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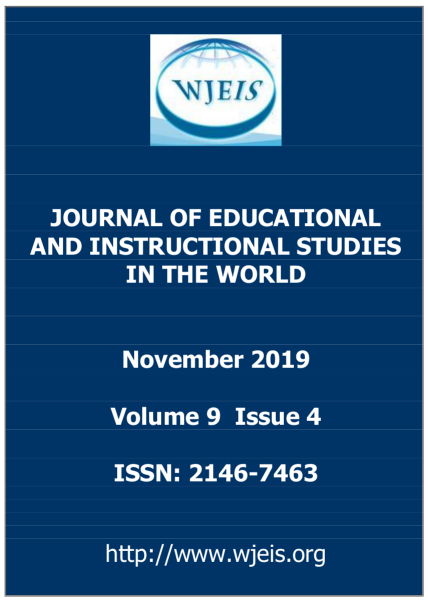

article a mini review

by Yahfizham Yahfizham

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Contact Address

Article Submission E. Mail: wjeis1@gmail.com

Prof. Dr. Zeki Kaya, Gazi Üniversitesi, Gazi Eğitim Fakültesi, Eğitim Bilimleri Bölümü, Teknikokullar Ankara/Türkiye

E. Mail: wjeis1@gmail.com

Assoc. Prof. Dr. Murat Hişmanoğlu
Uşak Üniversitesi,Yabancı Diller Yüksek Okulu, Bir Eylül Kampusü, Uşak /Türkiye

E. Mail: wjeis1@gmail.com

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Dear WJEIS Readers,

WJEIS appears on your screen now as Volume 9, Number 4. In this issue it publishes 2 articles.

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Although WJEIS is a new journal, it has been welcomed with interest. A lot of journals from various universities are in the evaluation process. We would like to thank cordially our colleagues who work hard in editorial board to evaluate the articles, writers who contribute to our journal and all readers.

1st November, 2019

Best regards

Prof. Dr. Zeki Kaya
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DETERMINATION OF THE VISUAL LITERACY LEVELS ON RECOGNIZING FORCE OF SIXTH GRADE STUDENTS

Dr. Salih Gülen
Muş Alparslan University- Turkey
sgnova@windowslive.com

Abstract

The main purpose of this study is to determine the visual literacy levels on recognizing force of the sixth grade students. The screening method, one of the quantitative research methods, was used in the research. The study was conducted with 75 students from 6th grade students by purposive sampling method in a public school in Eastern Anatolia Region in 2018-2019 academic years. The concept-drawing form prepared by the researcher was used to collect the data. The data obtained were analyzed with the help of Microsoft Excel program. Techniques such as frequency and percentage values were used in the analysis. In addition, the scoring key was used to score the data. As a result of data analysis; it was discovered that students can draw the concept of force with unit, size, aspect and direction characteristics. It was found that the students were able to draw very well in order to define the force, balanced and unbalanced forces. These results indicate that students' visual literacy levels are good. As a result, it can be said that the visual literacy of the students participating in the research is very good level at defining force. Suggestions were presented in parallel with the results of the study.

Keywords: Sixth grades, science, visual literacy, concept-drawing form, force.

INTRODUCTION

Science, which is one of the most frequently encountered branches since the birth of the individual, enables us to recognize the individual, nature and living things. In addition to these definitions, it explains the occurrence of biological, chemical and physical events in nature. People have long been interested in learning these physical phenomena in science (Ministry of National Education, MoNE, 2018). As a matter of fact, there is a mystery in physical events. As it is known, understanding and properties of force are mysterious subjects of physical events. Particularly understanding the forces applied in gravity is still a mystery (Demirkuş, 2019). However, basic properties of force are known.

Force; It can be defined as the effect that makes an object move, accelerates or stops a moving object. The unit of force, size, direction and direction are found (Gülen, 2019). Although force is basically explained simply in this way, it is a rich subject which has an important place in science class. At the sixth grade level of the secondary school, the student should be able to recognize the force and understand its characteristics (Dikici, Türker, and Özdemir, 2010). In the science program aim of the MoNE (2018), sixth grade students; "*to realize the properties of force, to show the resultant force by experiment and drawing, to discover balanced and unbalanced forces and their effects on objects*". Of particular note here is the recognition of force and the discovery of the effects of balanced-unbalanced forces on objects is "*drawing*". In other words, the program attaches importance to the students' exploration with their strength and characteristics. As a matter of fact, it is known that the subjects learned through drawings create images in the mental structure (Alpan, 2008). These images are thought to facilitate the learning and recognition status of the student (Isler, 2002). Students' mental images are defined as visual literacy.

