Applied Mathematics and Computational Intelligence
Volume 10, No.1, Dec 2021 [127-139]

# Sport Science Students' Perceptions in Solving Mathematical Word Problems

Muhammad Syahmi Bajuri[1] and Zarith Sofiah Othman[2*]

[1]Faculty of Education, Universiti Teknologi MARA Selangor Branch, Puncak Alam Campus, 42300 Bandar Puncak Alam, Selangor, Malaysia
[2*]Centre of Foundation Studies, Universiti Teknologi MARA Selangor Branch, Dengkil Campus, 43800 Dengkil, Selangor, Malaysia

[*] Corresponding author : zarithsofiah@uitm.edu.my

Received: 9 February 2021; Accepted: 11 June 2021; Available online: 12 July 2021

**ABSTRACT**

*Mathematical concepts that students learnt in school play a huge part in their lives later. In fact, the underlying skills learners developed in mathematics class like taking risks, thinking logically, and solving problems, will help them solve work-related and real-world problems. One such mathematics concept is the mathematical word problem solving. This is a mathematical exercise where some background information on the problem is presented in ordinary language rather than in mathematical notations. Even though such exercises are a common way to train and test learners' understanding of concepts using a narrative, the ability to interpret the word problems into mathematical concepts can be challenging especially to non-science students. Thus, the aim of this study is to identify the difficulties faced by students in solving mathematical word problems. First sample is 30 students form 1 were randomly selected to answer a short academic test. The data was analysed to identify the difficulties faced by students and to compare the students' performance between gender in solving mathematical word problems. Based on the results obtained, the majority of students had an average knowledge in solving mathematical word problems and there is no significant relationship between a short test score among gender. Second sample is 40 students from the same school were randomly selected to answer a survey questionnaire. There are three sections in the questionnaire which relates to students' anxiety, learning enjoyment and satisfaction. The Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree) were used. Based on the results obtained, it can be concluded that students felt more motivated when they learned about mathematical word problems with the help of their teachers. Besides, they were happy to be able to do practice exercises for mathematical word problems if they are practiced in group discussion. Therefore, theother study could be provided to search for new methods for sport science students to overcome the challenges in solving word problems in mathematics subjects.*

**Keywords:** Mathematical Word Problems, Secondary School Students, Sport Science Students

## 1 INTRODUCTION

The education system in Malaysia is overseen by the Malaysian Ministry of Higher Education (MOHE) and Ministry of Education (MOE). MOHE looks after universities and colleges under the tertiary education while MOE has authority over the pre tertiary education which includes pre-school,

primary, secondary and, post-secondary schools. The schools under MOE can be further categorized into government, international, vernacular, and private depending on the focus of their curriculum [1,2]. In the secondary school system, students are offered admissions into customary fields such as science, arts, vocational, and technical. Other than that, students are also given the opportunity to enter the military academy that prepares students for armed forces service, or sports academies that groom students for their athletic talents.

In general, all these schools follow a standard national curriculum. This means students learn similar fundamental subjects including mathematics. Mathematics is appreciated for its role in creating human contemplations by bringing key and orderly thinking forms to be utilized in investigating and tackling life issues. Additionally, it is a device used to ponder on innovative sciences [3]. As students fathom a mathematical problem, they activate their higher order thinking skills. This, in turn, helps students to become independent and creative thinkers. One concept in mathematics learning that enhances such skills is the mathematical word problem where a real-life scenario is presented, pondered upon, and resolved.

As mentioned earlier, the mathematical word problem relates to real life [4]. The problem is contained in a statement or a structure and usually depicts a facet of ordinary living that needs to be understood, interpreted, and solved using calculations. The statement is meant to assist students to be familiar with the mathematical language behind the text shown in the questions. However, interpreting the statement requires them to have not only knowledge about mathematics but also some intuition about real life [5]. This can be challenging for some students, particularly, those with less acumen in number problems [6]. A word problem is also defined as an oral description of the problem situation and presented within a scholastic situation. This is the most difficult type of problem faced by mathematics students [7].

