

Enhancing E-Learning User Interaction using Video Chat and Video Streaming

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Abstract— The internet users and internet speed has increased significantly in Indonesia. Based on Indonesian Internet Service Provider Association data, the growth of internet users has increased by 34.9% in 2014 (88,1 million) and the internet speeds up to 100 MBps via fiber optics were provided by the multiple telecommunications service providers. These improvements stimulate the eLearning providers to optimize its features, especially in user interaction. Video chat and video streaming are the alternatives to accommodate the needs of the interaction between educator and students in the eLearning. Video chat could be used as two-way communication between educator and students, but video streaming is used to broadcast the video footage from educators to students. This paper will analyze the comparison between video chat and video streaming utilization in the eLearning. The benefits and difficulties both in the technical aspects and students' perspectives will be discussed in this paper. As the result, the eLearning providers could adapt the technology based on the ability of their institution.

Keywords— internet technology, video chatting, streaming

I. INTRODUCTION

Internet has changed the way of communication in which people can communicate globally by a combination of textual and virtual interaction [1]. Information and communication technology rapidly updates the models to perform communication and obtain information. Among teenagers is online communication that is the most favorite choice in communication and socialization.

This study utilizes the technology in YouTube Live Streaming and Google Hangouts for communication in the learning process. This study involves multiple users using the wifi service with a laptop and a Smartphone as a communication medium.

YouTube provides free Video Streaming services. Using this free facility, YouTube dominates video live users. Live video used in YouTube can easily be setup by laymen, making it easy for anyone to use and broadcast a live program. The most promising service is that YouTube live is automatically stored in Google server and can be seen by everyone by providing a live video link to be sent to either the YouTube services or the email.

Google Hangouts is a communication tool developed by Google for video chat, sms and VOIP. With the video chat technology, Google Hangouts can be used for communication such as face to face, and can be done together up to 10 people. Hence, the technology can be used to perform together in virtual meetings, teleconference which can directly broadcast via YouTube.

Communication using YouTube and hangout at this time can be done easily as the current 3G and 4G communications networks have been provided by various ISPs and equipment for video chat is very easy to obtain. Moreover, Laptop or PC installed Camera is currently reasonable price. Even, the emerging android technology installed in the Smartphone can now be used for video chatting or streaming.

II. LITERATURE REVIEW

Video chat is fast-growing technology that is used by family and distant relatives to maintain close relationship [2]. Tatiana said that the use of video was applied in focusing various events, gossiping, finishing homework, connecting with others, playing games, and making communication to several people (multi-connection) although it was also used for fun and sexual activity [3]. Video chat can be used for communicating simultaneously in video and audio mode and used for accessing internet via computer networks, mobile tablet or mobile gadget[4].

Video chat is a new technology bridging the human social interaction through media interaction screen. Video chat has lively interaction feature though only has two dimensions, and offers social interaction though face to face interaction is confined by the screen [5]. Touching sense such as handshake, hug, and physical contact is important in interpersonal communication,

so using video chat enables people to express and experience intimate love [6]. Video chat can also be used in the learning process. According to Kathy, video technology chat can train children to support new vocabulary learning [7].

Streaming is currently widely used to broadcast live sports, music, news, entertainment so that people can see and hear directly. And now, many streaming services provide free of charge in such activities.

Video is transferred by using wireless and cable. Video can be transmitted directly and indirectly. Video can be used in distance education by listening to lectures directly, known as streaming, or can download the file from the server [8].

By using visual and listening or audio or video mode, students can more quickly process information that can help them understand the material more quickly. [9]. Streaming video and audio can assist students to comprehend a difficult and complex concept and procedure that can be elaborated with pictures and text [10].

Video chat needs high quality service (QoS) to avoid packet loss, end-to-end delay, and jitter. Classification with parameter QoS has been fulfilled by the advent of video chat via 3G technology [11].

Streaming currently tends to use the Internet line by applying Internet protocol and server that can broadcast live or store data in a server that can be downloaded or viewed back.

There are two models of transmission on the Internet i.e. download and streaming. In download model, we can transfer or view files that have been created and stored in the server. This means that what happens in the streaming file has occurred and been stored in a file. In streaming model, this technology is able to convey information directly. In

streaming, file cannot be downloaded at the same time with the event.

Many organization and institution utilize e-learning because it is similar to traditional training, and the cost is cheap as it is as effective as traditional learning.

Preparing lesson material and training coach are cheaper than developing e-learning. However, e-learning method is effective to be applied in a company. On the other hand, the cost of construction and development of e-learning is much cheaper than in-class procurement facilities, teacher recruitment, and required time [12]. In addition, e-learning has a wide range of cross-regional, cross-country.