Being literate is an important concept that has been regarded as the cause of even a class separation between human beings since ancient times. Although it was perceived as writing, reading and speaking in the early days, it also requires being an active, critical and creative reader and signifier of monthly and annual magazines of television and films, political and commercial advertisements,

photographs and drawings (Akyol, 2010). Being literate is about getting information, making sense and transferring information. The most important factor in this process is that literate individuals are very good followers. Being able to follow and update information is the basic element of being literate (Demirkuş, 2019). In addition, every kind of literacy needs to develop itself. As a matter of fact, although literacy is a general and inclusive concept, in addition to disciplinary literacy such as science literacy, mathematics literacy, cinema literacy, music literacy, political literacy and visual literacy can be increased. In this study, a study on visual literacy was conducted.

Although the literature says that visual literacy emerged during the Renaissance or early 1960s, it is thought that visual literacy also manifests itself in ancient cave wall paintings (Göçer and Tabak, 2013). It is known that the studies related to visual literacy belong to John Debes (Akpınar, 2009). It is known that many academicians have been working in this field until today. There are many definitions of visual literacy. Accordingly, Isler (2002) defines the cultural significance of images, objects and actions as the ability to produce and use meaning. Çubukçu (2004) describes the transformation of objects and events into symbols in the external world. In addition, in addition to these definitions, Sağlam and Bülbül (2012) pointed out that visual literacy involves cognitive difficulties in concept formation and problem solving. In general, visual literacy is related to vision, experience, interpretation and imagination (Akpınar, 2009; MEB, 2018). Although the foundation is based on seeing, what they see needs to be imagined in the mind (Göçer and Tabak, 2013). As a matter of fact, information is made meaning by images. The individual's literacy is related to the interpretation of the meanings in these signs. The individual gets stronger with increasing age (Yakin, 2012). This is about experience. It can be said that the visual literacy of the individuals gaining experience is at a better level. As it knows visual literacy develops in parallel with visual thinking. The individual who tries to perceive and comprehend the information is in the process of visual thinking. This situation is continuous (Çağlayan Kaptanoglu, 2007). In other words, an individual's visual thinking with his / her age and experience is also continuous. Visual literacy increases with the increase of the individual's experiences and thinking ability (Demirkuş and Öner, 2019). Visual literacy in general is an experience-based literacy concept that focuses on the concepts of sign, symbol, graphic, color and painting with the effect of vision as well as other senses (Alpan, 2008; Çubukçu and Gökçen Dündar, 2007).

It is possible to come across many studies about force and visual literacy (Alpan, 2008; Aydın, 2008; İşler, 2002; Özer, 2019; Sağdıç, Bakırcı, and Boynukara, 2019; Sağlam, Kanadlı, and Uşak, 2012; Seçer, 2008; Tokiz and Şaşmaz Ören, 2011). In addition to these studies, Nakiboğlu and Yildirim (2018) found that 46 graphic editors (17 in the fifth grade, 8 in the sixth grade, 12 in the seventh grade and 8 in the eighth grade) were included in the science textbook. It is known that visuality increases meaningful learning. With this help, students can use visual literacy levels when defining a concept (Zaini, Mokhtar and Nawawi, 2010). Candan, Türkmen and Çardak (2006) and Çakmak (2016) examined students' concept learning success with various visual factors. In addition, Göçer and Tabak (2013) found that prospective teachers had many metaphors related to visual literacy and had positive thoughts in general. In addition to these studies, it is possible to come across studies related to force and visual literacy such as misconceptions about the concept of force (Gülen, 2019), the use of visual materials in teaching the concept of force (Kantar and Doğan, 2016) and the development of visual materials in concept education (Gülen and Demirkuş, 2018).

In this study, the status of the concepts can be defined with the effect of visual literacy. The effect of visual literacy on defining more accurate concepts is being investigated. In the study, it was asked to define the force by the concept-drawing form developed by the researcher and answered by the students by drawing. With the data obtained, visual literacy levels of the students in these definitions were examined.

Purpose of the research

The main purpose of this study is to determine the visual literacy levels on recognizing force of the sixth grade students. In this context, the answers to the following questions were sought:

1. What is the level of sixth grade students' ability to express their knowledge about the concept of force with visual data?
1.1. What is the level of the students in the drawings for defining the force?
1.2. What is the level of the students in the drawings for defining balanced and unbalanced force?

METHODOLOGY

The screening method, one of the quantitative research methods, was used in the research. It is the method that defines the individual or object, which is the subject, in its own conditions, describing it as a situation in the past or still continuing (Çepni, 2010; Karasar, 2012). Visual literacy levels of a group of sixth grade students about strength recognition were determined with the measurement tool prepared by the researcher.

Sampling

Purposeful sampling method was used in the study. In this method, researchers try to understand the nature and society events or phenomena in the context of the selected situations and explore and explain the relationships between them (Büyüköztürk, 2009; Büyüköztürk et al., 2013). As a matter of fact, the research was conducted with 6th grade students in a public school in Eastern Anatolia Region in 2018-2019 academic years. A total of 75 students participated in the study, depending on the principle of volunteering (80 students were reached within the scope of the study. 3 of the participants left the first question completely blank, and 2 of the participants left the second question completely. Therefore, data of 5 participants were not processed). It was determined that the majority of the participants were farmers. It has been determined that these families have grown more wheat in agricultural affairs and also have a big head in terms of animal husbandry. As a result, it can be said that the socio-economic aspects of the participants were similar.