A study by Kier and Lapini in 2014 attempted to identify the challenges faced by students at a private religious school in Manila when given tasks to translate word problems into mathematical equations. The results showed that the students faced a lack of comprehension, lack of vocabulary, incorrect use of operation, interchanging of values and carelessness when solving mathematical word problems [8]. In another study, students from Butuan Central Elementary School were asked to solve mathematical word problems. It was found that most of the pupils can solve the task when the question is given as a mathematical calculation. However, in the situation where they had to interpret the word problem into mathematical notations, most of them answered incorrectly [3]. In another study, this time by Kusuma and Retnawati [9] in 2019, 6th grade students were tasked in solving mathematical word problems for operations involving integers, fractions, and decimals. Students were found to face difficulties with word problems and understanding concepts of fractional operations. In addition, students were inaccurate in their answers and they lack numerical skills. A study related to mathematics, a subject that exists in the classroom, was performed by Daud et al. in 2020. The objective of the research was to integrate students' perception in mathematics knowledge in answering and explaining mathematical words problems. The results obtained in this study showed there is no significant difference between ethnicity among form one students from secondary schools in Kuantan, Pahang [10]. Recently, in 2020, a study was performed to find risk factors for tertiary students' anxiety in mathematics subjects. The results show that students disagree that they were confused with mathematics problems because there are many words and numbers. They said mathematics allows them to think logically and reasonably although it requires hard work [11].

Next, sport science students find it difficult to define the concept in word problems in mathematics. They should learn how to develop their thinking skills in solving problems in terms of learning facts and contents in mathematics. Defining stage is also in science, technology and mathematics (STEM) elements. It is the first stage described as an understanding and memorizing process. In this study students should be able to understand and memorize the steps in interpreting the mathematical quiz. The results show that the defining stage was the second last rank based on the mean [12]. Identifying a mathematical problem is the fundamental component in the refractive thinking process. If students cannot identify the problems, it will affect the problem solving strategies [13].

It is meaningful if students can use the correct method to voice the mathematics problem. It is because if they get a low score in a mathematics test, it will affect their confidence level and will bring disappointment to them, teachers and parents [14]. Furthermore, it can provide a huge benefit for students to learn, understand and to express their knowledge especially in mathematical word problems. The foremost essential difficulty in solving sentence issues lies within the ability to understand the numerical issue structure that is inserted within the problem content rather than the difficulty with comprehending the issue structure [15]. In a study of 30 students from engineering programs, they found that the potential of a mathematical writing approach could allow students to revitalize the mind to experiment, plan, organize and conduct all mathematics problems. As students' performance increases dramatically in the cognitive process, they prompt them to act or plan to build good solutions [16].

To sum up the discussion so far, the mathematical word problem is a regular component in Mathematics. It plays an important part of the subject to teach students how to solve numerical and word problems. While the mathematical word problem is not in itself the focal point within the arithmetic syllabus, each mathematical theme contains word problems [17]. Indeed, the focus of the component are the underlying skills being emphasized here which are the higher order thinking skills. These skills are required for effective problem solving and are more demanding on students [18]. With this as the backdrop of the study, the paper will investigate the perspectives of a group of students relating to the challenges they face in handling mathematical word problems. Instead, they are weak in deep understanding to visualize the main problem in mathematical word problems. They can only focus on displayed numbers and select it as their mathematical calculation without considering the text given in mathematics words [19].

## 2 RESEARCH METHODOLOGY

There are two different samples taken at different times. First sample was conducted by using a test academic paper in early March before the Movement of Control Order (MCO). The sample were 30 students in a sports school in Selangor who were randomly selected from the form 1 students. There were only four classes in form 1 in this school. The average for each class is 15 students. To identify the difficulties that they faced in solving the mathematical word problems, students were asked to solve and give short answers to a set of subjective questions on the topic of algebraic expressions. These questions were adapted from an academic test book “Mathematics Textbook KSSM Form 1” and were based on the syllabus “Topic 5: Algebraic Expressions”. In terms of difficulty, the questions were deemed to be of three levels: easy, medium, and hard. After students had completed and submitted the test papers, their answers were scrutinized and later categorized according to the instrument used with the labels: no answer, correct and wrong answer. The data is then collected, analyzed and interpreted using quantitative analysis. The same data was used to

determine whether male and female students significantly differ in their achievement test in solving mathematical word problems among sport students.

