

CHAPTER III

RESEARCH METHODOLOGY

This chapter presents some research methods employed as foundation in the study. It consists of research design, research setting and participants, data collection, and data analysis.

3.1 Research Design.

This research applies a qualitative content analysis method in order to examine closely the data. The choice of this method is by considering two reasons namely theoretical basis and its effective use. According to Henry (1992), content analysis is one of the most appropriate methods to assess online discussion quality. This quality means that it focuses on the dimensions of social, interactive, cognitive and metacognitive. By using the method, all online postings are broken into units of analysis such as text, voice and images, then categorized them and counted the number of units in each category. So, from the classification of the texts in WA group transcripts can be drawn a conclusions about the content.

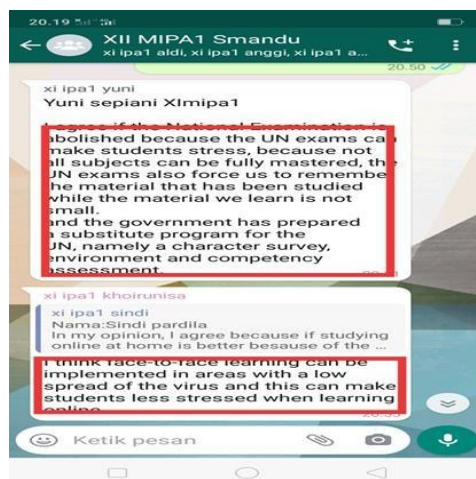


Figure 3.8 Example of unit of analysis

This view is in line with what McTavish and Pirro (1990) revealed that research using qualitative content analysis emphasizes on the characteristics of language as communication which focus on content or contextual meaning of a text. Another statement is stated by Schreier (2012) revealing that qualitative content analysis is one of the qualitative methods available to analyze data and interpret meaning

systematically and objectively. This is conducted by classifying material as examples of the categories of a coding frame.

Furthermore, for the reason of effectiveness, qualitative content analysis can reduce concepts that describe a research phenomenon by making categories, a model, and concepts. In conducting the content analysis processes in this study, three phases were used such as preparation, planning and organization, and implementation and observation. From these phases of research method, a systematic way of observing the phenomenon was achieved as well as data collection, information analysis, and result report. However, according to Rourke et al. (2001), the assesment of online discussion by using content analysis in its implementation has been regarded problematic and challenging. Problematic takes places when considering the target of learning to measure whether the knowledge or the skills, focus of model and context. While the challenges, according to Henri (1992), come from the complexity of online learning environment especially in term of interaction, the lack of content analysis models and in case of the lack of knowledge to make asesment or rubrics.

3.2 Research Setting and Participants.

3.2.1 Research Setting.

This research was conducted in one of of the public senior high schools in Siak regency, Riau, Indonesia. This school was selected since it has computer laboratory with wifi access facility, and the location is easily affordable. Beside that, the school has implemented the 2013 curriculum for all level of grade and the teachers have received HOTS training held by the school.

3.2.2 Research Participants.

The research involved 31 students of eleventh graders in a public high school in Riau. They consisted of 14 males and 17 females. They are all in nearly the same of age with the range of 16 to 17 years. They enrolled in the learning year of 2020-2021. All of the partipants in this research have experiences in online learning environment especially in English subject during the Covid 19 pandemic. Each of them had smartphones and very familiar with the

features available on WhatsApp. Besides Whatsapp, the participants also used Google classroom and Google meet as learning platform. The use of the learning platforms depends on teachers. Beside that, the students have simple basic English proficiency in speaking and writing so that a few errors in its use were still found in the discussion. But in general the students are able to write and speak English well.