Data collection tools

The concept-drawing form prepared by the researcher was used to collect the data. In this form, it was aimed to determine the visual literacy status of the participants with two questions. This form contains the following questions:
1. Can you make drawing showing the object that is affected by characteristics of force (unit, size, aspect and direction)?
2. Can you make drawings showing the objects that are affected by the balanced and unbalanced forces?

Analysis of data

The data of the measurement tool used in the study were analyzed with the help of Microsoft Excel program. Techniques such as frequency and percentage values were used in the analysis. The concept-drawing form was scored according to the criteria specified in Table 1. Grades obtained from this scoring were converted to one hundred points system.

Table 1: Criteria of concept-drawing form scores

Order	1. Question	Value	2. Question	N
1	Force	1	Force	4
2	Unit	1	Unit	4
3	Size	1	Size	4
4	Aspect	1	Aspect	4
5	Direction	1	Direction	1
6	Drawing	1	Drawing	2
7			Balanced	1
8			Unbalanced	1
	Total	6	Total	21

The criteria specified in Table 1 were prepared separately for the first and second questions. In the first question, since only one concept is requested from the participants and all criteria for scoring the minimum answers are scored with 1 point each. In the second question, drawings were asked for two concepts and scoring was determined according to the minimum values in each drawing. For example, in a drawing about the balanced force, there are two forces, two units, two sizes. In addition, it is considered appropriate to use these scoring values when it is considered to be in the drawings about the unbalanced force. In addition, in order to comment on the obtained grades, the interpretation value range specified in Table 2 was used.

Table 2: Interpretation value range of scores

Order	Value	Value range for image (%)
1	Very bad	00.01 - 20
2	Bad	20.01 - 40
3	Middle	40.01 - 60
4	Good	60.01 - 80
5	Very good	80.01 - 100

As can be seen in Table 2, a range of values has been determined in order to interpret the scores obtained. For a more precise interpretation, 100 points are divided into five equal parts. Accordingly, very bad (00.01-20), bad (20.01-40), middle (40.01-60), good (60.01-80), very good (80.01-100) values are available.

Reliability and validity

In the research, the status of the sample group was specified in detail and the conceptual framework and data collection and analysis were presented. The names of the participants were coded and evaluated with a note. The scoring was done by two different raters. Scores were 97% in consensus. The data collection tool was prepared to cover the subject concepts. Validity values such as structure and appearance have been obtained by taking expert opinion (Yıldırım & Şimşek, 2013).

RESULTS

The findings of the study are presented below. The data obtained by scoring the concept-drawing form is given in Table 3.

Table 3: Descriptive analysis of concept-drawing form

1. Question								
Criteria	Force	Unit	Size	Aspect	Direction	Drawing		
Frequency (f)	75	62	66	74	43	72		
Percent (%)	100	82.67	88	98.67	57.33	96		
2. Question								
Criteria	Force	Unit	Size	Aspect	Direction	Drawing	Balanced	Unbalanced
Frequency (f)	75	56	64	68	43	73	61	72
Percent (%)	100	74.67	85.33	90.67	57.33	97.33	81.33	96

35

When Table 3 is examined, it is understood that 96% of the students answer the first question by drawing. In the first question, all of the students indicated the "*force*" in the desired force drawing. In addition, almost all indicated the "*aspect*" of force. Apart from these, 88% of the students use the

force "*size*" and 82.67% use the force "*unit*". Finally, 57.33% of the students indicated that they indicated the "*direction*" of the force they draw. When the second question is examined, it is understood that 97.33% of the students answer the second question by drawing. In addition, it is understood that 81.33% of the students draw the "*balanced*" force and 96% the "*unbalanced*" force. It is understood that "*force*" of all students, 90.67% of the "*aspect*", 85.33% of the "*size*", 74.67% of the "*units*" and 57.33% of the students indicated "*direction*". The values of the scores obtained from the concept drawing form are given in Table 4.

Table 4: Scoring status of question-answers in concept-drawing form

Questions	**Mean**	**%**	**Answer**
Question 1	5.2	87.17	Very good
Question 2	17	81.33	Very good

When Table 4 is examined, the average and percentage values of the students' scores from the first and second questions are shown. According to Table 4, the average of the students in the first question is 5.2 and it is understood that this corresponds to 87.17. In addition, it is understood that the grade point average of the students in the second question is 17 and the value corresponds to 81.33 in the hundred grade system. According to the point's interpretation value ranges of these data, it shows that the students' drawing force, balanced and unbalanced force is "*very good*" level. Below are two illustrations illustrating the situation (randomly selected from all student drawings).