The second sample is the random sample of 40 secondary school students who were selected from a population of Sports Science students in the same school. Questionnaires were distributed among these students to explore the difficulties they faced in solving mathematical word problems. The questionnaire was adapted from research difficulties encountered in mathematical word problem solving of the grade six learners conducted by Mingke and Alegre [3]. The instrument employed was a structured questionnaire which comprises three parts: Anxiety, Learning Enjoyment and Satisfaction Level. A Likert scale was used with items ranging from 1 (strongly disagree) to 4 (strongly agree).

## 3 FINDINGS AND DISCUSSION

Table 1 : Test academic paper results

| Score Marks | Frequency | Percent |
|---|---|---|
| 3 | 4 | 13.3 |
| 4 | 3 | 10 |
| 5 | 2 | 6.7 |
| 6 | 1 | 3.3 |
| 7 | 14 | 46.7 |
| 8 | 2 | 6.7 |
| 9 | 1 | 3.3 |
| 10 | 3 | 10 |
| Total | 30 | 100 |

Table 1 illustrates the distribution of test academic paper results for the marks of 30 participants in solving mathematical word problems. The score mark for 3.0 has 4 (13.3%) students, score mark for 4.0 has 3 (10.0%) students, score mark for 5.0 has 2 (6.7%) students, score mark for 6.0 has 1 (3.3%) student, score mark for 7.0 has 14 (46.7%) students, score mark for 8.0 has 2 (6.7%) students, score mark for 9.0 has 3 (10.0%) students and score mark for 10.0 has 3 (10.0%) students.

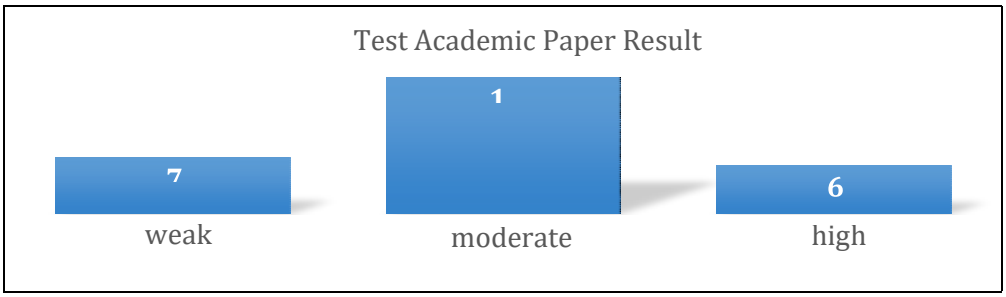


Figure 1 : Level difficulties in test academic paper

Descriptive mean and standard deviation analysis were conducted. Figure 1 shows the number of students in three levels of knowledge in solving mathematical sentence problems. It can be seen that 7 (23.3%) students are considered weak while 17 (56.7%) students are moderate. A total of 6 (20%) students can be categorized as having a high level of knowledge based on their performance in the test paper. This result showed that there were a small number of good students but the majority of them had average knowledge on the topic. There were also a few weak students which teachers must pay extra attention to.

Table 2 : The descriptive statistics performance in test academic paper results

| N | Range | Minimum | Maximum | Mean | SD | Variance |
|---|---|---|---|---|---|---|
| 30 | 7 | 3 | 10 | 6.433 | 2.0625 | 4.254 |

Students were given a test academic paper to determine the level of their skills in solving mathematical sentence problems. It can be seen in the descriptive analysis in Table 2 that on average, students showed a moderate performance (mean=6.433, SD=2.06). The weakest student achieved only 3.0 and the best student scored 10.0, with a range of 7.0 between the lowest and highest test scores. This result indicated that although there were a few students who achieved high scores, many more were in the middle and lower level of mathematics skills.