The recent generation uses all-digital devices such as smart phones, laptops, and Internet networks. Utilization of the equipment has become a habit every day. YouTube and hangout are examples that can be used for communication. YouTube applies Bitrate adaptive technology (ABR) which has HTTP basis. Algorithm rate-switching can improve the quality of video, so users can select the resolution in accordance with the conditions of each network [13]

YouTube is utilized for different purpose e.g. entertainment, family video share, work demonstration, or advertisement of a company or a product. Furthermore, foreign language education can be explored. [14]. Multimedia such as TV, Movies through YouTube can be used to improve learning at the college. Verbal and visual components of the video could potentially provide a valid approach to increase learning skill [15].

III. METHODOLOGY

In this study, the services of live streaming YouTube and Google hangout are chosen, and examined by using a laptop and a smart phone based on Android. For a laptop computer, two browsers are chosen i.e. Google Chrome and Mozilla Firefox which is used to access the URL. The network used is a Wifi network existing in the office with one Wifi tool.

Procedures that are used are as follows:

1. YouTube live streaming
 - a. Create an email address that is used to turn on YouTube live streaming
 - b. Create an account to YouTube live streaming
 - c. Create event
https://www.youtube.com/my_live_events
 - d. Invite the student to streaming
2. Google hangout
 - a. Activate browser
<https://hangouts.google.com/>
 - b. Create hangout name
 - c. Invite students
 - d. Analyze sounds and images
3. Analysis
To write technical application in YouTube Live Streaming and Google Hangouts in e-learning, to note their performance and compare their friendly use in e-learning. The result will be analyzed as the conclusion.
4. Conclusions
The analysis result of comparison in all aspects will be considered as the base in conclusion.

IV. IMPLEMENTATION

1. YouTube Live streaming

YouTube live streaming can be accessed in https://www.youtube.com/my_live_events by processing login with gmail.com, as shown no pictures 1. To perform streaming, click on the new live event in the top right corner

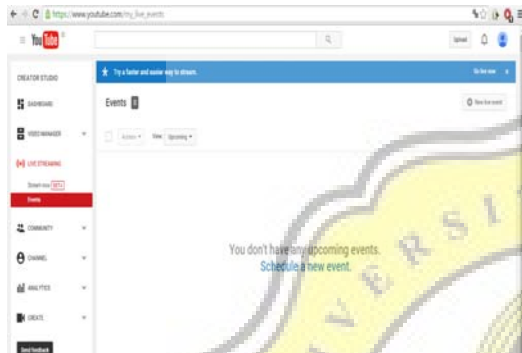


Figure 1. image of streaming settings

Fill the basic title information as the title: in accordance with the theme of the use of streaming and filling the description as detailed information on the activities carried out during the streaming. The title will be included by YouTube as suggested tags. Inside the suggested tags, the titles can be grouped (field of study) in accordance with the existing group in YouTube. Fill the execution time, and if necessary fill the closing time. The filled form looks like in Figure 2 below.

Due to the public purpose, it is necessary to choose the public button that will let users of live streaming can access themselves YouTube URL address.

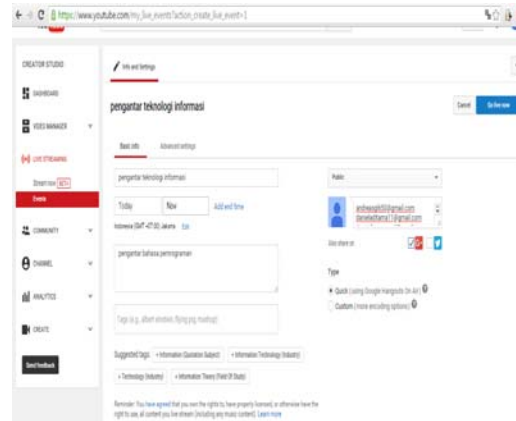


Figure 2: Creating live streaming

The figure below shows the process to start streaming. Take a few minutes to perform buffering. When finished buffering, click the start button broadcasting.

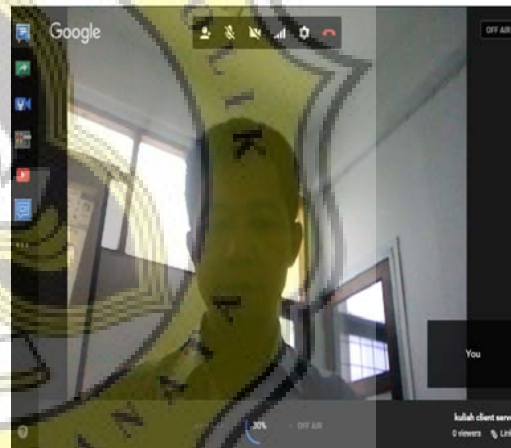


Figure 3: image of live streaming buffering

Invite participants via the send invite button to 11 email addresses and click invite, as shown in figure 4 below. Delivery sequence is randomly sent in once delivery. Student who firstly creates it can see the streaming.

