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FOCUS GROUP DISCUSSION OF PROSPECTIVE BIOLOGY TEACHERS' EDUCATION: A CRITICAL ANALYSIS OF TEXTBOOKS

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ABSTRACT

This study is to analyze the representation of textbooks through the results of focus group discussions conducted by prospective teacher students. The focus group discussion involved three discussion groups that were named according to the theme who was presented including the language group, the content group and the visual group. These results provide evidence that students prefer simple learning resources with short content explanations, some students prefer to be satisfied with explanations through visual displays and negative responses to the use of foreign languages. To be precise, students are more interested when textbooks are only a supplement to the learning process. However, making textbooks a part of the main learning process needs to be done gradually, due to the varying levels of student academic ability. In fact, the critical analytical results provide accurate images needed to help students deepen science content. One unit that is the best practice for all prospective teacher students is that being critical in science will be a starting point for being critical in other lessons. These results offer suggestions for teachers or lecturers to always expand student learning resources both textbooks and outside textbooks for future studies.

Keywords: critical analysis, focus group discussion, textbooks

INTRODUCTION

Textbooks have relevance to the learning process (Glasnovic Gracin, 2018). Therefore, every teacher, especially prospective teachers, should equip himself with knowledge about textbook review. The presence of textbooks in educational institutions whose conditions are very complex, of course, has a certain value. The value of the textbook depends on its weight, as well as on the mission, as well as on its function. In teaching-learning interactions, it is not only necessary to have a teacher and students, but also a learning tool. With textbooks, teachers, lecturers, and students will be helped in smoothing the teaching and learning process.

Several state-owned and private publishers produce and publish textbooks tailored to the needs of learning. The large selection of textbooks sometimes have difficulty and confusion in determining which textbooks to use (Chu, 2017). However, a teacher must be good at choosing textbooks that fit the curriculum and student needs so that learning objectives can be achieved properly. Likewise in Biology Education, textbooks are one that is critically analyzed for the benefit of learning outcome (Woyshner & Schocker, 2015). The provision of textbooks that are presented by many authors makes the quality of textbooks also vary. There are textbooks that are of high quality, medium quality, and there are also textbooks that are of low quality.

The tendency of students in class to take part in the learning process only accepts the information presented in the textbooks as an audience. There are still many students who have limited understanding in essence, they almost entirely respond positively to photos and illustrations only, accompanied by short texts, are prone to incomprehension of content, so that the results are often biased when analyzing textbooks for learning purposes (Abdou, 2016; Hilburn & Fitchett, 2012; Suh, An, & Forest, 2015). Many students complained that they could not understand the content even though they had tried to read the books required by the lecturers. Because the way to read textbooks is different from reading newspapers, magazines, articles and other readings. Indirectly, students learn textbooks as a hidden part because they are embedded in the text and are not taught openly (Eisner, 1985; Suh et al., 2015).

In Indonesia, despite the increasing emphasis on student-centered learning and activities, textbooks are still the most important teaching material and lecturers also devote most of their class time to teaching using textbooks. Previous studies from Indonesian textbooks revealed that the representation of textbooks used is sometimes the result of a fragmentary translation that has not been completed. Textbooks written in minority languages indicate that much of the content in textbooks is not well translated. Although the analysis of textbooks' representational content for science has done little to do with research, for social studies a lot has been done on the visual content of textbooks. (Ariyanto, 2018; Chu, 2017; Werner, 2002).

However, to understand more deeply, prospective teacher students should be accustomed to develop independently their ability to analyze textbooks representation content. For that we need an analytical technique in which participants are free to discuss with each other without fear or worry about the opinions that will be issued. Students are able to independently analyze information critically and apply the knowledge they have acquired in a variety of situations (McClune & Jarman, 2011). Perhaps our greatest challenge as educators is to ensure that student teacher candidates can transfer the knowledge learned in the classroom to the analysis of situations that arise in a variety of contexts. The ability to analyze and respond critically to what is expressed in textbooks in a scientific manner both in content and in context is a significant characteristic of scientific literacy and therefore, is very important to help students read and interpret textbooks correctly. (Begoña Oliveras, Márquez, & Sanmartí, 2013).

