CHAPTER IV

DATA AND ANALYSIS

4.1. Data

After explaining the research background, the theories that support the research, and the research methods used, this chapter presents the research results. The research results will be explained based on the results of interviews, observation and documentation. The discussion in this chapter is obtained through the results of data collection through documentation studies, observations, interviews with sources needed in the research, as well as discussions that focus on the problem under study. To obtain research objectives, researchers analyzed data systematically and accurately. At the analysis stage, the researcher made a list of questions for interviews, collected data, and carried out data analysis carried out by the researcher himself. To be able to find out Student Perspectives on Teacher Instructions Using English and Indonesian in Biology Classes.

First, develop a checklist for interview questions based on the research focus on students' perspectives or opinions, student participation in two languages and the benefits of learning two languages in one object. In the chapter on the results of this research and discussion, various matters relating to the results of the July 2023 interview which were conducted at SMP Mondial Semarang will be explained regarding Student Perspectives on Teacher Instructions Using English

and Indonesian in Biology Classes (Case Study of Class 8 Students of SMP Mondial 2022/2023). Interviews conducted by researchers were conducted on July 19, 2023. The results of this study were obtained using in-depth interview techniques with informants as a form of data collection and observation. The following is a table of interview schedules conducted by researchers:

Table 4.1

No.	Name	Languages	Class	Date	Time	Place
1.	QZD	Indonesian	8C	July 20, 2023	11.00	Zoom Meeting
2.	JR	English	8C	July 20, 2023	11.30	Zoom Meeting
3.	JDG	Indonesian	8B	July 20, 2023	12.00	Zoom Meeting
4.	MJB	English	8A	July 20, 2023	13.00	Zoom Meeting
5.	AAC	Indonesian	8A	July 20, 2023	13.00	Zoom Meeting

Source: Researcher 2023

In order for this interview to be more systematic and directed, the researcher divided it into three discussions. That is :

1. Research Results
2. Description of Research Identity
3. Discussion

Data obtained from the field were analyzed through the following stages. The first stage of data collection involves classifying the data and building a narrative. The data obtained from observations and interviews were arranged according to the predetermined micro problem formulation. The information obtained is adjusted to the needs listed in the problem formulation. The second stage of data reduction involves categorizing and collecting important information that is relevant to the research problem. Data from the interviews were collected and grouped based on the topic of the problem being tested. The information obtained was compiled based on sources from Mondial Junior High School's students. The third stage of presenting data involves interpreting data that has been provided by informants regarding the problem under study. After data collection, the information is adjusted to the informant's statement and the formulation of the problem that has been prepared. The data that has been compiled is then presented neatly so that it is easy to understand. The fourth stage of drawing conclusions involves taking conclusions based on the narratives that have been prepared in the previous stage, to provide answers to research problems. After the data is collected, a discussion is carried out which results in conclusions related to the problem under study. The data collected by the researcher was then tested for validity through several methods:

1. Source triangulation involves checking data from different sources in different ways and at different times. Researchers examined the data obtained from several different sources. Technical triangulation involves checking data to the same source, but using different techniques. In

addition to interviews, researchers also made observations to gain an understanding of field conditions. The results of observations are then documented. Observations were made at Mondial Junior High School which is on Jl. Candi Golf Boulevard no. 2, Candisari, Karanganyar Gunung, Semarang, Jawa Tengah. Observations were made to obtain information about field conditions. This method is used to ensure the validity of the data obtained by researchers.

2. The discussion technique with colleagues is carried out by presenting the interim results or the final results of the research to colleagues who have similar research.
3. The process of checking the data obtained by the researcher to the data provider. The aim is to verify the extent to which the data obtained is in accordance with what is provided by the data provider. This ensures that the information used in writing reports is in accordance with what is intended by the data source or informant.

4.2. Research Findings

The research findings section will present a detailed analysis of the individual interviews conducted with the five participants. The researcher will categorize and reduce the data by collecting crucial information relevant to the research problem and grouping it according to specific problem topics. This process will enable a comprehensive understanding of the participants' responses

and help draw meaningful conclusions from the data. The data reduction will involve organizing the information in a systematic manner, facilitating easier interpretation and identification of patterns and themes related to the research topic. Through this approach, the researcher aims to provide a rich and insightful exploration of the participants' experiences and perspectives on the subject matter.