Table 3 **:** Students' difficulties in solving academic test paper

| Items | No Answer | | Wrong Answer | | Correct Answer | |
|---|---|---|---|---|---|---|
| | Frequency | Percent | Frequency | Percent | Frequency | Percent |
| 1 | 0 | 0 | 0 | 0 | 30 | 100 |
| 2 | 4 | 13.3 | 6 | 20 | 20 | 66.7 |
| 3 | 15 | 50 | 12 | 40 | 3 | 10 |

Table 3 shows the sport science students' difficulties in solving mathematical word problems. It implies that most students have difficulties in item 3 in order to obtain the correct answer.

Table 4 : Students' answer for Item 1

| Items 1 | No Answer | | Wrong Answer | | Correct Answer | |
|---|---|---|---|---|---|---|
| | Frequency | Percent | Frequency | Percent | Frequency | Percent |
| a. Draw the concept | 22 | 73.3 | 0 | 0 | 8 | 26.7 |
| b. Able to interpret numbers display | 0 | 0 | 0 | 0 | 30 | 100 |
| c. Able to use the correct operations | 0 | 0 | 0 | 0 | 30 | 100 |
| d. Give the answer | 0 | 0 | 0 | 0 | 30 | 100 |

Table 4 shows the level of difficulties in solving mathematical word problems in item 1. The level of difficulty in Item 1 is easy. It can be seen that most students can identify the correct answer in item 1. Thus, the majority of students are able to interpret the numbers displayed and able to identify the correct operations to solve the question given.

Table 5 : Students' answer for Item 2

| Items 1 | No Answer | | Wrong Answer | | Correct Answer | |
|---|---|---|---|---|---|---|
| | Frequency | Percent | Frequency | Percent | Frequency | Percent |
| a. Draw the concept | 4 | 13.3 | 4 | 13.3 | 22 | 73.3 |
| b. Able to interpret numbers display | 4 | 13.3 | 3 | 10 | 23 | 76.7 |
| c. Able to use the correct operations | 4 | 13.3 | 6 | 20 | 20 | 66.7 |
| d. Give the answer | 4 | 13.3 | 6 | 20 | 20 | 66.7 |

Table 5 shows the level of difficulty in solving mathematical word problems in item 2. The level difficulty in Item 2 is medium. It can be seen that many students can identify the correct answer in item 2. Thus, many students are able to interpret the numbers displayed and able to identify the correct operations to solve the question given. Some students have difficulties to interpret numbers, display and use the correct operations to find the correct answer.

Table 6 : Students' answer for Item 3

| Items 1 | No Answer | | Wrong Answer | | Correct Answer | |
|---|---|---|---|---|---|---|
| | Frequency | Percent | Frequency | Percent | Frequency | Percent |
| a. Draw the concept | 15 | 50 | 12 | 40 | 3 | 10 |
| b. Able to interpret numbers display | 15 | 50 | 12 | 40 | 3 | 10 |
| c. Able to use the correct operations | 15 | 50 | 12 | 40 | 3 | 10 |
| d. Give the answer | 15 | 50 | 12 | 40 | 3 | 10 |

Table 6 shows the level of difficulty in solving mathematical word problems in item 3. The level difficulty in Item 3 is hard. It can be seen that many students have a difficulty to identify the correct answer in item 3. Thus, most students have difficulties to draw the concept, interpret numbers, display and use the correct operations from the question given to give the correct answer.