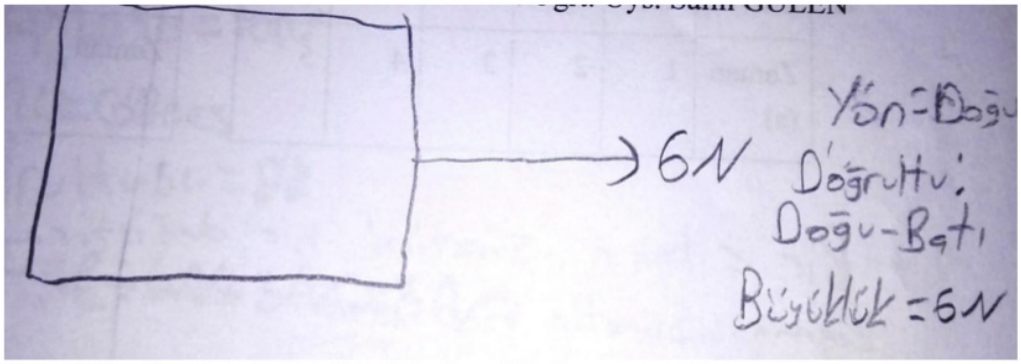

Figure 1: Drawing of student number 15 for force definition

As seen in Figure 1, it is understood that the student has specified all the details of the force in his drawing to define the force. Accordingly, the unit, size, aspect and direction of the force are plotted.

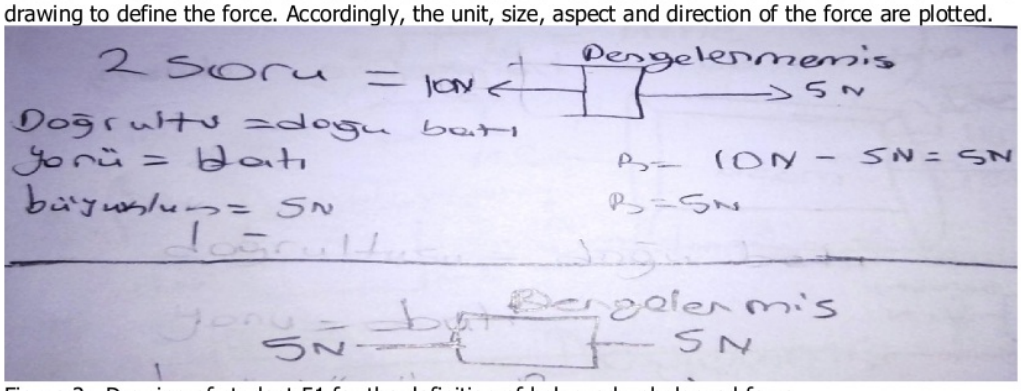

Figure 2: Drawing of student 51 for the definition of balanced-unbalanced force

In Figure 2, it is understood that when drawing the balanced and unbalanced forces, the students indicate the size, unit, aspect and direction of the force.

DISCUSSION

According to the findings, it is understood that the majority of the students are able to show the force, unit, size, aspect and direction. Also, it is understood that the majority of the students draw the unit, size, aspect and direction for the balanced and unbalanced forces. These data show that students can def force with all elements. This is thought to be due to the good visual literacy levels of the students. As a result of analyzes it is understood that the students have achieved very good success in the drawings for force and in the drawings for balan d-unbalanced force. As a matter of fact, this achievement is thought to be achieved by the fact that the visual literacy levels of the students are very good. Similarly, in Çakmak (2016) studies, it was found that computer-aided visualizations lead to greater increase in students' conceptual understanding levels. In other words, it can be said that the visuals used increase the visual literacy rate in students. Similarly, Göçer and Tabak (2013) found that preserves teachers had many metaphors related to visual literacy and had positive thoughts in general. In addition to these studies, Sağlam, Kanadlı, and Uşak (2012) found that concept images yielded successful results in a narrow sense but remained inadequate in a broad sense. In addition, Candan, Türkmen, and dak (2006) determined that the visuals used in relation to force increase academic achievement. This finding is similar to the findings of the study. As a matter of fact, it is thought that the success of the students' drawings is caused by their visual literacy. In addition, Dikici, Türker, and Özdemir (2010) and Gülen (2019) found that students had misconceptions about the concept of force. These findings do not match the findings of the study. In general, it can be said that students make a very good level of definition by using visual literacy in defining force.

CONCLUSIONS AND RECOMMENDATIONS

It has been discovered that students ca raw the concept of force with unit, size, aspect and direction characteristics. It was found that the students were able to draw very well in order to define the force, balanced and unbalanced for . These results indicate that students' visual literacy levels are good. As a result, it can be said that the visual literacy of the students participating in the research is very good at defining force. It is thought that the use of visual materials in educational environment will increase visual literacy. It is suggested that the use of visual drawings or materials in the processing of force-related issues will increase the level of success in this area.