1. Early introduction to English at School

The investigation focused on the duration during which students utilized English as a medium of communication. The study involved five participants who were asked about their initial experiences of using English in a school setting. The interviews provided mixed responses, showing various examples of when individuals first became involved with English in an educational context.

Participants QZD response,

"I have been using English since the first time of 7th grade, back on my primary school, we only use English just when we study about it."

Participants JR response,

"I have been using English since playgroup. Mondial was my first school and here we were taught to use English regularly at school since playgroup I guess."

Participants JDG response,

"I have been studying English since I was a pre-primary student but started using it since I was a primary student."

Participants MJB response,

"I have been using English since I was kindergarten."

Participants AAC response,

"Me too, I have been using English since I was kindergarten."

Participants provided diverse responses regarding their English language usage. Participant QZD mentioned using English since the beginning of 7th grade, but English was primarily employed during specific study sessions in their primary school. Participant JR reported using English since playgroup, where they were regularly taught to use English at Mondial, their first school. Participant JDG stated they started studying English as a pre-primary student but actively used it when they entered primary school. Participants MJB and AAC both confirmed using English since kindergarten.

2. Daily Communication: English Dominance with Occasional Bahasa Indonesia Usage

This study examines the language used by individuals in daily interactions. Five participants took part in the study, and each was asked whether they incorporated English into their daily communication. Responses varied significantly, with some confirming regular use of English in their daily interactions, while others reported minimal use of the language in their daily lives. This diversity in responses highlights the varied roles that English plays as a means of communication between different individuals.

Participants QZD response,

"No, I don't, sometimes I use Bahasa Indonesia because it's already my usual habit to speak in Bahasa Indonesia and a little bit of English."

Participants JR response,

"Yes, I do. I use English regularly because I have two younger brothers school at Mondial. One of them is six grade now and the other one is second grade, and they both were also taught in English of course in Mondial and we use English to communicate each other so we help each other to develop our English speaking. So, this is how my English sounds now and I proud of it."

Participants JDG response,

"Yes, I do, but I switch between Indonesian and English."

Participants MJB response,

"No, I don't. I still use Indonesian as my daily communication but I also often use English to speak with my friends and family."

Participants AAC response,

"No, I don't use English as my daily communication."

In response to the question, five participants shared their views on their language usage patterns. Participant QZD acknowledged that they do not exclusively use English in their daily communication. Instead, they often rely on Bahasa Indonesia as it has become their habitual mode of speech, though they do incorporate some English into their conversations. On the other hand, Participant JR expressed that they do use English

regularly in their daily interactions. This is largely due to having two younger siblings attending Mondial, where English is the primary medium of instruction. They communicate with their siblings in English to support each other's language development, and they take pride in their current level of proficiency. Participant JDG also confirmed that they use English as part of their daily communication, but they occasionally switch between Indonesian and English depending on the context or situation. Participant MJB, however, does not predominantly use English as their daily communication. They continue to rely on Indonesian for their everyday conversations but do use English frequently when speaking with friends and family. Lastly, Participant AAC indicated that they do not use English as their primary language of communication on a daily basis. The participants' responses demonstrate a varied use of English in their daily lives, reflecting their individual linguistic backgrounds, experiences, and preferences. Some embrace English as a regular mode of communication, while others balance it with their native language, Indonesian. This diversity highlights the multicultural and multilingual nature of their interactions and signifies the significance of language in shaping personal connections and expressions.

3. Bilingual Biology Class Usage

The research sought to identify the grade level at which biology classes were conducted using two languages. Five participants took part in

the study and were asked about their experiences with bilingual biology classes. The responses varied, with some recalling bilingual biology instruction from early grades, while others mentioned encountering it in higher grades. This diversity in responses provided valuable insights into the implementation and preferences for bilingual education in the context of biology teaching.

Participants QZD response,

"Since I was in the grade 7th."

Participants JR response,

"Since I was in 7th grade, because the only taught as a specific lesson called biology and biologi at seventh grade in junior higher. At elementary school they usually taught biology in sciences and biologi in tematik but everything in tematik is about biologi and not everything in science is not biology. So, now my only introduce clarify as well biology and biologi."