Table 7 : The descriptive statistics performance in students' gender

| Gender | N | Mean | SD | Std. Error Mean |
|---|---|---|---|---|
| Male | 12 | 5.583 | 2.7122 | .7829 |
| Female | 18 | 7.000 | 1.2834 | .3025 |

Table 8 : Independent sample test

| | | F | t-test |
|---|---|---|---|
| Quiz Mark | Equal variances assumed | 16.360 | 1.927* |
| | Equal variances not assumed | | 1.688* |

*p< 0.001

The next question is whether male and female students significantly differ in their achievement test in solving mathematical word problems among sport students. Independent t-test was conducted and the result shown in Table 8. It is found that the mean for Female (mean= 7.00, SD= 1.2834) is higher than Male (mean= 5.583, SD= 2.7122) shown in table 7. Assuming that the two groups have equal variances (F= 16.360, p< 0.001), there is statistically no significant difference between male and female on test performance. This result indicates that there is no significant difference in the quiz score between gender. In other words, male and female students have similar levels of performance in solving mathematical word problems.

Table 9 : The descriptive statistics performance of students' anxiety

| | N | Mean | SD |
|---|---|---|---|
| 1. I find it difficult to understand the problem in solving mathematical word problems. | 40 | 3.28 | 0.716 |
| 2. I practice solving mathematical word problems at home. | 40 | 3.13 | 0.883 |
| 3. I do not know what operations to be used in solving mathematical word problems. | 40 | 2.78 | 0.832 |
| 4. I do not know the process to be followed in solving mathematical word problems. | 40 | 3.05 | 0.846 |
| 5. I tend to guess the answer if I find it difficult to solve. | 40 | 3.45 | 1.131 |
| 6. I find it difficult to translate mathematical word problems to mathematical operations. | 40 | 3.08 | 0.971 |

| | | | |
|---|---|---|---|
| 7. I do not like to read mathematical word problems. | 40 | 2.78 | 1.349 |
| 8. I got low score in our quizzes in mathematical word problems. | 40 | 3.08 | 0.829 |
| 9. I find it boring when my teacher discussed mathematical word problems. | 40 | 2 | 0.906 |
| 10. I'm not good in mathematical word problems. | 40 | 3.25 | 0.899 |

Table 10 : The overall mean and standard deviation

| Gender | N | Mean | SD |
|---|---|---|---|
| Overall mean | 40 | 2.99 | 0.825 |
| Valid N (listwise) | 40 | | |

The descriptive analysis was conducted on the ratings that students made on ten items in the student's anxiety scale. It can be seen in Table 3 that students tend to guess the answer if they find it difficult to solve (mean=3.45, SD=1.131). On the average, they find it difficult to understand the problem in solving mathematical word problems (mean=3.28, SD=0.716), they are not good in mathematical word problems (mean=3.25, SD=0.899), they practice solving mathematical word problems at home (mean=3.13, SD=0.833), they find it difficult to translate mathematical word problems into mathematical symbol (mean=3.08, SD=0.971), they got low scores in their quizzes in mathematical word problems (mean=3.08, SD=0.829) and they do not know the process to be followed in solving mathematical word problems (mean=3.05, SD=0.846). The lowest rating students gave was to the item "boring when my teacher discussed mathematical word problems" with the mean = 2.00 and SD= 0.906.

Based on table 10, the overall mean of students' anxiety is 2.99 while the overall standard deviation is 0.825. This result indicates that students tend to guess the answer when they find it difficult to solve mathematical word problems. Besides, all items in this variable show that sometimes a student's anxiety influences their perception towards the difficulties in solving mathematical word problems.

Table 11 : The descriptive statistics performance in students' learning enjoyment

| | N | Mean | SD |
|---|---|---|---|
| 1. I find it easier to understand if exercises are practiced in the form of diagrams. | 40 | 3.45 | 0.597 |
| 2. I find it easier to understand if exercises are practiced in the form of video. | 40 | 2.7 | 0.911 |
| 3. I find it easier to understand if exercises are practiced together with team group. | 40 | 3.62 | 0.586 |
| 4. I find it easier to understand if exercises are practiced in exercise book. | 40 | 3.15 | 0.662 |

| | | | |
|---|---|---|---|
| 5. I find it easier to understand if exercises are practiced in the form of actual models. | 40 | 2.95 | 0.677 |
| 6. I find it easier to understand if exercises are practiced in the form of games. | 40 | 3.25 | 0.809 |
| 7. I find it easier to understand if exercises are practiced in the form of mind maps. | 40 | 2.6 | 0.81 |
| 8. I find it easier to understand if exercises are practiced in the form of presentation (Visual Aids). | 40 | 2.53 | 0.784 |
| 9. I find it easier to understand if exercises are practice in the form of the flash cards. | 40 | 2.68 | 0.888 |

