CHAPTER III

RESEARCH METHODOLOGY

The previous chapter has covered the background theories for this study: Systemic Functional Linguistics (SFL), Transitivity System, and Genre in Science. This chapter focuses on the *research design, site and participants, data collection,* and *data analysis*. The *research design* elaborates the method employed by this study, its principles and characteristics. The *site and participants* discuss the place where this study was conducted and the participant involved in this study. *Data collection* explains the technique used in collecting the data. *Data analysis* presents the procedure of Students' Text Types and the identification of the texts' features as proposed by Martin & Rose (2007), Anderson & Anderson (1997), Knapp & Watkins (2005), Fang (2005), as well as Transitivity System identification and classification as suggested by Halliday (1994), and Eggins (2004).

3.1 Research Design

This study used descriptive qualitative research to answer the research questions. This study is aimed to analyze, describe, categorize the data which involves an investigation of some aspects in students' writing text, such as the schematic structure and linguistic features. This study also investigated the difficulties encountered by students in the process of writing their text. In the end, the researcher made an interpretation of the findings, and drew a conclusion based on the findings.

In association with qualitative design, this study is considered as a case study since it used a text analysis (Creswell, 2012). Moreover, this study attempted to describe and interpret a particular phenomenon (Marshall and Rosman, 2006), that is, how the students present information based on their own

understanding of a certain topic through analyzing the Transitivity system in their writing text.

3.2 Research Site

3.2.1 Setting

This study was conducted at International Program on Science Education (later abbreviated as IPSE) Department in a state University in Bandung. IPSE is the only department in Faculty of Science Education which uses English as the instructional language. The course was English for Academic 2 which was designed to enhance student competency in academic writing and academic reading. The techniques used in that course were assignment, project, discussion, and presentation. The media used in teaching learning process were audio visual aids. In choosing the site, researcher considered some aspects such as time, cost, and geographic condition.

3.2.2 Participant

The participants in this study were six students from second semester majoring International Program on Science Education. They were chosen because they were aimed to master science and English as the instructional language throughout their study. They are prepared to teach science in international secondary school. Thus, they use English most of the time at campus.

The six participants were chosen based on their average score during the first meeting of their course until the mid-term. They were classified into three different groups based on their score. The groups are: high achievers, middle achievers, and low achievers. According to Duff (2008), classifying the participants would make the analysis a lot easier, especially in obtaining useful data.

3.3 Data Collection

3.3.1 Collecting Students' Writing Text

In this study, the data were collected from a document collection and interviews. The documents used in this study are the texts written by students who are categorized into three groups: high, middle, and low achievers. The texts are the result from their last stage of writing activity in their English for Academic Purposes (EAP) class. The stages conducted in this study are elaborated as follows.

In the first stage, the students were asked to read scientific data from some articles, tables, and graph. Then, they were asked to write their interpretation of the data as a summary which could show what they understood about the presented data. After that, the teacher gave some feedbacks for each of their work.

In the second stage, students were given a text about animals' taste receptor. They were asked to write a summary from that text. Further, they learned some insights given by their teacher regarding the core framework of science writing.

In the fourth stage, they worked in a group to discuss a topic related to the text written in the previous stage. With their group, they were asked to write their ideas. Then, they gave comment on each group's work. The teacher also gave feedback too. Finally they revised their work based on the feedbacks gathered.

In the final stage, students were asked to re-write their group work with the same topic individually. Then, they had to submit their writing to their teacher to get feedback. The following table presents the title chosen by each category of student to their writing

Table 3.1 Students' Writing Text

Categories of Achievement	Text	Title
High Achievers	Text 1	The Mechanism of Tongue
	Text 2	Human Taste Receptors
Middle Achievers	Text 3	Human Taste Receptors
	Text 4	How Does the Tongue Work and the Mystery Inside
Low Achievers	Text 5	The Mechanism of Tongue (Saliva)
	Text 6	The Trigger That Make People Have Urge to Eat Spicy Food

These categories helped researcher to analyze the students' academic writing texts more easily. Each category gave deeper information about the text.

3.3.2 Interview

To clarify some data, conducting a recorded interview with the participants is needed. According to Creswell (2002, 2014) there are some advantages of conducting an interview during the process of data collection in qualitative study. The advantages are: interview is useful when participants are unable to be directly observed, participants can provide historical information, an interview allows researcher to control over the line of questioning, and it permits participant to tell the detail of their personal information. The initial intention of using interview is to get additional insight about the participants' difficulties in writing the text from their point of view.

3.4 Data Analysis

The data collected from this study were analyzed into three stages: identification of the transitivity system that occurs in the texts, identification of the type of the texts, and identification of schematic structure and the linguistic features of the texts. Each stage is explained as follow.