Participants JDG response,

"Since I was primary student. Maybe starting from the third I guess, third grade."

Participants MJB response,

"Actually I have also learned both science and ipa since primary in mondial too but for the specific biology I started since grade 7."

Participants AAC response,

"Since I was in grade 7. The first time I studied biology in two languages was only in Junior High School."

Participants provided their responses regarding the grade in which Biology class was taught using two languages. Participant QZD stated that it was in 7th grade when they started studying Biology using two languages. Participant JR explained that the integration of both "biology" and "biologi" as distinct subjects occurred during 7th grade in junior high. At the elementary level, the subject was taught under different names, such as "sciences" and "tematik," with "tematik" focusing primarily on biology. Participant JDG recalled that the exposure to Biology in two languages possibly began in the third grade during primary school. Participant MJB clarified that while they learned both science and *"IPA"* since primary at Mondial, the specific study of Biology in two languages commenced in 7th grade. Participant AAC's experience with Biology in two languages started in 7th grade, specifically during their time in Junior High School.

Overall, the participants' responses reveal the diverse points at which they encountered Biology class with bilingual instruction. The responses indicate that the introduction of Biology class in two languages occurred during the 7th grade for most participants, either in junior high or primary school, and that Mondial School had a unique approach to teaching science subjects.

4. Differences in Biology Lessons: English vs. Indonesian

The study aimed to explore and highlight the noteworthy distinctions between biology lessons conducted in English and Indonesian. Five participants were involved in the research and were asked to share their insights on the subject. Each participant provided diverse responses, elucidating various aspects such as language clarity, comprehension levels, teacher proficiency, and overall learning experiences. The contrasting answers shed light on the multifaceted nature of bilingual biology education, revealing its advantages, challenges, and implications for students and educators alike.

Participants QZD response,

"Well i think the language is the one reason why it's different, well sometimes it's a bit hard to understand the words one by one but as long as the materials is the same i can understand it."

Participants JR response,

"In my opinion, Miss. There are no really big significant differences, maybe small one. They both teach the same material but sometimes in different order. For example, in term one biology may teach about the human body and biologi may teach about photosynthesis in plants. In term two is the reverse, biology may teach photosynthesis in plants and biologi about the human body. It's not a big deal in my opinion and maybe there are some small details that are taught in one of the subjects that are in the others."

Participants JDG response,

"The significant differences is the language of course and also sometimes one of them are taught with more details than the other."

Participants MJB response,

"The significant difference is that in the English curriculum, biology was taught in a more general way and not going into every detail, it taught us more about the connection of the lessons with our daily life and sometimes gives us insight about biology in the future or biotech. While in the Indonesian curriculum, biologi was taught in a more detailed way and had many things for us to memorize. It didn't have much to do with critical thinking nore technology so I think this could be improved more in the curricula. Other than that, sometimes we have different topics to be discussed so sometimes we learn a chapter in biology but the chapter is not in the biologi textbook or vice versa."

Participants AAC response,

"For me, learning biology using Indonesian is more effective but I also need to study biology in English because I need some logic questions in the quiz helps me a lot."

Participants provided their perspectives on the differences between learning Biology in English and Indonesian, expressing various opinions on the significance of these distinctions. Participant QZD believed that the language barrier posed some challenges, but overall, they could

comprehend the material as long as it remained consistent. Participant JR shared that while there were minor variations, the essence of the subject matter remained the same in both languages. The sequence of topics differed, but it did not greatly impact their understanding. Participant JDG highlighted the most notable distinction as the language of instruction, with some subjects delving into more detail than others. Participant MJB pointed out significant differences between the English and Indonesian curricula. In the English curriculum, Biology was taught more generally, emphasizing connections to daily life, future biotechnology insights, and critical thinking. Conversely, in the Indonesian curriculum, Biologi was taught with a focus on memorization, lacking critical thinking and technology-related components. They suggested potential improvements in both curricula to address these disparities. Participant AAC expressed a preference for learning Biology in Indonesian due to its perceived effectiveness. However, they also acknowledged the importance of studying Biology in English to improve problem-solving abilities, particularly in quizzes with logic-based questions. Overall, the participants' responses demonstrated their awareness of the language-related distinctions in learning Biology and the varying levels of detail and emphasis between the English and Indonesian curricula. They presented valuable insights into the strengths and areas for improvement in both approaches.