Table 3.3

Summary of participants' information

Thread	Male		Female	
	N	%	N	%
Students	14	45.2	17	54.8
Total	31	100		
Smartphone ownership	31	100		
Learning platforms:				
Whatsapp				
Google classroom				
Google meet				

3.3 Data Collection.

The students discussed two argumentative questions or topics shared on whatsapp group (WAG) by the instructor. The questions covered two different topics. They are (a) What are your opinions about online learning and face to face learning?, and (b) Do you agree the deletion of national examination?. The choice of these topics is critical for successful online discussion. Greenlaw and DeLoach (2003) argued that a topic should be interpretive that enables students to respond with multiple ideas and perspectives. They also add that such a kind of topic can build arguments and leads students to explore solution and make critique. Moreover, the reasons for providing the questions were intended to provoke each students having critical postings or arguments since each question had the different characteristics for interpretation. The discussion took a period of one week to give the students enough time to post and make peer responses and online messages. The two given different questions were intended to provoke

each students had critical postings or arguments as each question had different quality or angle. If all students discussed one single topic, the discussion would sound similar response in which there is a tendency for participants in Whatsapp group to take an easy way by typing or copying paste from other members. Besides that, it was also intended to give different alternative to choose which topic they consider most familiar for them. The following are Whatsapp features that are used in online discussion and to support collaborative learning. Chart 3.1 display the hierarchical structure of data collecting procedure on Whatsapp group and figure demonstrates Whatsapp features and its function to support the data collection and collaborative learning.

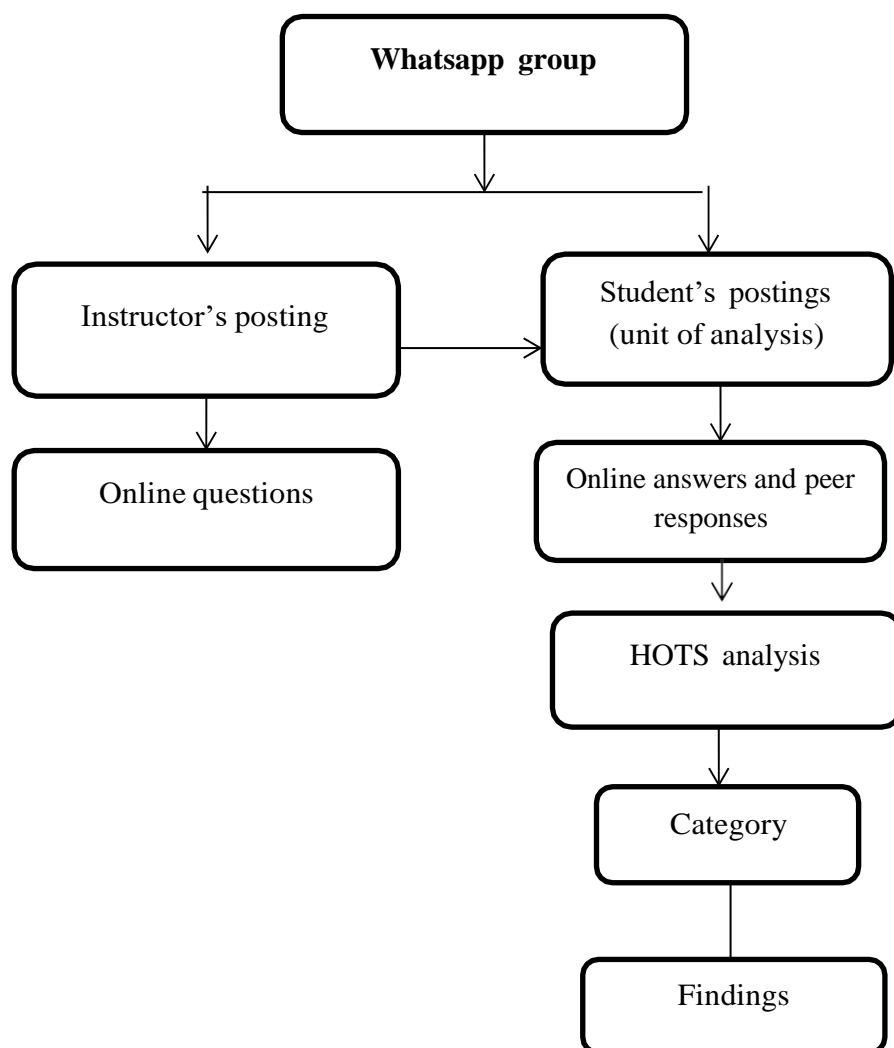


Chart 3.1 The hierarchical structure of data collection procedure from Whatsapp group



Figure 3.8 Whatsapp text

The transcripts in this feature (figure 3.8) were the main source of collecting data. Overall student's postings in the form of message transcripts were regulated in text type on clipboard of Whatsapp group. The posted messages were technically administered by following some rules as follow :