Table 12 : The overall mean and standard deviation

| Gender | N | Mean | SD |
|---|---|---|---|
| Overall mean | 40 | 2.99 | 0.747 |
| Valid N (listwise) | 40 | | |

The descriptive analysis was conducted on the ratings that students made on nine items in the student's learning enjoyment scale. It can be seen in Table 4 that students find it easier to understand if exercises are practiced together with a group (mean=3.62, SD=0.586). On the average, they find it easier to understand if exercises are practiced in the form of diagrams (mean=3.45, SD=0.597), they find it easier to understand if exercises are practiced in the form of mind maps (mean=3.25, SD=0.809) and they find it easier to understand if exercises are practice in exercise book (mean=3.15, SD=0.662). The lowest rating students gave to the item "It is easier to understand if exercises are practiced in the form of presentation (Visual Aids)." with the mean=2.53 and SD= 0.784.

Based on table 12, the overall mean of students' learning enjoyment is 2.99 while the overall standard deviation is 0.747. This result indicates that students find it easier to understand mathematical word problems if exercises are practiced together with a group. Besides, all items in this variable show that students agree in learning enjoyment towards the difficulties in solving mathematical word problems.

Table 13 : The descriptive statistics performance in students' learning satisfaction

| | N | Mean | SD |
|---|---|---|---|
| 1. Mathematical word problems are useful to me outside school. | 40 | 3.55 | 0.959 |
| 2. I find it interesting in answering mathematical word problems. | 40 | 3.4 | 0.928 |
| 3. I like Mathematical statement problem in mathematics. | 40 | 3.15 | 1.027 |

| | | | |
|---|---|---|---|
| 4. I feel more motivated to learn about the mathematical word problem with the help of teachers to understand the topic. | 40 | 4.1 | 0.928 |
| 5. Learning a mathematical word problem changed my idea about how this world works. | 40 | 3.4 | 0.871 |
| 6. I am happy to be able to do practice exercises for mathematical word problems even though I do not understand how it all works. | 40 | 3.78 | 0.862 |
| 7. I do not expect mathematical word problem can help my understanding about the real concepts of mathematics for doing the calculations. | 40 | 3.55 | 0.677 |
| 8. Mathematical statement problems are one of my favorite topics. | 40 | 3.2 | 1.137 |

Table 14 : The overall mean and standard deviation

| Gender | N | Mean | SD |
|---|---|---|---|
| Overall mean | 40 | 3.52 | 1.044 |
| Valid N (listwise) | 40 | | |

The descriptive analysis was conducted on the ratings that students made on eight items in the student's learning satisfaction scale. Table 5 showed that students feel more motivated to learn about the mathematical word problem with the help of teachers to understand the topic (mean=4.10, SD=0.928). On the average, they are happy to be able to do practice exercises for mathematical word problems even though they do not understand how they all work (mean=3.78, SD=0.862), they feel that the mathematical word problem is useful to them at outside school (mean=3.55, SD=0.959), they do not expect mathematical word problems can help their understanding about the real concepts of mathematics for doing calculations (mean=3.55, SD=0.677), they find it interesting in answering mathematical word problems (mean=3.40, SD=0.928), they feel learning mathematical word problems changed their idea about how this world works (mean=3.40, SD=0.817) and they believe mathematical word problems are one of their favourite topics (mean=3.20, SD=1.137). The lowest rating students gave was to item "I like mathematical word problems in mathematics" with the mean= 3.15 and SD= 1.027.