5. Effectiveness of Learning Biology: English vs. Indonesian

The main focus in this section is to find out the comparative effectiveness of learning biology in both Indonesian and English. The study involved five participants sharing their perspectives on the problem, each providing a different response. Some participants liked studying biology in Indonesian for better understanding, while others believed that using English improved their understanding of complex scientific concepts. The variety of answers offers valuable insight into the potential benefits of teaching bilingual biology and underscores the importance of adapting a language approach to individual learning preferences.

Participants QZD response,

"For myself Bahasa Indonesia is more effective, more easier, but sometimes it can be the English one too so both of them is effective, like for example a name of something sometimes it's difficult to read so it's 50/50." `

Participants JR response,

"For me it is definitely English not because of the lessons, both the teachers, Ms. C teach biologi really well and Ms. R also teaches biology really well, I understand both perfectly. But, personally I am more comfortable with English than Indonesian, so I pick biology."

Participants JDG response,

"For me, learning biology in Indonesian is more effective because it is my mother language."

Participants MJB response,

"As I said before, biology goes more deep into critical thinking, biotech, and the definitions are simpler to understand as it is not as detailed as our biology lesson in indonesian."

Participants AAC response,

"For me, learning biology using Indonesian is more effective but I also need to study biology in English because I need some logic questions in the quiz helps me a lot."

Participants shared their preferences regarding the language of instruction for learning Biology, expressing various reasons for their choices. Participant QZD stated that both Bahasa Indonesia and English were effective for them, though they found some challenges in reading certain names. Overall, they considered both languages equally beneficial. Participant JR, on the other hand, favored learning Biology in English not because of the teachers or lessons but due to their personal comfort with the language. Participant JDG emphasized the effectiveness of learning Biology in Indonesian, as it was their native language. Participant MJB reiterated that Biology, taught in English, delved deeper into critical thinking, biotech, and featured simpler definitions, which they found easier to understand than the detailed lessons in Indonesian. Lastly,

Participant AAC expressed a preference for learning Biology in Indonesian, finding it more effective for their understanding. However, they acknowledged the need to study Biology in English to tackle logic-based quiz questions effectively. The participants' responses showcased their individual language preferences and the factors influencing their choices in learning Biology. Some participants felt equally comfortable with both languages, while others preferred their native language or English for personal reasons or specific learning advantages.

6. Future Expectations: The Role of English in Biology Lessons

This study aims to explore participants' expectations regarding the future use of English in biology lessons. Several participants expressed the hope that the integration of English would increase global scientific research and communication opportunities. Others anticipate potential challenges to language comprehension but recognize the importance of language proficiency for scientific progress. The varied responses provided valuable insight into participants' perspectives on the role of English in biology education in the years to come.

Participants QZD response,

"My expectations are to make me more confident and more fluent on using english, if maybe there's an questions about biology i can understand it without i have to translate some words"

Participants JR response,

"It will definitely help me with my future school like what I said earlier. English in biology really helps me understand better, better than Indonesian. Maybe it can help me in the future, at college or at senior high but out of academic education I honestly don't think that I'm good at use it."

Participants JDG response,

"My expectations are for me to understand biology in English even more and add biology-related english vocabularies because I feel like it will be very useful for me growing up, like for example being a college student because it has been my dream since I was younger to be a doctor."

Participants MJB response,

"In the future I hope I could get more beneficial information as I do like the English biology lessons. I also hope I get to know more about scientific terms in English."

Participants AAC response,

"In my opinion, my expectation of using English in biology lessons is I hope that learning in biology class is more exciting and the explanation is more detailed."