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A MINI- REVIEW TO WRITING STEM IN MULTIPLE CHOICE QUESTIONS

Yahfizham Yahfizham
William Iskandar Street, North Sumatra- Indonesia
yahfizham@uinsu.ac.id

Abstract
Multiple-choice questions are still a popular and objective option as a means of collecting information against the ability of each learner, the support in the process of assessment of learning outcomes-one of its main components namely the stem. The rules of writing a right stem should focus on the skills of what will be revealed to be measured, it is still less attention and becomes a challenge. This mini-review paper is purposed to described the importance of following the rules in making multiple-choice questions, focus on stem. It's provide simple practical proposal, in writing stem using a cognitive domain (Bloom's taxonomy) with collect journal article that discussed the multiple-choice item writing guidelines that have been published online, then do a summary of writing rules that focus on the stem. The guide practical recommendations can give as a beginning to write the new stem on multiple-choice items or as a hint to peer review revise previously maked stem in multiple-choice questions.

Keywords: Multiple-choice questions, assessment, stem, cognitive domain.

INTRODUCTION

The multiple-choice items have been started in the era of the 19th century by Frederick J. Kelly's physical education. The article entitled "*The Kansas Silent Reading Test*" has been published widely in international journals. The multiple-choice item has two main attributes of staple questions (stem) and a choice answers (answer choice) which consists of the answer keys and deceitful (Kelly, 1916). The additional components of questions (items) multiple-choice, sentence, or is optional information as supporters to explain stem and a choice answers but not as a guiding answer key (Gierl et al., 2017). The figure 1 below is the detail of the structure item type multiple choice.

The multiple-choice item is one way that can be selected by educators to dig up information against the ability of knowledge, attitude and skills (Aiken 1982; Tractenberg et al. 2013; Gruhn & Cheng. 2014; McMahan et al. 2014; Pugh et al. 2016; Scully 2017; Verenna et al., 2018). It can reveal knowledge of what has been gained and what learners yet (Walsh et al., 2017). Assess thinking ability learners in the learning process, including part of the pedagogy of competences must be owned by educators (Lynam & Cachia, 2018) Assessment tools such as the use of multiple-choice items to reveal the levels of thinking skills that are used on the concept of Bloom's activities in daily quizzes, exams, midterm, final exam of the semester and exams until now still done (Ursani et al., 2014).

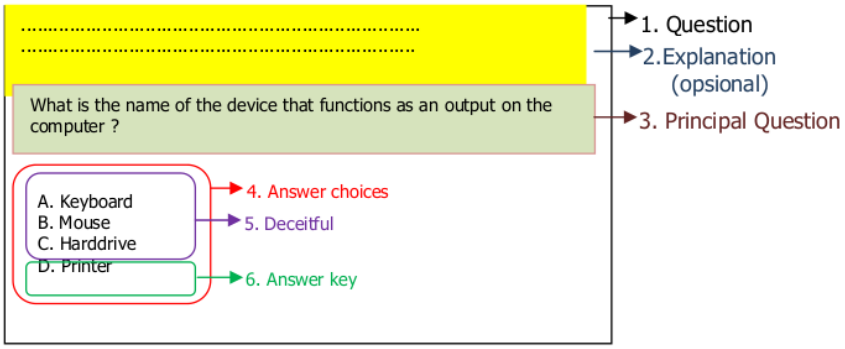

Figure 1: Multiple-choice item structure

Although it has many guides available in writing multiple-choice items of quality in various fields, still it is found an error writing multiple-choice questions, as reported by (Nedeau-Cayo et al., 2013; Rodríguez-díez et al., 2016; Pate & Caldwell, 2014). Error writing item multiple choice because it does not follow the guidelines of the rules of writing, the impact on the harm of educators in assessing thinking ability learners (Rankin & White, 2016; Koretsky et al., 2016; Chiavaroli, 2017).

Some studies reveal that errors in writing multiple-choice item are written not in accordance with the method of grammar, punctuation, and spelling, resulting in learners become confused and ultimately disappointed (Vydareny et al., 1986; Haladyna & Downing, 1989; Haladyna & Shindoll, 1989; Kehoe, 1995; Frary, 1995; Hansen & Dexter, 1997; Haladyna et al., 2002; Moreno et al., 2015; Pate & Caldwell, 2014). An additionally, explanation of the sentence on the item, the stem and the choice of answers are provided, often there is no connection at all (Boland et al., 2010). Large items can cause deviations of the understanding of meaning, spend time, and brings out the flavor, not confident learners (Campbell, 2011; Towns, 2014; Rush et al., 2016; Koretsky et al., 2016; Dell & Wantuch, 2017). The presentation of images, tables, and other items, the stem, and the choice of answers will be able to draw attention and be a stimulus that affects the learners to responded (Ruder & Straumanis, 2009; Tsai et al., 2012). Preferably, the use of images, tables, and the like is shown on the item may not give an advantage or disadvantage to any particular party.

