for Autism Awareness (LCSAA)
Number of subscriber	333
Total views	1878 views
Average number of views/video	134 views
Average view duration/video	00:03:47
(Month) Most Views	April and September 2020



(Gender) Most Views	63,1% female, 36,9% male
(Age) Most Views	18-34 yo
Most Viewed Video	"Let's make a tie dye" (308 viewers)
	"Let's make a face shield" (235 viewers)
	"Let's make a face mask" (197 viewers)
Video duration with average number of views	6-7 minutes (115,7 views)
	8-9 minutes (184,4 views)
Gadget used to watch	Mobile: 85%, 3,3 minutes
	Desktop: 12%, 5,88 minutes
	Tablet: 3%, 5,85 minutes
	Smart TV: 1%, 19,45 minutes
The average number of times repeated/video	134 views (8-9 time played back)
Frequent keywords in video title	"Autism", "Berkebutuhan Khusus", "Creativity", "Mari Membuat"
Views by country	Indonesia (95, 09%), Russia (4, 52%), India (0, 39%)

Based on this statistical data, each video containing learning material is viewed by an average of 134 views, and if 15 students are considered as the average number of students in one class, then one video appears to be played back 8-9 times.

The top three most viewed videos contain practical tutorials for creating something that is trending right now, including making a tie dye, face shield, and face mask. The duration of these video is about 6-9 minutes. Based on the data in figure 3, videos with a longer duration are tend to be viewed by more views. Based on the results of interviews from the instructors, they were more likely to repeat long videos because they had more difficulty in understanding the material. Besides that, it may also because of the content that is interesting to practice.



**Figure 3. Number of views with variation of video duration**

In figure below, in terms of type of gadget frequently used to watch the videos, the mobile phone is more frequently used gadget(85%), then desktop (12%) and also tablet and Smart TV. The interesting part is they used a Smart TV to watch the video with longer average view duration (19,45 minutes). This may because the large screen of TV makes it more comfortable to watch for a long time.

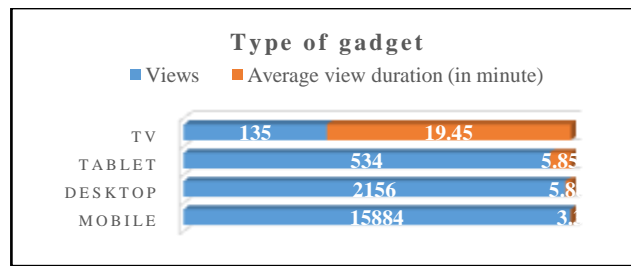


Figure 4. Number of views and average view duration for different type of gadget used.

However, it should be noted that video sharing platforms such as YouTube are still considered as a supporting learning medium, because actually HFA has limited characteristics in terms of communication that need to be improved through face-to-face interaction, both for training self-confidence, compiling and organizing language when speaking, monitoring the focus of their learning.

The analysis results from the usage of YouTube and qualitative analysis presented above are in line with the other findings presented in [16], which developed a learning mobile application for autistic students. In designing and developing the application, this paper finds that the convenience factor and being accustomed to using the application are very important. In the case of utilizing the YouTube and a learning media, it shows a beneficial potential as a learning medium as an application that is familiar to be used by students.

## V. CONCLUSION

Cognitive Theory of Multimedia Learning emphasizes the centralistic understanding of human learning. In this study, it can be seen that adolescents with special needs, especially High Functioning Autism (HFA), show the potential for the ability to adapt learning media via YouTube and try to regulate, control the way of learning. This is in line with CTML thought, which criticizes the varied principles of the flow of positivism. Although they are supportive for adolescents with special needs, especially HFA; YouTube platform as learning media through the stages of a multimedia presentation, sensory memory, working memory, and achieving long term memory successfully adapts learning and at the same time it shows its relevance to the cognitive theory of multimedia learning. So it can be concluded that YouTube is a video sharing that is considered effective for HFA; this learning medium is easy to use, can be played repeatedly as a tutorial, videos help in practical assignments, there is a subscribe feature to remind the advanced materials or links to previous learning materials. Henceforth, a deepening study of the cognitive theory of multimedia learning is needed by pairing it with cybernetics to parse in more detail the information technology-based learning system.

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