Participants shared their preferences regarding the language of instruction for learning Biology, expressing various reasons for their choices. Participant QZD stated that both Bahasa Indonesia and English were effective for them, though they found some challenges in reading

certain names. Overall, they considered both languages equally beneficial. Participant JR, on the other hand, favored learning Biology in English not because of the teachers or lessons but due to their personal comfort with the language. Participant JDG emphasized the effectiveness of learning Biology in Indonesian, as it was their native language. Participant MJB reiterated that Biology, taught in English, delved deeper into critical thinking, biotech, and featured simpler definitions, which they found easier to understand than the detailed lessons in Indonesian. Lastly, Participant AAC expressed a preference for learning Biology in Indonesian, finding it more effective for their understanding. However, they acknowledged the need to study Biology in English to tackle logic-based quiz questions effectively. The participants' responses showcased their individual language preferences and the factors influencing their choices in learning Biology. Some participants felt equally comfortable with both languages, while others preferred their native language or English for personal reasons or specific learning advantages.

4.3. Discussion

In this section, we will discuss the results of the interviews that have been conducted. The discussion revolves around six questions that gather insights from the participants. These questions explored various aspects, such as students' first use of English at school, their preference for language in biology lessons, and

their expectations for the future integration of language into the subject. Participants' responses provided diverse perspectives, highlighting the importance of language choice in education and the need for an inclusive approach to address individual language preferences and enhance the learning experience.

1. Exploring Students' Early Usage of English in Education: Diverse Experiences and Implications for Language Proficiency

    This first section of the study revolves around the topic of the participants' initial usage of English in a school setting. The primary focus is on gathering information from the participants about the specific time they first encountered and used the English language during their educational journey. By exploring this aspect, the study aims to understand the early experiences of students with English as a medium of communication in an academic environment. The participants' responses showcase a range of experiences and starting points when it comes to using English as a language of communication. Participant QZ's journey began in the 7th grade, indicating a later introduction to English compared to others. However, it seems that English was mainly reserved for specific study sessions during their primary school years, suggesting a selective integration of the language into the curriculum.

    On the other hand, Participant JR's exposure to English started even earlier, during playgroup, which speaks to the increasing trend of introducing English at a very young age in some educational settings. This

highlights the importance placed on English proficiency from the early stages of a child's education. Mondial, the first school mentioned by JR, appears to have adopted a bilingual approach, emphasizing regular English instruction. Participant JDG's account reveals an interesting pattern, where the formal study of English began during the pre-primary stage but became more actively utilized upon entry into primary school. This indicates a transitional phase, where students may start with foundational language learning and gradually integrate it into their everyday communication as they progress in their education. Participants MJB and AAC stand out for having English incorporated into their lives from an even earlier age, with both reporting its use since kindergarten. This early exposure might have significant implications for language acquisition and proficiency, as research suggests that early language exposure can positively impact language learning and fluency (Hoff, 2006). Several studies have explored the benefits of bilingual education and early language exposure. Research by Petitto et al. (2012) demonstrated that children exposed to two languages from infancy showed enhanced cognitive flexibility, which is beneficial for academic success. Another study by Paap and Greenberg (2013) found that bilingual individuals exhibited better attention and task-switching abilities compared to monolinguals.

In conclusion, the diverse responses from the participants regarding their English language usage highlight the various starting points and trajectories in language acquisition. Early exposure to English, as demonstrated by some participants, aligns with research suggesting potential cognitive and academic benefits. However, the overall effectiveness of bilingual education and language integration warrants further investigation to develop comprehensive language learning strategies that cater to individual needs and maximize language proficiency. Participant JDG's experience fell in between, as they began studying English in pre-primary school but actively used it when they entered primary school. The most striking similarity between Participants MJB and AAC was that both of them confirmed using English since kindergarten, suggesting an early and consistent integration of the language in their education. These interview results align with previous research on the importance of early language exposure in promoting language proficiency. Studies have shown that early exposure to a second language, particularly during preschool and kindergarten, can lead to improved language development and cognitive benefits. Children tend to be more receptive to language learning at younger ages, and this early exposure lays a strong foundation for further language acquisition and usage. Overall, the interviews' results and the context of previous research emphasize the importance of early exposure and consistent use of the English language for enhancing language proficiency. Creating immersive

learning environments and integrating English into various aspects of education from an early age can contribute to better language skills and open up broader opportunities for communication and future academic and professional success.