1. Before sending messages to Whatsapp group, students used Whatsapp message reply feature and have to firstly drag right the previous chat from their peers and replied it. This is intended to identify who sends the message and whose message that the sender meant to respond. This rule was made to avoid overlapping and confusing messages.
2. When students employed other features such as voice record to interact, they were not allowed to use it as answers and responses.
3. The students have to write their real names on Whatsapp numbers and posted messages for identification of the senders or chatters so that instructor and peers knew whose responses were being sent.
4. Students have to write their names on their chatting sheets just on the left or right corner before being posted.



Figure 3.9 Whatsapp group chat

Group chat (figure 3.9) or Whatsapp group (WAG) was created as a virtual classroom for students and instructor to interact and communicate. It contained the list of all participants that involved during online discussion activities. Before the students involved in the group, instructor made a list of students' phone numbers and made sure that the numbers do not mistype. To control and manage the WAG during the discussion, one particular student and instructor acted as group admins. Due to the WAG is just the same as face to face classroom, all members of group were regulated with rules and guidelines made by the instructor. For example, students are not allowed to leave the WAG out without any acceptable reasons. If this happened, the student was provided just one more chance to join the group.



Figure 3.10 Whatsapp voice record

Whatsapp voice record is a feature used by instructor and students as an alternative for interaction and communication beside text messages. This feature is only used for non analyzing data and its purpose is for unclear instructor's instructions. For the purpose of data analysis, participants were requested to type

written chats on Whatsapp clipboard. But if the instructor regarded there were necessary postings to confirm, the use of the feature became an option.

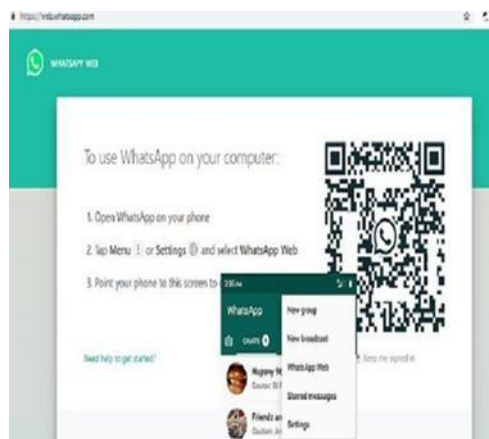


Figure 3.11 Whatsapp web

Whatsapp web (figure 3.11) was window based feature and employed as starter before creating Whatsapp on PC or laptop. In online discussion, this feature was used as alternative beside the use of android handphone for interaction and communication. The function in this feature was just similar to the function to android handphone. In some cases, using Whatsapp on laptop was visually more friendly, clear and eye catching because student's postings can be easily read. In this study, no advisable direction for students to choose one of the two devices either handphone or laptop.

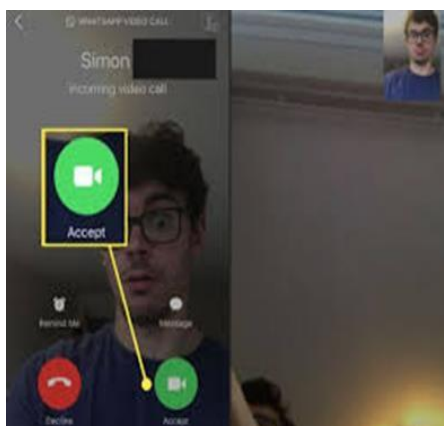


Figure 3.12 Whatsapp video call

In this study, this feature (figure 3.12) is alternative device to support online discussion collaboratively. The instructor used this feature for the purposes of communicating to particular students in privacy that frequently broke the

group rules and of passive students that took too much time to respond. The instructor provided advice and motivation with a promise of do not repeat the same mistake. If this mistake was still repeated, the instructor kicked them out from the group.



Figure 3.13 Whatsapp photo and video

This feature (figure 3.13) was used when the students felt that their answers need to add supplementary materials from others sources by using handphone camera. The materials have to be relevant to the discussion topic. The sources may be from internet, magazine or books. The result of camera shooting has to be edited before posting it to group.