Focus Group Discussion (FGD) technique can be an option to explore data with special characteristics. FGD is a data collection process and therefore prioritizes the process. FGDs were not conducted for the purpose of producing direct solutions to problems or to reach consensus. FGD aims to explore and obtain a variety of information about a particular problem or topic which is very likely to be viewed differently with different explanations. Unless the problem or topic being discussed is about problem solving, the FGD is certainly useful for

identifying various problem solving strategies and options (Gellert, 2014; Nel, Romm, & Tlale, 2014).

This study adopts a critical approach to analyzing textbook representations through the results of focus group discussions conducted by student teacher candidates. Representation is the act of building a relationship between two objects through a form of symbolic communication (Roland Pennock & Chapman, 2017). This representational practice, of course, involves prospective biology teacher students. In this study, content in textbooks is understood as a manifestation and extension of representational practices in education. These research questions include:

1. How is the textbook-based learning process carried out by student teacher candidates?
2. What are the results of the critical analysis of the focus group discussion regarding textbook-based learning?
3. What are the best practices produced by prospective teacher students in relation to critical analysis of textbooks on the theme of plant biology?

THEORETICAL FRAMEWORK

Focus Group Discussion

Focus Group Discussion (FGD) is a form of discussion designed to generate information about the wants, needs, points of view, beliefs and experiences desired by the participants. Focus Group Discussion is the right technique to explore data with special characteristics and research with specific objectives. Through the FGD technique, it can be seen about perceptions, opinions, beliefs and attitudes towards a product, service, concept or idea, as well as enabling a needs assessment or program evaluation that cannot be carried out using other data collection techniques (Manoranjitham & Jacob, 2007; Masadeh, 2012).

FGD aims to collect data on participants' perceptions and views on something, not trying to find consensus or make decisions about what actions to take and therefore prioritizing the process. Therefore, in the FGD, open-ended questions were used, which allowed participants to provide answers accompanied by explanations (Nel et al., 2014; Wong, 2008). By obtaining data related to the factors causing the problem and the potential they have to solve the problem, a problem can be resolved immediately. This technique can not only be used to solve problems, but can also be applied to extracting perceptual information and needs related to the problem. FGDs are certainly useful for identifying various strategies and problem-solving options. Through discussion students can see other people's thought processes and build their own understanding. It is important to develop habits of thought in order to critically evaluate and make decisions about these problems (Gellert, 2014; Masadeh, 2012).

Critical Analysis

Critical analysis is a capacity, a potential that is owned by everyone. However, critical analysis will still be blunt and will not develop if it is not practiced. Critical analysis determines a new reality, a better agreement to improve the reality or situation being analyzed. The most important tool for carrying out critical analysis is the question. There are a number of important elements that need to be understood in critical analysis, which requires the search for facts and the characteristics of the situation or reality that is trying to understand. Critical analysis also examines situations or events that are in the process of change from a complete perspective (B. Oliveras, Márquez, & Sanmartí, 2014).

Critical analysis is needed to enable students to make judgments on the modifications necessary to their knowledge. Critical analysis can be used as a problem-solving activity by involving students either independently or in groups. McClune & Jarman, (2011) explained that there are certain indicators to analyze a good level of critical reading. It is known that students who have good critical analysis skills can evaluate new information by comparing it based on previous knowledge from other sources. So that it produces relevant and credible arguments (Mishra, 2015).

Textbooks

Textbooks play an important role in teaching that can facilitate student activity in learning, both inside and outside the classroom. A textbooks does not only need to be examined in terms of its value, but also in terms of the scope of its material. The scope of the material in question is the broad scope of problems related to visuals, context and content as well as language use. As one component of the curriculum, textbooks serve the role of achieving curricular outcomes by pooling a range of teaching resources and activities. Textbooks content is carefully selected and organized to provide a specific picture to their audience, the students (Tan, Mahadir Naidu, & Jamil@Osman, 2018).

Textbooks have a central role in knowledge construction and the transmission process as the main tools for planning learning in the classroom (Baumgartner, Bay, Lopez-Reyna, Snowden, & Maiorano, 2015). In order to gather the important information we need from a textbook, it is imperative that we follow the process systematically. This will really help to understand more of what is being read and build a strong knowledge base, which will help make it easier to learn the next lesson. (Setyono, 2018).