2. Understanding How English is Used in Daily Communication: Examining Linguistic Practices and Identity Expression.

In this segment, we will explore the topic of "English language usage in daily communication." We will delve into whether individuals incorporate English as a regular means of communication in their everyday interactions. The focus will be on understanding the participants' language preferences and examining the role of English in shaping their daily communication patterns. By gathering insights from various respondents, we aim to gain a comprehensive understanding of the significance of English in their daily lives. Upon being questioned, five participants opened up about their language usage patterns, revealing a diverse array of preferences and practices. While some individuals incorporate English into their daily interactions, others predominantly rely on their native language, Indonesian. Participant JR stands out as a regular user of English, citing its significance in supporting their younger siblings' language development. This finding aligns with the notion of language as a tool for interpersonal bonding and familial communication (Hoff, 2013). Participant JDG's adaptive language behavior, switching between

Indonesian and English depending on the context, exemplifies the concept of code-switching, which is common in bilingual individuals and is influenced by social factors (Gardner-Chloros, 2009). The ability to seamlessly switch between languages in different situations showcases the participants' linguistic flexibility and proficiency. For Participant MJB, English assumes a special role in their communication repertoire, mainly employed when interacting with friends and family. This selective use of English highlights its significance in fostering particular social connections and reflects the participants' awareness of language dynamics in various social settings (Pavlenko, 2014).

Interestingly, Participant AAC primarily abstains from using English as their daily mode of communication. This observation raises questions about the factors influencing language preferences and the impact of language attitudes on language use (Doerr & Zimman, 2014). Understanding the motivations behind such choices can shed light on the intricate relationship between language and identity. Research by Gardner-Chloros (2009) highlights the significance of code-switching as a feature of bilingual communication, serving various functions such as identity expression and social alignment. This aligns with the observations made in the current study, where Participant JDG's code-switching behavior reflects their adaptability and social awareness. Pavlenko (2014) explores the concept of linguistic repertoire, emphasizing the dynamic use of

multiple languages by bilingual individuals. The selective use of English by Participant MJB resonates with this idea, demonstrating how individuals draw from their linguistic repertoire to accommodate diverse social contexts. Moreover, studies by Doerr and Zimman (2014) delve into language attitudes and their impact on language practices. The case of Participant AAC, who refrains from using English in their daily communication, might be influenced by their language attitudes and perceived social implications.

The responses of the five participants regarding their language usage patterns reveal a rich tapestry of linguistic practices, encompassing regular English users, code-switchers, selective language users, and those who prioritize their native language. This diversity underscores the multifaceted roles language plays in shaping personal connections and identity expression. The findings shed light on the dynamic nature of language use in social contexts, highlighting the need for further research into language attitudes, code-switching behaviors, and the intricate interplay between language and individual identity.

3. Exploring Bilingual Bilingual Instruction: Varying Timelines and Approaches

In this section, our focus will be on exploring the grade level at which Biology classes were conducted using two languages. We will delve

into the participants' responses and analyze their experiences with bilingual Biology instruction. By examining their accounts, we aim to gain insights into the varied approaches and timelines for integrating two languages into Biology education. This investigation will shed light on the significance of bilingualism in the context of learning Biology. The participants' responses shed light on the varying experiences and timelines for the incorporation of two languages in Biology class. Participant QZD and Participant AAC both reported the introduction of bilingual Biology instruction during their 7th-grade year in Junior High School. This suggests a consistent approach to bilingualism in Biology across educational institutions. Participant JR's account is unique as it reveals a distinct approach to teaching Biology using two languages. At the elementary level, the subject was taught under different names, but the integration of both "biology" and "biologi" occurred during 7th grade in Junior High School. This approach might have been implemented to gradually expose students to bilingual scientific terminology. Participant JDG's recollection points to a possible early introduction to bilingual Biology education. The exposure to Biology in two languages could have begun as early as the third grade during primary school. This early exposure aligns with research that emphasizes the benefits of early bilingual education in enhancing language development and cognitive skills (Nelson & Kohnert, 2017).