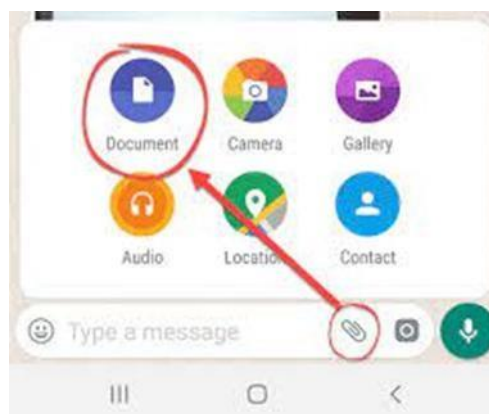


Figure 3.14 Whatsapp document

Another important feature in the discussion is Whatsapp document (figure 3.14). It is a part of attachement facility available on chatting clipboard besides camera, emoticons and voice record. In the attachement, there are other features such as camera, gallery, audio, location, and contact list. Whatsapp document

contains files, videos, or images that can be used to supplement student' answers. During the discussion, to strengthen their opinions or ideas, they used other sources of information either online or offline through internet usage. The materials students obtained through the document were attached before or after their answers. To avoid too long supplementary materials from the document, the students were only allowed to add maximum one paragraph or five sentences. The supplementary materials were posted at the same chatting of their answers or responses. not a separate part.

Furthermore, after all the members of the group were listed and joined the group and the instructor posted the two discussing questions, the instructor made rules or instruction as guidelines for the members before posted their messages. The instruction was regulated as follow:

- 1.The messages must be written in English.
- 2.Answer the questions according to your ability.
- 3.Do not ask to your peers
- 4.Your answers were not allowed to be similar to your peer's answers.
- 5.You are allowed to write your answers into Bahasa Indonesia first and then translate them into English.
- 6.Your answers must be original, not copy paste from other English sources such as internet or books.
- 7.Your answers should consist of answers and peer responses.
- 8.The length of your answers must be at least one paragraph or consists of 6 to 10 sentences.
9. About one week after the questions posted on group, students should post their answers.

Before all the procedures above completed as an initial preparation, the students were given couching clinic in face to face session at school and students were requested to apply health protocol of Covid 19. In the couching, three steps were conducted in the classroom :

- 1.Preliminary. In this step, some activities were carried out:
 - a.Introducing students to HOTS through materials and short video.
 - b.Guiding students with rules and guidelines during the discussion in WA group.

This step is very crucial because it determines the continuity and keeping connected students in the group and how to send and reply messages,

c. Fostering and training students with some basic English expression such as the use of according to me,..., I think..., I agree..., I don't agree... the use of basic grammar such as I, my, your, and the use of tenses especially present, simple past and future. In this step, if students found difficulties to write their answers directly in English, they were allowed to write first in Bahasa Indonesia and then translate them in English by using dictionary or e-dictionary that can be downloaded from Google Playstore. But they were firmly not allowed to copy paste the answers from other sources.

d. Doing some exercises in the form of essay which related to HOTS reading text. This exercise was intended to make students accustomed to practice HOTS items. Initially the instructor himself taught how to answer the HOTS items before the students were asked to do it.

e. Evaluating the whole process of couching. In this step, the instructor found out if all student have understood the instruction and learning process. If there were still any problem, the instructor explained again the points that the students did not understand.

2. Planning and Organizing which consist of activities as follow :

a. Make a list of students' active phone numbers.

b. Creating whatsapp group.

3. Implementation and Observation which consist of the activities as follow :

a. Instructor posts two questions and give feedback.

b. Teacher presence in WA group for motivation, humor, responses, or comments.

c. Ensuring that all students have posted their messages and completed them.

4. Analysis consist of the activities as follow :

a. Posted messages on WA group were categorized based on the model.

b. Coding all messages based on category.