METHOD

The data source access to preview reading material is done by leveraging the intelligent Search Engine Google (https://scholar.google.com). This machine chosen for reasons due to the user interface that is easy to use and it is an extensive network of servers and systems that are always updated. The keyword as you type is "writing multiple-choice items." The results obtained as many as 354 relevant documents based on the time at any time. To search for the more narrow and focused then used provisions of the selection criteria as the article, which is as follows: 1) the only journal articles, 2) the article of the journal used in the English language, 3) the articles of the journal can be downloaded, 4) the documents.PDF format, 5) the title of the journal must be the word "write multiple-choice items", "multiple-choice item writing guidelines", "rules of writing multiple-choice items", "develop multiple-choice items", "models of writing multiple-choice items", "strategy writing multiple-choice items", "the method to write multiple-choice questions", "techniques to write multiple-choice items", "tips and tricks to write multiple-choice items", "how to write an item selection Double", "training to write multiple-choice questions", "building an item multiple choice", and "devise multiple-choice items".

Based on a criterion that is done, the final data obtained as many as 15 documents that referred to review reading materials. Total final data verification later returned with re-reading the entire text so that they meet all the criteria for inclusion in the review.

RESULTS

The literature review of the journal article, which concentrates on a discussion of the study of writing multiple-choice items. The acquisition of 15 documents articles in the period between the years 1986 until 2018, which has been implemented on a subject or discipline different fields. Table 1 below displays the overall data review source readings.

Table 1: Fifteenth critical studies included in this literature review (document)

Authors and Year	Number of Rules	Subject
1. Vydareny et al. (1986)	9	Medical
2. Haladyna & Downing. (1989)	43	Not Specified
3. Kehoe. (1995)	11	Not Specified
4. Frary. (1995)	14	Not Specified

5. Hansen & Dexter. (1997)	12	Not Specified
6. Haladyna et al. (2002)	31	Not Specified
7. Cheung. (2003)	8	Chemistry
8. Collins. (2006)	19	Medical
9. Boland et al. (2010)	12	Medical/Psychiatry
10. Campbell. (2011)	10	Medical
11. Towns. (2014)	23	Chemistry
12. Moreno et al. (2015)	9	Not Specified
13. Walsh et al. (2017)	15	Medical
14. Dell & Wantuch. (2017)	12	Medical
15. Scully. (2017)	4	Not Specified

Based on many rules of writing multiple-choice items to their respective authors, we did an analysis that focuses on stem only. The study starts with the nine rules made by (Vydareny et al., 1986). We obtain the four states that are directly related to the writing of the stem, i.e., the rules 2, 3, 4, and 5. Among the 43 regulations set by (Haladyna & Downing, 1989), we found six laws that relate to writing stem, i.e. to-18, 19, 20, 21, 22 and 23. Of the 11 rules that are expressed by (Kehoe, 1995), gained six guides that lead in writing down the stem, ranging from 1, 2, 3, 4, 5, and 6.

Among the 14 rules proposed by (Frary, 1995) obtained six states that guide writing down the stem, ranging from the 2, 6, 8, 11, 13 and 14. Of the 12 rules offered by (Hansen & Dexter, 1997), we get eight things into a discussion on the stem, namely rules 1, 2, 3, 4, 5, 6, 8, and 12. Among the 31 rules set by (Haladyna et al., 2002), retrieved the four writing guidelines that could become stem, namely the 14, 15, 16 and 17. Then from 8 guidelines offered by (Cheung, 2003), retrieved the four rules that guide the writing stem, i.e. 1, 2, 3, and 4. Of the 19 steps presented, (Collins, 2006) retrieved eight guidelines that can be followed in writing the stem is right, i.e., the 4, 5, 6, 7, 8, 9, 10, and 11. In the next steps of the 12 proposed by (Boland et al., 2010), there are four rules in writing a right stem, hence the 4, 5, 6, and 7. The next of 10 practical steps that have been developed by (Campbell, 2011) in writing down the stem, there are only two rules that are pertinent i.e. 3 and 8 of the 23 best practices in writing multiple-choice items according to (Towns, 2014), just 7 rules associated with the writing stem i.e. 7, 8, 9, 10, 11, 12 and 13. The nine multiple-choice item writing guidelines are summarized by (Moreno et al., 2015), only four of which govern the writing stem, namely rules 4, 5, 6 and 7.

According to (Walsh et al., 2017) suggested that in writing multiple-choice items must follow 15 rules. Particular writing stem, there are only three rules, namely the 1st, 11th, and 14th. The 12 practical steps are the best version of (Dell & Wantuch, 2017), only four of which focus on the writing of the stem, which is a rule 5, 6, 7 and 8. Multiple-choice item writing guidelines that are the last of the journal review, coming from (Scully, 2017). He offers a practical strategy 4, only three rules that can be used as guidelines in writing down the stem. Table 2 below is a summary of the results of the analysis of all journal articles.

