# TALKING STICK LEARNING MODEL BY ANIMATION VIDEOS IN SOCIAL SCIENCES SUBJECTS

### Dewi Ayuni<sup>1</sup>, Gimin<sup>2</sup>, Mifta Rizka<sup>3</sup>

<sup>1,2,3</sup> Faculty of Teacher Training and Education, Universitas Riau, Indonesia

Corresponding author: gimin@lecturer.unri.ac.id

Article info	Abstract
Received: 17 April 2023 Accepted: 15 October 2023 Published: 25 October 2023	The purpose of this study was to find out the application of the talking stick learning model assisted by video animation can improve student learning outcomes in social studies lessons. Data
Keywords:  Talking Stick; video animation;	collection was carried out in class VII B with 32 students. This research is quantitative research with a quasi-experimental approach with a one group pretest-posttest design. Data collection techniques
student learning outcomes	used in the form of observation and tests. The instrument in this study used a learning implementation sheet and 10 multiple choice questions. Data analysis techniques using descriptive analysis and inferential statistical analysis. It is known that student learning outcomes in the normality test are 0.059, which means that the data is normally distributed, with an average pre-test result of 67.34 and a post-test of 86.71. This is evidenced from the results of the paired sample t-test obtained by a t value of -13.519 with a Sig value. (2-tailed) of 0.000 <0.005 means that there is a significant difference between the pre-test and post-test scores. The n-gain result of 0.61 which is in the medium category indicates that the application of the talking stick learning model assisted by video animation can improve student learning outcomes. Therefore, it is necessary to innovate in learning, such as implementing a fun learning model so that students play an active role and improve learning outcomes.

International Journal of Educational Best Practices (IJEBP)

ISSN: 2581-0847

Vol 7 No 2 October 2023

#### INTRODUCTION

Currently, schools in Indonesia are starting to implement an independent learning curriculum. The Merdeka Curriculum is a curriculum with intracurricular learning with varied content so that students can be more optimal and have enough time to deepen concepts and strengthen competencies. The independent learning curriculum gives teachers and students independence in thinking. Teachers as drivers of independent learning or leaders in learning are required to prioritize approaches that make students the center of learning so that students have an active role, explore ideas, and have cognitive skills. Teachers are also required to be able to get along actively, creatively, innovatively, create quality learning, and prepare learning tools that can achieve learning goals so that students do not experience difficulties in learning. Students' difficulties in learning have an effect on low learning outcomes. The low learning outcomes Social Science subjects are caused by several factors, including: (1) social science material memorizes more and makes students bored, (2) students' lack of curiosity about social science material, (3) less variety in the use of learning methods and students pay more attention than deliver (Mesita, 2021). Learning outcomes are the result of an assessment of students' abilities which are determined in the form of numbers after undergoing the learning process (Sahiu, S., & Wijaya, 2017). The use of numbers in certain test results is intended to determine students' absorption capacity after receiving learning material (Bungsu et al., 2018).

Based on direct observations by researchers when participating in the Introduction to Schooling Field Program (PLP) at SMP Negeri 5 Pekanbaru, there were still teachers who used conventional methods in the process of teaching and learning activities, namely delivering material only using the lecture method in front of the class (Wahyono et al., 2020. Apart from that, we still found students who lacked the courage to express their ideas, and some students were found to be busy carrying out their own activities. The learning method used has an effect on students' activeness in the learning process, resulting in the grades obtained by students tending to be low in achieving Learning Goal Achievement Criteria (KKTP) 75. The use of the lecture, question and answer method becomes the teacher's choice without any innovation in the lecture method, so that students become bored and tend to be passive, resulting in low student activity (Pour et al., 2018). The method that can be used to improve learning outcomes is by making changes in the learning process (Putri et al, 2022).

According to Ibrahim et al (2017) Low learning outcomes can be done by changing the approach used from what was originally the teacher as a learning center to students as learning centers. Making changes in learning can be done by applying varied and interesting learning models, one of which is the cooperative learning model which can make students the center of learning. Therefore, the use of learning models that can make students more active is needed, this model is called the talking stick learning model. Talking stick is a learning model with the help of a stick. Students who hold the

International Journal of Educational Best Practices (IJEBP) ISSN: 2581-0847

Vol 7 No 2 October 2023

stick must first answer questions from the teacher after they have studied the main material (Andre Suhardiana, 2019). A stick is a tool used in the talking stick learning model. The stick will run from one student to another continuously until all students have a turn to answer questions from the teacher (Fathurrohman, 2019).