The research steps are described in table 3.3

Table 3.3
Descriptions of research steps

No	Steps	Description	Length of day
1	Preliminary	Classroom couching :	

		<ul style="list-style-type: none"> • Introducing details of HOTS with materials and short videos • Guiding students with some rules and guidelines in online discussion • Fostering students with some basic expressions such as: according to me, I think..., I don't agree, I agree, etc. • Doing item exercises in forms of multiple choice and essays. • Evaluating the whole process of coaching 	Two days
2	Planning and Organizing	<ul style="list-style-type: none"> • Make a list of students' active phone numbers. • Creating whatsapp group. 	
3	Implementation and Observation	<ul style="list-style-type: none"> • Instructor posts two questions and give feedback. • Teacher presence in WA group for motivation, humor, responses, or comments. • Ensuring that all students have posted their messages and completed them. 	Seven days
4	Analysis	<ul style="list-style-type: none"> • Posted messages on WA group were categorized based on the model. • Coding all messages based on category. 	

3.3.1 Students Document.

Students document used in this research was in the form of student online worksheet transcribed from Whatsapp group. It consisted of online postings in which students post their messages in the form of answers and peer responses. Each message will be analyzed and categorized as a unit of analysis. Anderson and Krathwohl taxonomy model is used to measure students' higher order thinking through the messages. Some examples of online messages are illustrated in the following figures.