Table 2: Summary of the stem in the developing multiple-choice items

Rules	**Authors**														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Must be relevant with content and context	√				√		√	√		√	√	√			√
The phrase is specified, it should not be repeated in the answer choice	√		√	√	√		√	√		√	√	√			√
Must be put in only the necessary information and should short as possible	√	√	√	√	√		√	√	√		√	√		√	
Must not be tricky and	√	√	√	√	√		√	√	√		√	√			

exceptional that they could deceive the testee into answering incorrectly															
Beginning with a "question word" and at the end of the "question mark."	√	√		√	√		√	√							
Should be a positively stated or phrased	√	√	√	√	√		√	√		√			√	√	
Should be clear what is being to ask	√	√	√	√	√		√			√			√	√	√
Should be th completion format, do not leave a blank in the beginning or middle of the phrased	√		√	√	√		√			√			√	√	√

The fifteenth journal articles have different criteria as a basis in developing multiple-choice rule item writing guidelines, specifically writing stem. According to (Vydareny et al., 1986) summarizes the use of 3 educational books. (Haladyna & Downing, 1989) analyze the 46 books and other sources in various fields such as education, psychology, and psychometric. (Kehoe, 1995) adapted sourced from 3 in Handbook of education and journal articles. (Frary, 1995) culminating in sourced from 6 in the field of education handbook and three journal articles. (Hansen & Dexter, 1997) uses seven books as examination review reading materials.

The thought of (Haladyna et al., 2002) culminating in the results of their review are sourced from 27 educational books. (Cheung, 2003) summarizes the assessment book and six evaluations in the field of education plus one journal article. (Collins, 2006) relies on his guidelines by analyzing five specialized journal articles in the medical field. (Boland et al., 2010) to make guidelines that are sourced from two books, journal articles, and 1 6 free articles online. (Campbell, 2011) based on book 1 and 5 medical journal article that is a source in the drafting of a guide. (Towns, 2014) based on books 1 and 3 journal articles, which became a reference in establishing the rules. (Moreno et al., 2015) using three criteria of validity viz., precision adjustment rules, and finding. (Walsh et al., 2017) using 1 Handbook, plus eight journal articles as a source of reading material. (Dell & Wantuch, 2017) summarizes the rules that are sourced from book 1, 5 journal articles and three free articles that can be accessed online. Finally, (Scully, 2017) with a strategy that can be followed by guidelines, sourced from 4 books, 9 journal articles and one free article that can be accessed online.

DISCUSSION

The stem is part of one unified whole inherent in writing multiple-choice items. There are at least two on stem distractor, and one key differentiator becomes the answer to the other question types such as "right/wrong", "Match", and "Description" (Thissen et al., 1989; Kehoe, 1995). Stem serves as a tutorial on the ability of what will be revealed or what skills will be assessed. The use of vocabulary that is not familiar among learners, the language does not follow the style of instrumental writing and placement of punctuation can be awkward positions which result in endless time duration provided to answer item (Hideki, 2010). Indeed, making a right stem still lacks excellent interest. Most educators write multiple-choice items that don't follow an existing method.

The habit of writing multiple-choice items that do not fit the guidelines for measuring writing ability think, according to the learning product that is included in the curriculum and teaching materials, coverage remains a challenge (Naeem et al., 2012; Abdulghani et al., 2017; Dellinges & Curtis., 2017; Walsh et al., 2017). Assess thinking ability learners in the learning process, including part of the pedagogy of competences, must be owned by educators (Lynam & Cachia, 2018). Assessment is done in a planned, systematic and directional (Baird et al., 2017).

The framework that has been created by (Bloom et al., 1956) in a book entitled "Taxonomy of Educational Objectives: The Classification of Educational Goals, Handbook 1 Cognitive Domain", the foundation towards the development of disclosure search thinking ability. This concept provides operational support verbs that can facilitate as guidance for the assessment of classification ability of thinking (Morrison & Free, 2001; Stanny, 2016). Revision of the concept of dimension thinking ability according to (Krathwohl, 2002) classifies hierarchical thinking ability starting from the lower level to the upper mentioned as the first dimension (1) based on knowledge, comprehension, application, analysis, evaluation and create. The second dimension (2) based on factual knowledge, conceptual, procedural and metacognitive.

Before writing the stem, it is necessary to make a table of specifications that contains the scope of subject matter, an indicator of product, level two dimensional thinking ability in accordance revised Bloom's taxonomy, and the verb can be operationally used. Table 3 is shown a grid item multiple choice for power electronics courses at the State University of Padang as an example object. The existence of t[26]table grid will ease in the preparation of multiple-choice items (Fives & Didonato-barnes, 2013; DiDonato-Barnes et al. 2014; Jugar, 2013).