Talking stick is a learning model with the help of a stick. Students who hold the stick must first answer questions from the teacher after they have studied the main material (Andre Suhardiana, 2019). A stick is a tool used in the talking stick learning model. The stick will run from one student to another continuously until all students have a turn to answer questions from the teacher (Fathurrohman, 2019). In the talking stick learning model, each student is given the opportunity to express his opinion. Besides that, students can explore the ideas they have, play an active role, dare to argue, express their opinions, and make it easier for students to remember the lessons that have been taught. Each model has limitations. The limitations of the talking stick model are that it requires a duration that exceeds class hours and not all students are ready to accept questions. In this case the research was carried out using the help of animated videos, the use of this animated video is to maximize students' understanding of the material being taught with a short duration and have readiness when receiving questions. Animated video is a video medium that shows a moving image accompanied by sound which is packaged and then presented concisely and clearly (Rachmawati & Erwin, 2022). The use of animated videos has quite large potential in learning, the use of animated videos can provide indirect experience and make it easier for students to understand concrete explanations (Noviyanto et al., 2015). The advantage of animated videos is that the delivery of material to students can be more effective and faster (Munir, 2015). Video is a medium that contains audio and visual elements. Through video media, students will be able to understand subject matter which is still abstract because the nature of video can concretize the message (Andriyani & Suniasih, 2021). This will stimulate and increase students' motivation in learning.

Based on explanations and facts that occurred, the researcher is interested in examining the problem with the title "The Application of the Talking Stick Learning Model Assisted by Video Animation to Improve Student Learning Outcomes in Social Studies Subjects at SMP Negeri 5 Pekanbaru". Based on the explanation that has been explained in the background, the formulation of the problem in this study is: Can the application of the talking stick learning model assisted by video animation improve student learning outcomes in social studies subjects at SMP Negeri 5 Pekanbaru? Based on the formulation of the problem that has been described, the purpose of this research is to find out the application of the talking stick learning model assisted by video animation to improve student learning outcomes in social studies subjects at SMP Negeri 5 Pekanbaru.

**International Journal of Educational Best Practices (IJEBP)** ISSN: 2581-0847

Vol 7 No 2 October 2023

#### **METHOD**

This type of research is quantitative research using quasi-experimental method. The research design used in this study was a one group pretest-posttest design. The use of the one group pretest-posttest design can make the results after being given treatment more certain and guaranteed because they are compared with the conditions before being given treatment (Sugiyono, 2012). The sample classes gave treatment a pretest before being gave treatment and a posttest after being gave treatment using the talking stick learning model assisted by animated videos. This research was carried out at SMP Negeri 5 Pekanbaru in the 2022/2023 academic year. The research was carried out in February 2023 with a duration of 4 meetings lasting 2 x 40 minutes. The research population was all class VII students consisting of eight classes, namely VII A, VII B, VII C, VII D, VII E, VII F, VII G, VII H, totalling 279 students. The sample was taken using a purposive sampling technique, where the sample was taken based on the consideration that the selected class had low academic abilities, so that one class was obtained, namely class VII B, totalling 32 students.

Research data was collected using learning implementation observation instruments that were assessed by social studies teachers, and test instruments in the form of giving a pretest before being given treatment, and a posttest after being given treatment by students. The research was carried out over four meetings, the first meeting began by giving a pretest to students, The pretest and posttest questions consist of 10 multiple choice questions with 4 answer choices. The material for the pretest and posttest questions is different from indicators C1 to C4. the second, third and fourth meetings began to apply the talking stick learning model assisted by animated videos during learning on economic activity material. Then at the end of the fourth meeting, students were given a posttest. After the data is obtained, data analysis is then carried out using descriptive statistical analysis, and inferential statistical analysis in the form of a normality test, paired sample t-test, and n-gain test with the help of SPSS for Windows version 22 to process observation results, and pretest and posttest results.

#### FINDINGS AND DISCUSSION

#### **Descriptive Statistical Analysis**

## a. Description of the Implementation of Talking Stick Learning Assisted by Video Animation

The procedures of the research could be divided into four staged of activity in one rounded (cycle), namely: planned – action and observation – reflection. Activities and observations combined at one time, namely when actions are carried out and

International Journal of Educational Best Practices (IJEBP) ISSN: 2581-0847

Vol 7 No 2 October 2023

observations are carried out at the same time. The results of the observations are then reflected to plan the next stage of action. The description of the implementation of learning using an observation sheet instrument which was observed by an observer. from the second meeting to the fourth meeting. Observations start from the beginning of learning activities the end of learning. At the first meeting no observations were made because at the meeting one teacher only gave a pre-test to students and had not implemented the talking stick learning model assisted by video animation. Therefore, the observation started at the second meeting until the fourth meeting. The results of observing the implementation of the talking stick model assisted by video animation can be seen in Table 1.