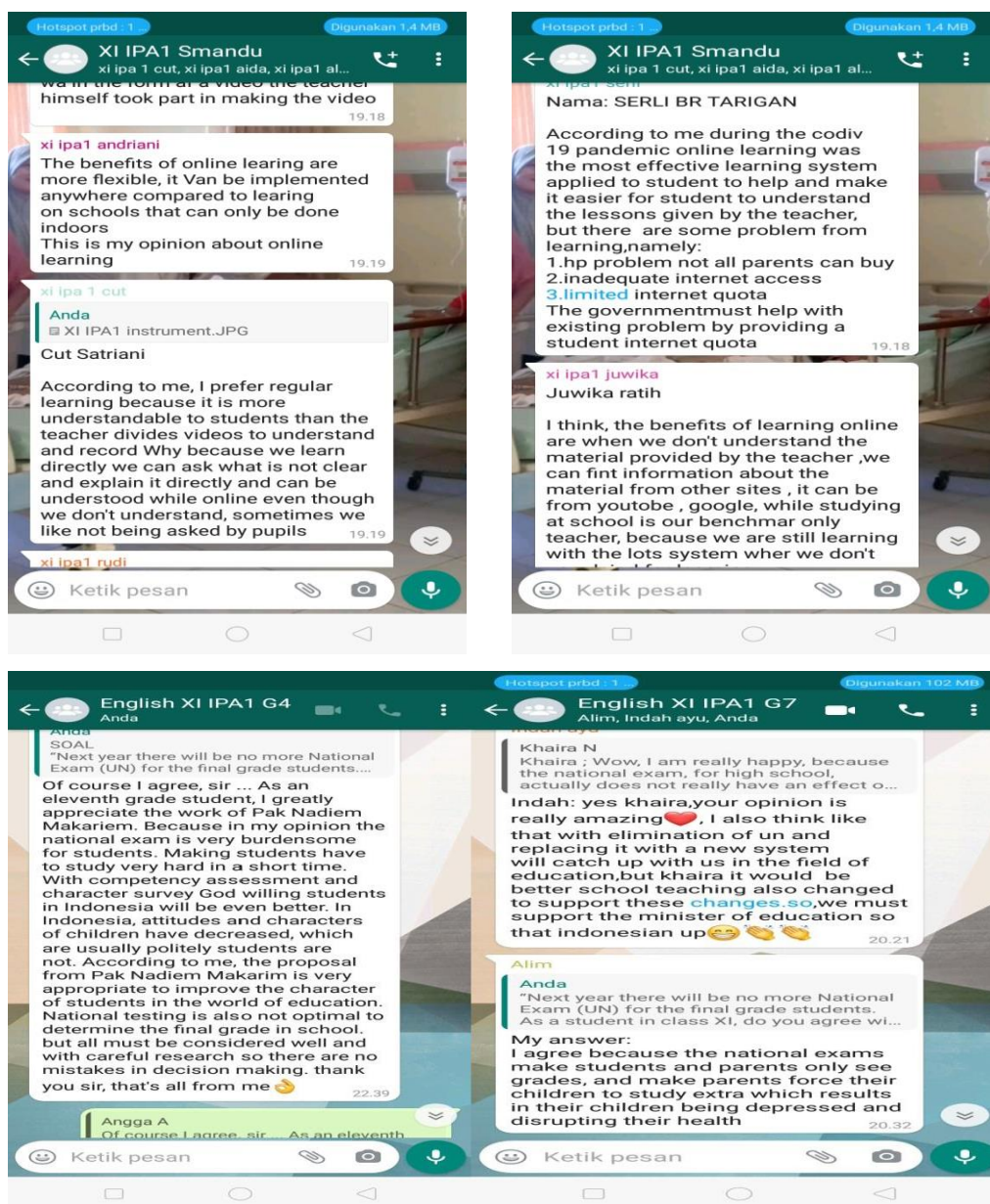


Figure 3.15 Examples of student postings as document

With total number of postings 82 from 31 students, the messages were then classified and coded. From this step, the coded messages were then determined which messages included in each of categories.

3.3.2 Student interview.

The interview session was conducted in the school. Due to Covid 19 pandemic, the session was carried out by applying health protocols in which students must use masker, wash hands and keep distance. In this study, the interview was conducted after the instructor completed the coaching clinic to get

spoken responses from the participants. There were eight questions asked to students. They are divided into two themes namely students perception on the usefulness of Whatsapp for online learning, and the second theme was about student perception on how student's higher order thinking skills can be promoted through online discussion mediated by Whatsapp. The first theme consisted of three questions, while the second one consists of five questions.

Duration of the interview session took about thirty minutes. The participants were 12 students and they were randomly selected to participate. The reason to select the students was due to the consideration of proportion in which the voices and opinions of the twelve participants were regarded to sufficiently represent the whole students. The participants consisted of 8 females and 4 males. The selection of gender did not consider how many females or males that have to be determined because the focus of analysis was on the content. Furthermore, to get satisfied feedback or responses from the students and to avoid intimidating situation, the atmosphere of interview was conditioned as comfortable as possible in the classroom. The instructor gave them some candies and drinking water while the interview was in progress. The interview activity were recorded and then transcribed verbatim to get findings.

3.4 Data Analysis.

This study focused mainly on two sources of data namely students' online posting transcripts on Whatsapp group as document and student interview. To get accurate findings, qualitative content analysis was employed. The whole transcripts on Whatsapp group were separately classified in a table based on the categories of HOTS. Content analysis was carried out at the level of message in which each postings was treated as unit of analysis. For example, single relevant message posted by the students was identified its content and then classified based on the indicator described in the categories of HOTS. The use of content analysis is certainly dilematic and potential to emerge some problems. Eventhough the message content were not whole relevant to the discussion, more necessary emphasis was on elaborative responses and the categories of cognitive skills that

the students used during the discussion. The interaction patterns among the students and between the instructor students in the transcripts were focused on.