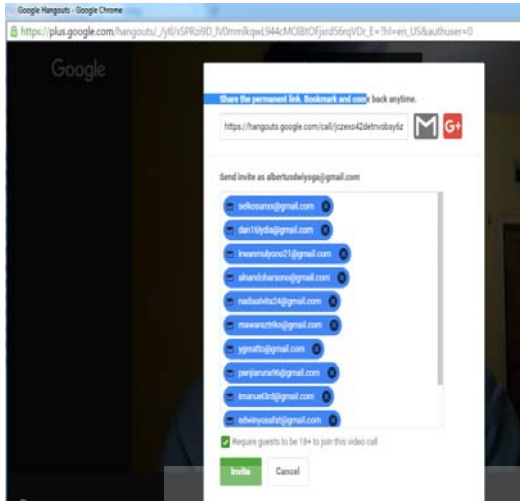


Figure 4: invite by email

The figure below is the image how to start broadcasting. Of the 11 users, only 3-4 users can enjoy streaming (see viewer in the picture below right). The rest is experiencing a prolonged delay streaming and could not access, and even get no streaming picture and then break up.

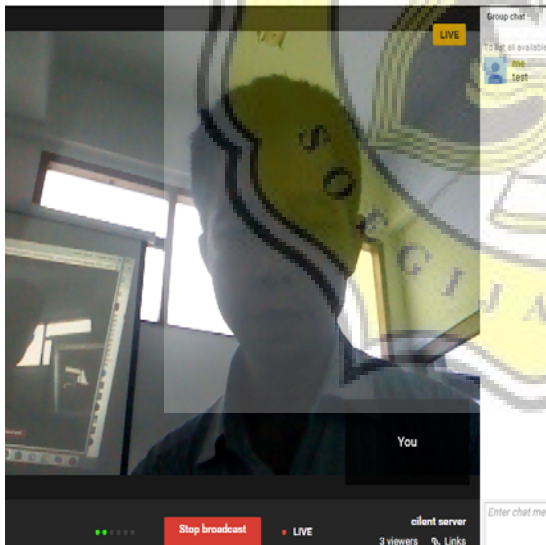


Figure 5: the number of participants seen in the viewer

2. Setting Google hangouts

a. Hangout experiment with 11 participants

To start, activate <https://hangouts.google.com/> browser with email login x.gmail.com, so it will look like in the picture below. Click the video call and fill the hangout title and then click the arrow to the right. After filling in the title, invite all available emails. Look at Figure 7 and Figure 8.

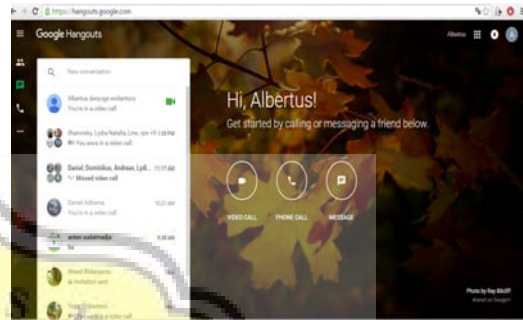


Figure 6: Starting hangout

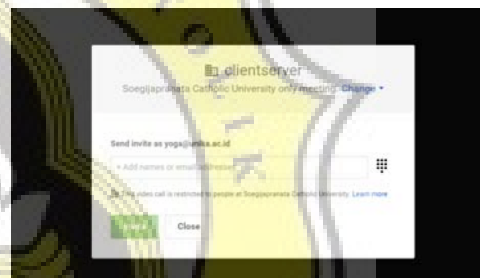


Figure 7: processing the invite by email

If finished, you can click the button of video chat, and next, send the invite. In this study, 11 email addresses are listed in the Invite. This process will be randomly sent to the student and the quickest respond will be included in a video chat. Video chat has a maximum of 10 participants.

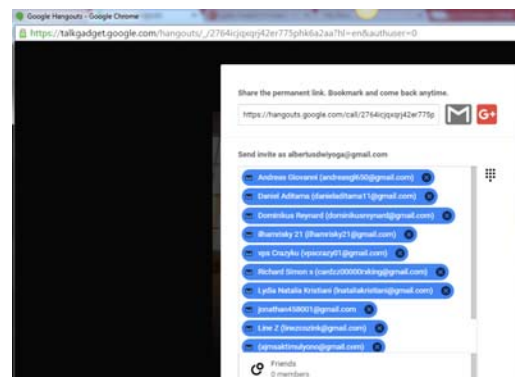


Figure 8: invite by email

The response of each student will look like in Figure 9 below where the answer's response will be seen in the camera area.