METHODOLOGY

The focus group discussion uses a participatory approach (Participatory Approach) with an open-ended method that allows participants to provide answers with explanations (O.Nyumba, Wilson, Derrick, & Mukherjee, 2018). We are adapting the literature on the use of this method in biodiversity, ecology, and conservation research (Bennett et al., 2017). Focus group discussions involve three discussion groups in which one group actively discusses a topic, while the other observes the discussant group. The discussion groups are named according to the theme, including language groups, content groups and visual groups. Preparation begins with identifying the main objectives and determining the main objectives of the research. Based on the research objectives, a list of questions was prepared as a guide for each focus group discussion session. After that, identification of participants, this technique is largely based on group dynamics and synergistic relationships between participants to generate data (Green, Draper, & Dowler, 2003). The composition of the group will depend on the main objective of the discussion theme. (Krueger, 2014) states that when the discussion takes place, individual self-disclosure tends to be natural and comfortable. However, for some people, this takes effort and conviction. Self-competence to be fully involved in group discussions is very important in producing useful data (Bentley, Lavine, Bentley, & Lavine, 2018).

Sampling was conducted purposively because the FGD depended on the ability and capacity of participants to provide relevant information (O.Nyumba et al., 2018). The FGD was conducted with 30 participants and divided into three discussion groups. The duration of the FGD was carried out for 100 minutes, consisting of ten meetings. The themes of the textbook discussed included (1) plant cells and water; (2) whole plant water relations; (3) roots, soils, and nutrient uptake; (4) plants and inorganic nutrients; (5) bioenergetics and ATP synthesis; (6) the dual role of sunlight: energy and information; (7) energy conservation in photosynthesis: harvesting sunlight; (8) energy conservation in photosynthesis: CO2 assimilation; (9) allocation, translocation, and partitioning of photo-assimilates; and (10) cellular respiration (Hopkins & Huner, 2008). Data collection was carried out assisted by a skilled facilitator and an assistant (O.Nyumba et al., 2018). The facilitator is in charge of managing existing relationships to create a relaxed and comfortable environment for discussion participants. Assistants play a role in conditioning the people involved in peer assessment and participant observation.

Data collection during the FGD includes peer assessment, recording and participant observation (Stewart, Shamdasani, & Rook, 2012). Peer assessments carried out by participants at a more senior level include assessment of class management during FGD, instructional competence, interest in learning and student involvement and management of heterogeneity of opinions. Recording and participant observation was carried out by observers during the FGD and after completion of the FGD, it included language analysis, content, visual textbooks and open interviews. The data analysis was done qualitatively (O.Nyumba et al., 2018).

FINDINGS AND DISCUSSION

Peer Assessment

Peer assessment output in higher education has been increasingly studied by people in the last few decades. Several studies conducted peer assessment without any assessment criteria. However, the output produced in this study was evaluated based on quality criteria (Gielen, 2011). We interpreted the results based on recording and feedback during observations during the FGD implementation. The evaluation results are in accordance with the explanation (Sridharan, Muttakin, & Mihret, 2018) and (Adams & Mabusela, 2017) that the implementation of peer assessment is effective in reducing the presence of conflict, improving communication and improving the quality of contribution to teamwork. The broader role of peer assessment is in terms of interaction, communication and balance of learning metaphors for student teacher candidates (Merry, Orsmond, Merry, & Orsmond, 2018). Thus, peer assessment practice can improve the assessment experience and feedback for students and provide many benefits during the FGD process (Chew, Snee, & Price, 2016; Lladó, Soley, Fraguell, Pujolras, & Planella, 2014).

Peer assessment in this study was conducted by students as one of the student-centered assessments (Reinholz, 2015). The application of peer assessment in this lesson is a complement to the assessment that has been applied so far. The results of the average peer assessment for each FGD group are described in Table 1.

Table 1. Classification of Focus Group Discussion based on Peer Assessment

Assessment Components	FGD Group A (%)	FGD Group B (%)	FGD Group C (%)
Class management	46.33	45.50	37.00
Instructional competence	48.67	46.50	37.67
Interest in learning and student involvement	41.67	37.50	28.00
Managing the heterogeneity of opinions	48.00	44.50	43.00

The assessment component for class management indicators in the FGD A group was higher on average than that of the FGD B group and the FGD C group with an average score of 46.33%. The FGD that took place in this group had met the assessment criteria, namely the presentation was carried out by paying attention to the principles of efficiency and effectiveness, the discussion could take place in a multi-way manner and during the discussion all members were actively involved. This principle is the basis for a prospective teacher. A teacher later becomes an active agent who can analyze all forms of problems himself. For this reason, proactive learning is a new domain in critical analysis (Weller, 2018).