Based on table 14, the overall mean of students' learning satisfaction is 3.52 while the overall standard deviation is 1.044. This result indicates that students will feel more motivated when they are learning about the mathematical word problems with the help of teachers to understand the topic. Besides, all items in this variable show that most students have learning satisfaction towards the difficulties in solving mathematical sentence problems.

## 4 CONCLUSION

It is concluded that the selected sports science students in this study faced difficulties in mathematical word problem solving. From the result of the test paper, they seem to struggle to translate the word problem into mathematical notations. This can be seen in their attempts to solve algebraic expressions. Their lack of ability to visualize the mathematical word problem may be the reason why they failed to interpret the problem correctly. It is also believed that some students focused only on the numbers displayed in the question but failed to take into consideration the text of the word problem when they developed their solutions. Next, it seems that these students find it difficult to define the concept behind the word problem. It is because they do not have adequate skills yet to fully understand the numerical issue structure that is inserted within the content. Thus, it leads them to have problems comprehending the issue at hand. From the same test result, this study shows that there is no significant difference in the quiz score between gender. It indicates that male and female sport science students have similar levels of performance in solving mathematical word problems.

The result of students' anxiety indicates that most students tend to guess the answer when they find it difficult in solving mathematical word problems. Commonly students will make their own conclusion to state the correct answer based on their understanding when they face the difficulties in solving word problems at the end of solution. Besides, the same result also shows that student's anxiety sometimes can influence their perception towards the difficulties in solving mathematical word problems. Therefore, it is important to know the condition of students' anxiety where it plays a big role in their own perception towards the difficulties in solving mathematical word problems.

The result of students' learning enjoyment in this study mostly got a positive result. It can be found that most students are easier to understand the word problem solving if exercises are practiced together with a team group in the learning. Besides, many students feel that the learning enjoyment can help them to overcome the difficulties in solving mathematical word problems. Most students choose group study as the learning enjoyment where they are able to discuss and share ideas together about how to find the correct solution.

The result of students' learning satisfaction indicates that students will feel more motivated when they are learning about the mathematical word problems with the help of teachers to understand the topic. Students feel more motivated to learn mathematical word problems with the guidance of teachers and they feel confident with the concept idea that is presented by their teacher. The result shows that most students have learning satisfaction towards the difficulties in solving mathematical sentence problems. Therefore, positive results in the learning satisfaction can help them to give a new perception about the mathematical word problems.

Based on the conclusions, it is suggested that students be taught a way to interpret mathematical problems clearly. They should be trained to apply the skills they already have and the new skills that they learnt to strategically deconstruct and understand the word problem. This is hugely beneficial to students as they would then focus on solving the problem instead of focusing on how difficult the problem is. Finally, even though this study only reported the results relating to Sports Science students, it touches upon similar problems faced by other non-science students. Therefore, further studies should be done to learn how these students can be assisted to overcome challenges they faced in solving mathematical word problems.

**REFERENCES**

[1] S. Selvadurai, O. P. Liu, M. M. Radzi, O. P. Hoon, O. P. Tee, and B. Saibeh, "Debating education for nation building in Malaysia: National school persistence or vernacular school resistance?," *Geografia-Malaysian Journal of Society and Space*, vol. 11, issue 13, pp. 14-23, 2015.

[2] "Enhancing Teaching and Learning Practices in Malaysia," *UKEssays.com*. [Online]. Available: https://www.ukessays.com/essays/education/enhancing-teaching-and-learning-process-in-malaysia-education-essay.php. [November 2018].

[3] G. P. Mingke and E. M. Alegre, "Difficulties Encountered In Mathematical Word Problem Solving Of The Grade Six Learners," *International Journal of Scientific and Research Publications (IJSRP)*, vol. 9, no. 6, pp. 336-345, 2019.

[4] Z. Salemeh and M. J. Etchells, "A Case Study: Sources of Difficulties in Solving Word Problems in an International Private School," *Electronic International Journal of Education, Arts, and Science (EIJEAS)*, vol. 2, special issue, pp. 149–163, 2016.