Mondial, as mentioned by Participant MJB, seems to have incorporated both science and "IPA" (the Indonesian term for science) in their primary education, but the focused study of Biology using two languages commenced in 7th grade. This observation hints at a gradual and comprehensive approach to bilingual science education.The participants' diverse experiences in bilingual Biology instruction demonstrate the importance of contextual factors in shaping language integration practices in the educational landscape. However, it is essential to conduct further research to assess the overall effectiveness and impact of bilingual education in the field of Biology. Research by Nelson and Kohnert (2017) supports the idea that early bilingual education offers cognitive advantages, including improved executive functions and metalinguistic awareness. The early exposure to bilingual Biology, as mentioned by Participant JDG, might have contributed to their enhanced language and cognitive skills.

All the participants' responses regarding the grade when Biology class was taught using two languages showcase varying timelines and approaches to bilingual education. Participant QZD, JR, JDG, MJB, and AAC all offered unique perspectives, reflecting the diverse language integration practices across different educational settings. These findings emphasize the significance of context in shaping bilingual education and highlight the potential benefits of early exposure to bilingual instruction in

fostering language and cognitive development.

4. Exploring Distinctions in Biology Lessons: English vs. Indonesian Instruction

This question aims to explore and identify the notable distinctions in biology lessons when taught in English versus Indonesian. By examining the differences in instructional language, content depth, teaching approaches, and learning outcomes, the study seeks to gain insights into the impact of language on the educational experience and students' understanding of biology concepts. Understanding these differences is crucial for optimizing bilingual education strategies and enhancing biology instruction in diverse linguistic settings. The participants' perspectives on the differences between learning Biology in English and Indonesian shed light on the varying nuances and implications of language choices in education. Participant QZD acknowledged the challenges posed by the language barrier but emphasized that consistent exposure and practice enabled them to comprehend the material effectively. This finding resonates with research that suggests consistent language input contributes to language learning and proficiency (Hoff, 2006).

Participant JR's observation of minor variations in subject matter between the two languages while retaining the essence aligns with previous studies on bilingual education. Research by Baker (2011)

suggests that bilingual learners can transfer their knowledge between languages, enabling them to grasp core concepts regardless of the language of instruction. The distinction highlighted by Participant JDG, focusing on the language of instruction impacting content depth, echoes the notion of linguistic relativity, where language influences the way individuals perceive and interpret information (Boroditsky, 2011). It underscores the importance of considering language choices in shaping educational content and outcomes. Participant MJB's identification of significant differences between the English and Indonesian curricula in Biology instruction reveals the potential impact of language on the depth and breadth of educational content. This finding aligns with the work of Pavlenko (2014), emphasizing that language choice can affect the way information is conveyed and understood. Research by Cummins (2014) also supports the notion that the language of instruction can influence cognitive development and critical thinking skills. Participant MJB's observation of the English curriculum's emphasis on critical thinking and future biotechnology insights highlights the potential benefits of using a language that encourages higher-order thinking. Participant AAC's preference for learning Biology in Indonesian due to perceived effectiveness highlights the significance of language comfort and familiarity in the learning process (Dewaele & MacIntyre, 2016).

The participants' perspectives on learning Biology in English and Indonesian provide valuable insights into the influence of language on education. The findings emphasize the importance of consistent language exposure, the transferability of knowledge between languages, the impact of language of instruction on content depth, and the potential benefits of multilingual education in fostering critical thinking. These observations underscore the need for thoughtful language integration strategies to optimize educational outcomes and cater to individual language preferences and learning needs.

5. Comparative Effectiveness: Learning Biology in Indonesian vs. English

The study focuses on determining the effectiveness of learning biology in either Indonesian or English. By comparing the outcomes and learning experiences in both languages, the research seeks to identify which language medium yields better results and understanding of biology concepts among students. Understanding the comparative effectiveness of these language approaches is essential for devising optimal language integration strategies in biology education. In the study, participants voiced their preferences regarding the language of instruction for learning Biology, highlighting diverse reasons behind their choices. Participants QZD found both Bahasa Indonesia and English effective, despite encountering challenges with certain names in English. Overall, they considered both languages equally beneficial. Participant JR favored

learning Biology in English not because of the teachers or lessons but due to their personal comfort with the language. On the other hand, Participant JDG emphasized the effectiveness of learning Biology in Indonesian, being their native language. Participant MJB appreciated the deeper exploration of critical thinking and biotechnology in English-taught Biology, finding the simpler definitions more accessible than the detailed ones in Indonesian. Lastly, Participant AAC preferred learning Biology in Indonesian for better understanding, while acknowledging the need to study in English for logic-based quiz questions.