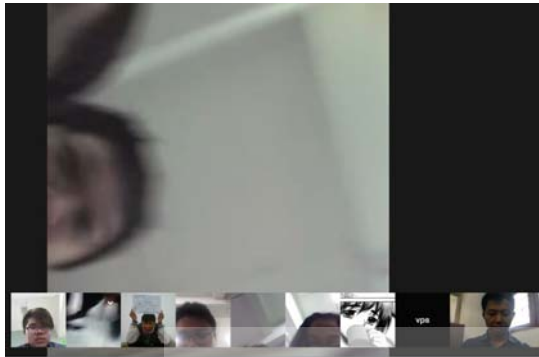


Figure 9: Participants hangout

Once participants join, each student will be visible below the main image. All 11 participants are invited, but only 9 can access (maximum of 10 participants in a hangout). The sound that comes out is not clear and noisy while the images appear disturbed.

b. Trial in Google Hangouts with 4 participants using smart phones.

Hangout with 4 participants is very different from 9 participants. All participants very clearly hear the voice of the discussion. Delay in the image still occurs, but it is better than delay in the first trial.

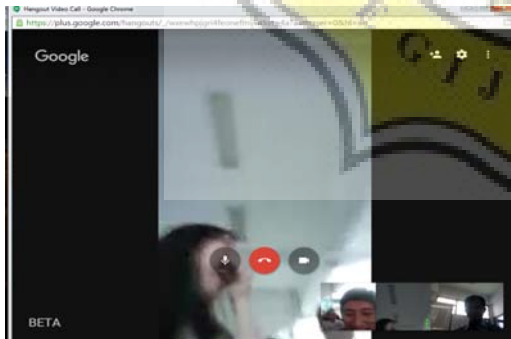


Figure 10: hangout with 4 participants

3. Google hangout with Laptops

c. Google Hangouts with Laptops

Invite procedure is the same as the first trial. 11 students using gmail.com email addresses and invite will appear in each

email address. The display screen is also identical.

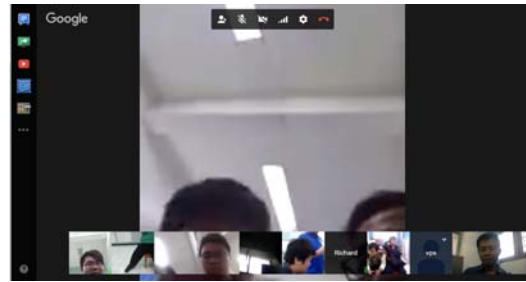


Figure 11: laptops

Below is the process of using YouTube which is used for the learning process. Each student will see the video from YouTube. Chatting can be done and can be read properly. However, the sound is still noisy and sometimes unclear. Images are still captured by Google hangout though there is a delay. After all, the sound is not clear.

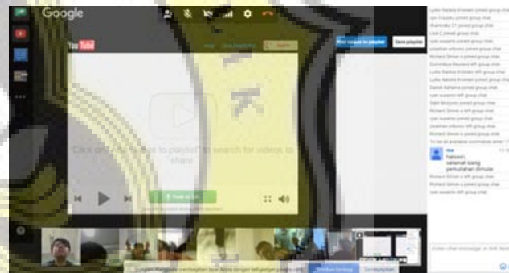


Figure 12: display movies with YouTube.

d. Trial on Hangouts with 4 participants using laptop

By trying connection hangout with 4 participants, video can be captured well, and the sound can be heard clearly. 4 participants can listen to the discussion with clear. However, delay sound is still present, and noise or disturbance due to the connections is interfering.

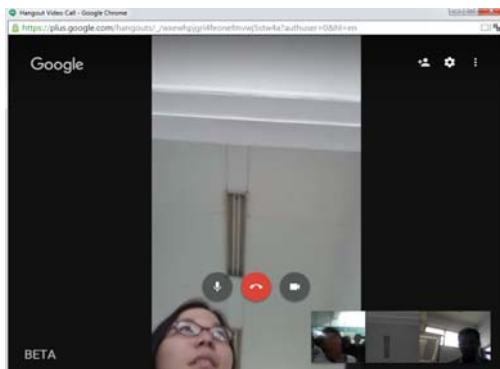


Figure 13: hangout with laptop

V. Conclusions

YouTube and Google Hangouts live streaming can be used in communication and learning process. The performance of YouTube Live Streaming to save the result directly in the streaming server is very useful because it can be retrieved for the purpose of other studies or feedback. YouTube and Google hangout live streaming can be run well if the number of participants is limited, so that the memory and processor load of the mobile phone and laptop can decrease. Some requirements to consider in order for live streaming and video chat to work well include: the quality of smart phones and laptops affects the image and sound. A large bandwidth path will be needed if the number of participants more than 4 people. The assigned PC / laptop host (server) must have a high processor and memory.

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