Table 3: Table of Specifications for Writing Stem

Indications	Dimensions 1	Dimensions 2	Verbs
Students can recognize and understand terms, concepts, and connect one data with other data by describing it merely, so it becomes a piece of complete information.	1. Lower Level (Knowledge, Comprehension & Application)	Factual & Conceptual	• define • identification • name • label • recognize • describe • explain • classify • illustrate • predict • interpret • restate • discuss
Learners can set up resources according to needs, analyze and perform settings return all information that had been owned in more comprehensive that it became practical knowledge	2. Higher Level Analysis, Evaluation & Create	Procedural & Metacognitive	• solve • analyze • compare • investigate • create • assess • judge • debate

The table of specifications for the writing of multiple-choice items on the stem conducted was indeed in line with the purpose of learning. The table grid is useful as a liaison between the coverage of the material and the level of ability to think about what will be assessed. This role also became a blueprint for anyone who will write multiple-choice items with curriculum and materials or materials the same coverage so that the device will generate relatively about the same issue (Alade & Omoruyi, 2014). Keep in mind that none of the table grid can be used for all learning needs. The relevance of the creation of a table of grating multiple-choice items before writing is ensuring that the assessment conducted does not deviate from the aims and learning product so that it can ensure that the measuring instrument which is used meets the aspect good judgment and correct in assessing the results of the study.

RECOMMENDATION

The work of writing multiple-choice items, more correctly described as an art than a science (Wadi et al., 2017). In terms of the writing of the stem, to note the verb that represents the level of capability of operational thinking. The verb becomes functional formulas and tools to measure the ability to think. A collection of verbs of operational loads on the stem must be selected from the table grid that has been created. The rules of the writing stem according to the method of grammar, punctuation, and spelling is very important, yet many forget or ignore it. For those who have mastered the material, a corresponding method stem writing grammar, punctuation, and spelling, it would be in his favor and expedite the time answer item (Frey et al., 2005; Walsh et al., 2017; Dellinges & Curtis, 2017; Albano & Rodriguez, 2018). The communicative style of writing sentence sentences has an impact on the fading sense of anxiety of students and has an arousal effect in answering items.

The writing of the stem should be a sentence or a prase clear, concise, easily understood, and focus on the ability to think what would like to ask, not convoluted, and not repeat the word. According to (Vydareny et al., 1986; Haladyna & Downing, 1989; Haladyna & Shindoll, 1989; Kehoe, 1995; Frary, 1995; Hansen & Dexter, 1997; Haladyna et al., 2002; Frey et al., 2005), the writing of the stem should match the content and context, can be prefixed with one of the words queried as to whether, why, who, how, when and where (Campbell, 2011; Towns, 2014; Rush et al., 2016; Koretsky et al., 2016; Dell & Wantuch, 2017). The stem must end with the symbol "question marks (?)" is separated from the end of a word on the stem, and the stem should be writing on a paragraph recently.

The writing of the stem must be free from instructions that direct on answer keys and must not contain statements that provide guidance on the most correct answer choice (Vydareny et al., 1986; Haladyna & Downing, 1989; Haladyna & Shindoll, 1989; Kehoe, 1995; Frary, 1995; Hansen & Dexter, 1997; Haladyna et al., 2002; Frey et al., 2005; Collins, 2006; Boland et al., 2010; Campbell, 2011; Towns, 2014; Rush et al., 2016; Koretsky et al., 2016; Dell & Wantuch, 2017). Stem not allowed include the words or sentences in a choice answers, this will be considered as leak items (Dellinges & Curtis, 2017; Walsh et al., 2017; Albano & Rodriguez, 2018). By selecting one of the operating table verb grating placed on the stem, became the keyword for educators against the ability to think what will be evaluated (Green, 1997) The strategy of selecting the right operational verbs which are placed on the stem can measure all levels of thinking ability learners (Scully, 2017). This step will redirect multiple-choice items on writing, which focus on the realm of thinking ability what it wants to be measured to support assessment on learning (Jones et al., 2009).

The writing stem which ends with the word "except" and/or beginning with the word "not", though the phrase alphabet thick, marked bottom line, tilted and capitalized, should not be used because it contains or has connotation elements of words or sentences (Vydareny et al., 1986; Haladyna & Downing 1989; Haladyna et al., 2002; Tarrant et al., 2006; Towns, 2014; Chiavaroli, 2017; Dell & Wantuch, 2017). Writing a stem beginning with "dot-dot" and/or "underscore" best avoided (Bailey, 2018).

CONCLUSION

The efforts in the development of the ease of multiple-choice writing items of quality pragmatically continued to do in various fields for the maturity of measuring instruments in support of the assessment of the mastery learning and learning outcomes. Painstaking and actively practiced by following the method set out in writing multiple-choice items into the primary key is to be done without having to convene and develop a unique training program. Writing a right stem by following the practical methods, as a rule, offered to measure the low-level thinking ability and height according to the original Bloom's taxonomy of the cognitive domain, in the field of education, certification, and licensure can be done.

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