These diverse responses underscore the significance of individual language preferences in the learning process. Language comfort and familiarity can positively impact comprehension and engagement (Dewaele & MacIntyre, 2016). Participant JR's choice of English reflects the role of affective factors in language learning, where a positive emotional connection with the language enhances learning outcomes (MacIntyre, 2019). Participant JDG's preference for their native language aligns with the concept of linguistic relativity, suggesting that individuals perceive and interpret the world through the lens of their native language (Boroditsky, 2011). This preference highlights the potential influence of cultural and linguistic identity on language choices in education. MJB's observation of the English-taught Biology curriculum's emphasis on critical thinking and biotechnology echoes previous research on

multiliteracies pedagogy, which encourages the integration of multiple languages and literacies to enhance cognitive skills (Cummins, 2014). Research by Dewaele and MacIntyre (2016) emphasizes the role of language enjoyment in language learning. Participant AAC's preference for Indonesian due to perceived effectiveness might be linked to their enjoyment and comfort with the language. This finding underscores the importance of fostering a positive learning environment to support language acquisition.

In conclusion, the participants' language preferences in learning Biology provide valuable insights into the impact of affective factors, linguistic identity, and cognitive advantages on language choices. Understanding these preferences is crucial for designing effective language integration strategies in biology education. The study highlights the significance of considering individual language needs and preferences to optimize learning outcomes and cater to diverse linguistic backgrounds.

6. Integration of English and Indonesian in Biology Classes

The study aims to gather participants' expectations regarding the future use of English in biology lessons. By exploring their anticipations and aspirations, the research seeks to understand how learners envision the role of English in biology education, potential benefits, and challenges they foresee, and how it may shape their learning experiences and career

prospects. Understanding these expectations is crucial for developing effective language integration strategies and enhancing biology instruction in diverse linguistic settings. During the study, participants shared their preferences for the language of instruction in Biology classes, revealing a range of reasons behind their choices. Participant QZD found both Bahasa Indonesia and English to be effective for learning, although they faced challenges with reading certain names in English. Overall, they perceived both languages as equally beneficial. Participant JR, however, favored learning Biology in English not because of the teachers or lessons, but due to their personal comfort with the language. On the other hand, Participant JDG emphasized the effectiveness of learning Biology in Indonesian, given that it was their native language. Participant MJB reiterated that Biology taught in English delved deeper into critical thinking, biotechnology, and offered simpler definitions, which they found easier to comprehend compared to the more detailed lessons in Indonesian. Lastly, Participant AAC expressed a preference for learning Biology in Indonesian, as they found it more effective for their understanding. However, they also acknowledged the importance of studying Biology in English to excel in logic-based quiz questions.

The participants' responses showcased the diverse factors influencing their language preferences in learning Biology. Some participants felt equally comfortable with both languages, while others

preferred their native language or English due to personal reasons or specific learning advantages. Research by Dewaele and MacIntyre (2016) on foreign language enjoyment and anxiety supports the idea that affective factors play a crucial role in language learning. Participant JR's comfort with learning Biology in English may be attributed to a positive emotional connection with the language. The concept of linguistic relativity, as explored by Boroditsky (2011), suggests that language influences the way individuals perceive and interpret information. Participant JDG's preference for learning Biology in their native Indonesian aligns with this notion, as they may feel a stronger connection to the subject matter when taught in their primary language. Pavlenko's research on the bilingual mind (2014) highlights how different languages offer varying perspectives and depths of understanding. Participant MJB's observation of Biology taught in English being more focused on critical thinking and biotechnology provides evidence of the impact of language on the emphasis of educational content. The study by Cummins (2014) on multiliteracies pedagogy emphasizes the significance of integrating multiple languages and literacies to enhance cognitive skills. Participant MJB's experience with simpler definitions in English-taught Biology exemplifies how language choices can shape the accessibility of subject matter for learners. The participants' language preferences in learning Biology demonstrate the importance of considering affective factors, linguistic identity, and cognitive advantages in language choices.

Understanding these preferences is crucial for optimizing language integration strategies in Biology education, catering to individual language backgrounds and facilitating effective learning outcomes.