The second indicator for the instructional competency component of the FGD A group still produced the highest average of 48.67%. Here it is clear that when the FGD was held, the material was presented with various interesting strategies. When interpreting a chart or picture, the presentation is given clearly enough so that the discussion participants can understand clearly. Another thing is that when there are questions during the FGD, the discussion is carried out based on theoretical or practical studies, is rational, and full of responsibility. This main section explains how students enjoy and appreciate each experience they get, analyzing their potential to support learning (Dyment & O'Connell, 2003; Reinholz, 2015).

The third indicator for the components of interest in learning and student involvement was still superior to the FGD A group of 41.67%. The peer assessment results explain that textbook analysis can develop critical thinking skills and exploration skills. On this occasion some comments during the discussion can combine experience and prior knowledge effectively. The presenter can summarize the results of the discussion quite well, so they really appreciate all the contributions given by the other groups. This principle is in accordance with the research conducted by Begoña Oliveras et al., (2013) that when accustomed to thinking critically about the surrounding environment, it can help connect facts related to the actual context with scientific knowledge.

The fourth indicator for the component manages the heterogeneity of opinions with the highest score among all. FGD group A got a score of 48.00%. All students are involved in the learning process regardless of their level of readiness, so that the participatory approach during the FGD can be seen. During the FGD, students appreciated every opportunity to both reason from their own point of view and reason with others to reach an agreement within their team (Chu, 2017). A discussion always offers great potential for debate and argument. There is a meaning that is built up and it can provide deeper insights to get a better understanding. The discontinuity that appears in argumentation, negotiation and clarification of differences in meaning is an analysis of the epistemological nature (Gellert, 2014).

Record keeping and observation

Critical analysis data are summarized based on recording and observations made by two observers. The overall results are presented in Table 2 for critical analysis of language in the textbook, Table 3 for critical analysis of the content in the textbook and Table 3 for critical analysis of the Visual in the textbook.

Table 2. Critical Analysis Response for Language Presentation in Textbook

FGD Group	Advantages	Weakness
A	*'Can train in critical thinking '* *'Make students more active in looking for meaning and explanation before learning'*	*"The limitations of the English language, sometimes the content of the material cannot be understood, it is necessary to read repeatedly to understand"* *'The use of foreign languages slightly hinders concept understanding'* *"Using a foreign language has to work twice, translating first and many scientific languages that are difficult to understand have to be read many times"*
B	*'Very clear and detailed in explaining '* *'More familiar with some new vocabulary'* *'The language is scientific and the concept is clearly unambiguous'*	*'Requires a long time to understand the context / content of the material '* *'Can cause misconceptions if the material is too complex and causes misunderstanding* *'The editorial language is high and scientific, so it is difficult to understand'*
C	*'Can add new vocabulary'* *'Makes curiosity to study the book more widely'*	*"Learning by means of translation makes many sentences confusing and difficult to understand"* *'Too complex so it takes a long time to understand'*

Student responses when using the textbook of language elements for each FGD group were almost the same. In fact, it can be illustrated that students get more value from the presentation of the textbook, especially related to the expansion of vocabulary in foreign terms. However, they are quite difficult when faced with foreign languages. It takes enough time to understand the contents contained in the textbook. These results explain that language is an important part of a study. From a theoretical perspective, language is said to be action (Graham & Graham, 2018).