[5] P. Phonapichat, S. Wongwanich, and S. Sujiva, "An Analysis of Elementary School Students' Difficulties in Mathematical Problem Solving," *Procedia - Social and Behavioral Sciences*, vol. 116, pp. 3169–3174, 2014.

[6] D. J. C. Tindowen, N. K. Ramirez, and J. G. Sales, "Students' difficulties in translating mathematics word statements," *Journal of Humanities and Education Development (JHED)*, vol 1, issue 1, pp. 11-18, 2019.

[7] L. Verschaffel, S. Schukajlow, J. Star, and W. Van Dooren, "Word problems in mathematics education: a survey," *ZDM*, vol. 52, no. 1, pp. 1–16, 2020.

[8] J. K. B. D. Cruz, and M. R. C. Lapinid, "Students' difficulties in translating worded problems into mathematical symbols," in DLSU Research Congress 2014 Proceeding, De La Salle University, Manila, Philippines, March, 2014.

[9] U. I. Kusuma, and H. Retnawati, "Analysis of Sixth Graders' Difficulties in Solving Mathematics Word Problems on Whole Numbers, Fractions, and Decimals," *Journal of Physics: Conference Series*, vol. 1320, 012008, 2019.

[10] A. S. Daud, M. K. Aziz, W. N. Ali, N. S. Adnan, and Z. Embong, "Students' Perception in Learning Mathematics across Gender and Ethnicity," *Journal of Physics: Conference Series*, vol. 1529, 032019, 2020.

[11] Z. Md Yusof, N. Mohd Zanuddin, B. Abdul Karim, F. Zakaria, N. F. Mohammad Noor, N. Kamarudin, and M. Misiran, "Structural Equation Modelling (SEM) of risk factors for mathematical anxiety in tertiary students," *Applied Mathematics and Computational Intelligence*, vol. 9, pp. 53-64, 2020.

[12] Z. S. Othman, N. Ismail, A. K. Khalid, and N. Tukiman, "Module Development for STEM Education Achievement: A Case Study at the Secondary School Level," *Journal of Computational and Theoretical Nanoscience*, vol. 17, no. 2-3, pp. 1085-1089, 2020.

[13] I. N. Yenti, Y. S. Kusumah, J. A. Dahlan, and H. Fitri, "Students' errors in refractive thinking (the component of identifying problems) about spheres and distance in three-space," *Journal of Physics: Conference Series*, vol. 1657, 012061, 2020.

[14] Z. S. Othman, A. K. Khalid, and A. B. Mahat, "Students' common mistakes in basic differentiation topics," AIP Conference Proceedings, vol. 1974, 050009, issue 1, 2018.

[15] J. E. Wright, "An Investigation of Factors Affecting Student Performance in Algebraic Word Problem Solutions," Paper 26, Education Theses, Dissertations and Projects, Gardner-Webb University, 2014.

[16] G. P. B. Lee, C. S. Lim, and L. M. Leong, "Use Mathematical Writing as a Practical Approach to Increase Students' Problem Solving Skills: A Case Study," *The Mathematics Enthusiast*, vol. 17, no. 1, article 10, pp. 239-273, 2020.

[17] E. A. Andam, E. Atteh, & W. Obeng-Denteh, "The Cooperative Learning Approach of Solving Word Problems Involving Algebraic Linear Equations at Institute for Educational Development and Extension (IEDE), University of Education, Winneba, Ghana," *Journal of Mathematical Acumen and Research*, vol. 1, no. 1, pp. 1-11, 2016.

[18] M. G. Gurat, "Mathematical Problem-Solving Strategies among Student Teachers," *Journal on Efficiency and Responsibility in Education and Science*, vol, 11, no. 3, pp. 53-64, 2018.

[19] A. J. Boonen, B. B. de Koning, J. Jolles, and M. van der Schoot, "Word Problem Solving in Contemporary Math Education: A Plea for Reading Comprehension Skills Training," *Frontiers in Psychology*, vol. 7, pp. 191-201, 2016.