3.4.1 Identification of Transitivity System

In order to identify the type of the students' writing texts, the identification of transitivity system in each text was needed. Therefore, the students' texts were broken down into number of clauses. The analysis of the Transitivity System was based on the theory from Halliday and Matthiesen (2004), Eggins (2004), and Emilia (2014). Table 3.2 is the example of transitivity identification from Text 3:

Table 3.2 Analysis of Transitivity System

1.	Human	can taste	many kinds of foods and drinks.
	Senser	Process: Perceiving	Phenomenon

2.	The human tongue	has	role	in the process of speaking
	Processor	Process: possession	Possessed	Circ: Loc: Place

3.4.2 Identification of Text Types

After identifying the participants and process that mostly occur in each of students' text, researcher determined the type of the text. This stage used Martin and Rose's (2007), Anderson and Anderson's (1997), and Knapp and Watkins's (2005) theory about text types. The texts were categorized by the text types that mostly occur in science such as Explanation Text, Report Text, and Procedure Text.

3.4.3 Identification of Text's Schematic Structure and Linguistic Features

To find out the extent to which students' texts fulfill any type of text's schematic structure, the identification of each text's schematic structure should be conducted. The students' texts were analyzed whether they consist of generic structure of certain text which occurs mostly in science field. Table 3.3 is the example of schematic structure's identification from Text 1 which is identified as Explanation Text:

Table 3.3 Schematic Structure of Text 1

THE MECHANISM OF TONGUE
Phenomenon 1. Tongue is one of our senses beside eyes, ears, nose, and skin. 2. Tongue can help us to taste different flavors; ~~like~~ sweet, salty, sour, biter, and umami. 3. In fact, we can taste those flavors by the entire surface of the tongue. 4. ~~Although~~ there are several people [[who have several areas in the tongue [which is ~~more~~ sensitive to certain flavor.]] 5. (But), we're not going to talk about it, 6. we're going to talk about [[how our tongue can taste them]] **Explanation** 7. Each taste receptor has a group of receiver cells [called microvilli [[which is located in the center of the taste receptor]] 8. Microvilli can send the message from the chemical substance ~~from~~ of the food through the microscopic fiber to our brain. 9. Then, our brain will decide [whether the food ~~tasted~~ (is) sweet, bitter, salty, or umami] 10. At first, the researchers thought [that every person has their own type of taste receptor] 11. However, the latest theory state(d) [that chemical substance on the taste receptor will cooperate to create a pattern [which shows whether the flavor is sweet, salty, sour, ~~our~~ or bitter]] 12. Our tongue has 4 receiver cells for 4 primary flavors 13. It is scientifically proved. 14. But for umami taste, it is still in the stage of (being) research(ed). 15. And how ~~we can~~ can we taste spicy? 16. Spicy actually (is) not a flavor. 17. It is just a ~~sense of burning~~ a burning sensation [caused by a chemical substance [called capsaicin] 18. [If the other flavors have their own receptor cells], ~~the~~ spicy (is) received by the papillae of the tongue and the sensory nerve receptor ~~for high heat~~. 19. This is how the burning sensation come(s). 20. The receptor send(s) information to our brain as an irritation as if ~~of the burn of cells~~ the cells are burnt [which is similar to the burning skin] 21. Thus, when we taste spicy (food), brain will response like [we are (being) burnt] 22. In fact, ~~arising from this~~ the arising heat is just the sensation of spicy and (is) not really ~~on~~ (burnt by) fire.

After analyzing each text's schematic structure, the next step was analyzing the features found in the text, which indicates to what extent students wrote their text with the appropriate features, especially the features of scientific

text suggested by Halliday and Martin (1993), Martin and Veel (1998), and Fang (2005; 2006).

3.4.4 Transcribing and Condensing Interview

The next step after analyzing students' writing texts is identifying students' difficulties in writing academic texts from interviews. First, the researcher recorded and transcribed the interview. After that, the researcher classified the students' difficulties found in the interview based on the ones who encounter them. Lastly, the researcher presented the data into a condensed body of information and did the interpretation of the findings.

3.5 Concluding Remark

This chapter has presented the methodology used in this study which includes research design, site and participant, data collection, and data analysis. The research design of this study is a case-study. The texts were collected from the second-year International Program on Science Education (IPSE) students in a state university in Bandung. The text later were analyzed with Transitivity System in Systemic Functional Linguistics suggested by Halliday and Matthiesen (2004), Eggins (2004), and Emilia (2014), Scientific Texts Features suggested by Fang (2005; 2006), and the Type of Texts in Science field proposed by Martin & Rose (2007) and Knapp & Watkins (2005). The next chapter will elaborate the findings and the discussions of this study.