Table 3. Critical Analysis Response to Content Presentation in Textbook

FGD Group	Advantages	Weakness
A	*'Very detailed, covers every discussion, covers important things that must be learned'*	*'There is often material that is difficult to understand'* *'There are some new words or new terms that have not been understood before'* *'The material is too large so it's quite difficult to digest it quickly'*
B	*'The theory used is a grand theory so as to minimize misunderstanding '* *'Very broad, many terms to learn, there is a glossary'*	*'Some of the explanations are convoluted'* *'Sometimes there are terms that are not understood* *Some of the material has a very high cognitive level that makes it lazy to read '*
C	*'Complex and structured'* *'Extensive and detailed'*	*'Static'* *'Difficult to understand'*

Student responses when using the textbook of content elements for each FGD group were quite diverse. In fact, some respondents responded positively by providing content from the textbook. However, for most of the other respondents it is too difficult to interpret in detail the content on the textbook. They are quite difficult when they have to interpret the contents of the chapters presented. The cognitive level of the high textbook sometimes makes it lazy to be understood in reality. This result explains that there are still many students who want to understand the content lightly but clearly and understandably. This overview helps to connect science learning in college with facts related to the actual context (B. Oliveras et al., 2014).

Table 4. Critical Analysis Response for Visual Presentation in Textbook

FGD Group	Advantages	Weakness
A	*'Very helpful when there is material that is not clear'* *'Makes more long-term memory'* *'Color images are sometimes easier to distinguish'*	-
B	*'There are more attractive images, especially with sharp colors'* *'The images contained in the e-book are very clear and clear compared to normal books'*	*'The explanation is in the small picture, less clear'* *'The caption in the image does not explain what is presented in the image'*

C	*'Very helpful and easy in the learning process' 'Obviously easier to understand and interesting '*	*'There are some that are not explained' 'Sometimes there are general images so it is necessary to understand more'*

Student responses when using the textbook of visual elements for each FGD group stated more positive reasons. In fact, most respondents find it easier to understand the material with visual aid or interpretation. Few of the respondents stated that the statement was negative from a visual perspective. Even the FGD A group stated that there were no weaknesses. However, the negative statement in question is more precisely just the wish that students as readers want a complete picture presentation with narration. Although in fact, we can visually interpret the theme in question. The results of research in the social field reinforce that when taught appropriately and creatively, the visuals contained in textbooks have the potential to help students develop higher order thinking skills and increase student engagement and learning agency. (Woyshner & Schocker, 2015).

The textbook critical analysis provides accurate images needed to assist students in deepening science content. These results offer suggestions for teachers or lecturers to always expand student learning resources both textbooks and outside textbooks for future studies. As a result, textbooks are an important source of information on student teacher student learning experiences in Indonesia. A major part of teacher education is critical reflection. A reflection to be able to embrace change, although sometimes it is difficult, the solution is only the teacher's control of change (Weller, 2018).

Critical analysis can actually lead to valuable self-assessments and best practices in everyday life (Olfman, Bostrom, & Sein, 2003; The, The, Program, & Fire, 2016). Even the smallest meaning that can be taken is a best practice for each individual. For this reason, scientific studies with the theme of plant biology can be seen to what extent best practices can be interpreted in a real way. The best practice is simply analyzed by examining every word that often appears during the FGD, taking notes and observing during interviews. Figure 1 interprets that students are still having difficulty with the use of textbooks as the main book used. More details are presented in Figure 1.

Greater attention to understanding learning is through personal responses through effective questions that can lead students to deep insights. Clarity, ordering, and level of questions affect student perceptions, motivation, and the achievement of desired educational outcomes. Questions can be said to be one of the most powerful teaching tools as best practices that can significantly improve the quality of teaching (Tofade, Elsner, & Haines, 2013).

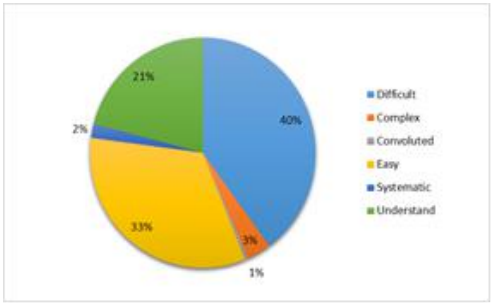

Figure 1. Classification of words that often appear as a result of critical analysis

CONCLUSION

This article provides evidence that students prefer simple learning resources with short explanations, some students prefer to be satisfied with explanations through visual displays. To be precise, students are more interested when textbooks are only a supplement during the learning process. However, making textbooks a part of the main learning process needs to be done gradually, due to the varying levels of student academic ability. In fact, critical analytical results provide accurate images needed to help students deepen science content. One unit that is the best practice for all student teacher candidates is that being critical in science will be a starting point for being critical in other lessons.

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