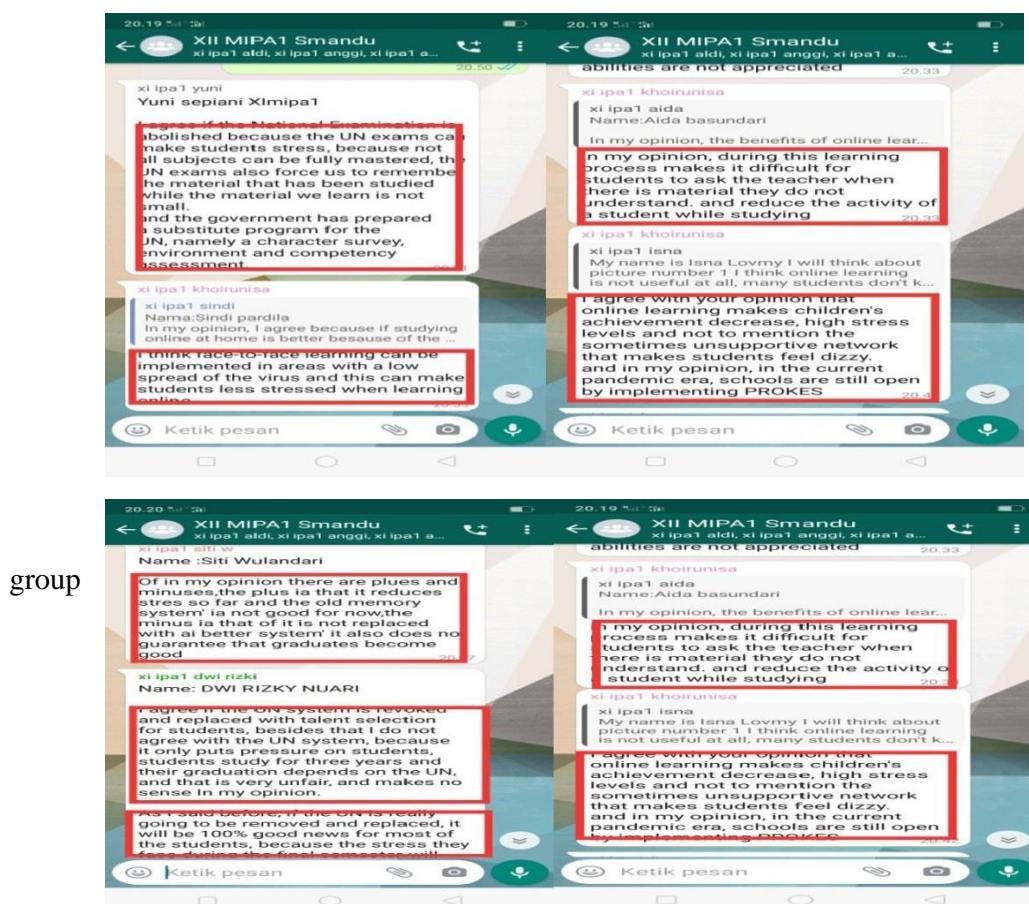


Figure 3.19 Examples of message transcripts extracted from Whatsapp

Coding scheme in this study employed two types of coding namely alphabet coding and color coding. The alphabet coding was symbolized with particular alphabets for simplification such as CS-A, A-D, A-O, and A-A for the category of analyzing; CS-E, E-Ch and E-Cr for the category of evaluating and CS-C, C-G, C-Pr, C-Pl for the category of creating. Meanwhile, the color coding was represented by three different colors such as green for analyzing, yellow for evaluating and red for creating. This type of coding was intended for the ease of marking the categorization. From this coding, the HOTS categorization from the posted transcripts can be determined. The definition of each classification was used as basic indicators for the outcomes of analysis. As the general category of HOTS in this study, the use of the definition was for manifestation of other

indicators because the definition was still regarded too general and less explicit.

Table 3.5 shows the explanation.

Table 3.5

HOTS category in general indicators (Adapted from Anderson & Krathwohl, 2001)

Code	Category	Indicator
CS	Cognitive Skills	Cognitive skills are the intellectual or mental activities that process information.
CS-A	Analyzing	Students break a topic or idea into components or examining a subject from different perspectives. Analysis helps reveal the connections among facts.
CS-E	Evaluating	Students make judgments about something based on criteria and standards. This requires checking and critiquing an argument or concept to form an opinion about its value.
CS-C	Creating	Students involves putting elements together to form a coherent or functional whole. It includes reorganizing elements into a new pattern or structure through planning. This is the highest and most advanced level of Bloom's Taxonomy.

To obtain accurate meaning, each code of the general categories was explicitly clarified with subcodes. For example, analyzing aspect consisted of three subcodes such as *distinguishing*, *organizing* and *attributing*. Each subcode has different definition or indicators which support the indicator of the general categories. Each subcode had alternative names to explain the meaning of the subcodes and equipped with applied skills and their definitions. Meanwhile, the category of *evaluating* has two cognitive processes namely *checking* and *critiquing*. The aspect of *checking* was about supporting to make decision on a problem, and the aspect of *criquing* was about the judgement of a procedure for a given problem. These processes have different definition to support the category of evaluating. For the category of *creating*, it has three cognitive processes with different definition. They are *generating*, *planning* and *producing* and each has

different definition. The three skills are the most complicated aspects which need hypothesis and good planning in constructing a procedure. The aspect of generating talked about constructing hypothesis of an observed phenomenon. The aspect of planning talked about conducting a procedure to complete a task. And the aspect of *producing* was about inventing a product. All these subcodes in this study were employed as analysis parameter to assess HOTS categories and the applied skills were used to interpret and discuss the observed data.

From table 3.5 the derivative definition of each subcode was explicitly explained with more detailed in table 3.6 and 3.7. From the alternative names of the subcodes, the meaning of HOTS categories became more explicitly segmented, so that which categories that were decided to take could be accurately selected. After this step completed, the applied skills of the categorization in the two tables were employed to interpret and discuss the data to obtain student's critical thinking outcomes. And at the end, the tendency of student's pattern of thinking in responding the questions was identified. The code and subcodes on table 3.6 were provided different indicators but with similar meaning. The subcodes in this table were used to display the outcomes obtained from data analysis, while the applied skills on table 3.6 were used to interpret student's thinking skills obtained from the data analysis. The reason to choice the applied skills in table 3.6 for interpretation due to the skills were regarded deeper and meaningful.

Table 3.6

Coding of each categories and their subcodes.

Code	Subcode	Alternative names	Applied skills
CS-A	A-D	Differentiating	Students can distinguish between irrelevant and relevant parts or important parts to insignificant parts of a given question.
	A-O	Organizing	Students can determine how a part of the element is correlated and can function together in determining the solution of a problem.
	A-A	Attributing	Students can determine the core of the relationship a question is given with the

			desired answer
CS-E	E-Ch	Checking	Students can track inconsistencies or consistency of a process or result to support decision making on a given problem.
	E-Cr	Critiquing	Students can detect inconsistencies between the results and decisions in accordance with the procedures given problems and provide a description of what is considered true.
CS-C	C-G	Generating	Students provide with alternative hypotheses based on criteria.
	C-Pl	Planning	Students plan a procedure for completing some tasks.
	C-Pr	Producing	Students are given a description of a result and must make a product that matches the description given, student need to built their own ideas.

Table 3.7

Subcodes of analyzing category.

Code	Alternative names	Applied skills
	CS-A	
A-D	Discriminating	Students distinguish relevant from irrelevant parts or important from unimportant parts of presented material
	Distinguishing	
	Focusing	
	Selecting	
A-O	Finding	Students determine how elements fit or function within a structure
	Coherence	
	Integrating	
	Outlining	
	Parsing	
	Structuring	
A-A	Deconstructing	Students determine a point of view, bias or values underlying presented material

Table 3.8
Subcodes of evaluating category

E-Ch	Coordinating	Students detect inconsistencies within a process or product; Students determine whether a process or product has internal consistency;
	Detecting	
	Monitoring	Students detect the effectiveness of a procedure as it is being implemented
	Testing	
E-Cr	Judging	Students detect inconsistencies between a product and external criteria; Students determine whether a product has external consistency; Students detect the appropriateness of a procedure for a given problem

Table 3.9
Subcodes of creating category.

C-G	Hypothesizing	Students come up with alternative hypotheses based on criteria such as generate hypotheses to account for an observed phenomenon.
C-Pi	Designing	Students devise a procedure for accomplishing some task such as plan a research paper on a given topic.

Table 3.7, 3.8 and 3.9 were employed to determine the categorization of HOTS. The selection of the indicator or applied skills in the tables was due to the definitions in the tables were more explicit than the definitions in table 3.5 and 3.6. Therefore, the indicators in table 3.7, 3.8 and 3.9 were used for interpretation and discussion of the data.

In attempting to get more detailed and explicit findings beside the result of HOTS categorization, assesment scale was also included. This is intended to

assess the degree of students' thinking skills in each of HOTS category and to depict explicit outcomes. Table 3.10 illustrates the scale.

Table 3.10

Assessment scale of student's HOT level. (Adapted from Kusuma et al., 2017).

Student scores	HOTS level
100 – 76	Excellent
75 – 51	Good
50 – 26	Enough
25 - 1	Poor

Furthermore, to answer research question number two, student interview was carried out to get students' perception about the usefulness of Whatsapp for online learning and whether discussion mediated by Whatsapp can promote their higher order thinking skills. Twelve students were randomly selected and they were asked one by one with the questions that have been prepared. The students were selected for the reason of representation of 31 students where all their opinions and voices were considered to represent all participants. In the interview session, the instructor provided eight questions with two themes. The first theme was about student's perception on the usefulness of Whatsapp for online and the second theme was on how student's higher order thinking can be promoted through the mediation of Whatsapp. The interview result was then recorded and transcribed verbatim.