**Table 1.** Implementation of Talking Stick Learning Assisted by Video Animation

No	Indicator	Second Meeting	Third Meeting	Fourth Meeting
1	Introduction	68.75	75	81.25
2	Core	75	80	85
3	Closing	87.5	81.25	93.75
	Amount	77.08	78.75	86.66

Source: Processed Results of Excel 2023 Data

From the analysis results in Table 1show that the learning activities at the second meeting have fulfilled the desired category, namely with an average learning implementation of 77.08%, and is in the good category. the highest percentage is found in closing activities. At the third meeting the implementation of learning was 78.75% and was in the good category. As for the fourth meeting, the implementation of learning was 86.66% in the very good category and the highest percentage was in closing activities.

#### **b.** Description of Student Pre-test Results

The pre-test was given before students were treated with a talking stick model assisted by an animated video. The pre-test is given to determine students' initial ability to a material.

 Table 2. Student Pre-test Achievement

Mark	Criteria	Frequency	Percentage
x ≥ 75	Achieved	11	34
$x \le 75$	Not achieved	21	66
Amount		32	100

Source: Processed Results of Excel 2023 Data

From the analysis results in Table 2, that there are still many students who have not reached the KKTP (Criteria for Achievement of Learning Objectives), this can be seen from the scores that have not reached the predetermined criteria, namely 75. Based on

International Journal of Educational Best Practices (IJEBP)

ISSN: 2581-0847

Vol 7 No 2 October 2023

the data obtained, 21 students had not yet reached the KKTP and 11 students had reached the KKTP.

#### c. Description of Student Post-test Results

The post-test is given after students are given treatment to find out the students' final ability to material economic activities and economic actors.

**Table 3.** Students' Post-test Achievement

Mark	Criteria	Frequency	Percentage
x ≥ 75	Achieved	30	6
$x \le 75$	Not achieved	2	94
Amount		32	100

Source: Processed Results of Excel 2023 Data

From the analysis results in Table 3 that two students have not yet reached the KKTP. While thirty students have reached KKTP. This means that the students' scores at the time of the post-test experienced a significant increase.

#### **Prerequisite Analysis Test**

#### 1. Normality Test

The normality test is used to see whether student learning outcomes are normally distributed or not. The normality test uses the SPSS version 22 program with the test criteria if the significance value is greater than 0.05, then the data is normally distributed. Meanwhile, if the significance value is less than 0.05, the data is not normally distributed. The results of the normality test in class VII B are known in Table 4.

Table 4. Pre-test and Post-test Data Normality Test

**Tests of Normality** 

	Kolmogorov-Smirnov <sup>a</sup>				Shapiro-	Wilk
	Statistic	Df	Sig.	Statistic	Df	Sig.
Post-test	0.164	32	0.029	0.947	32	0.118
Pre-test	0.111	32	$0.200^{*}$	0.936	32	0.059

Source: Processed Results of SPSS Data 22

The normality test uses the Shapiro-Wilk test. The Shapiro-Wilk test is used because the number of data is less than 100. The Shapiro-Wilk test data is said to be normal if the significance value is greater than 0.05. Table 4 shows the post-test and pre-test data in the Shapiro-Wilk column normally distributed with a significance for the post-test of 0.11, while for the pre-test of 0.05. Based on these results, the pre-test and post-test data were normally distributed because the significance values for all variables were > 0.05.

International Journal of Educational Best Practices (IJEBP) ISSN: 2581-0847

Vol 7 No 2 October 2023

#### 2. Hypothesis Test

The next step is to test the hypothesis. Hypothesis testing using parametric statistical tests (Paired sample T-Test). The results of hypothesis testing can be seen in Table 5.

Table 5. Paired Sample T-test

	Tuble 2.1 and bumple 1 test								
	Paired Samples Test								
			Paire	ed Differe	nces				
	95% Confidence								
			Std. Std. Interval of the						
			Deviatio	o Error Difference					
		Mean	n	Mean	Lower	Upper	T	Df	Sig. (2-tailed)
Pair 1	Pretest - Posttest	-19.3750	8.10715	1.43315	-22.2979	-16.4520	-13.519	31	0.000

Source: Processed Results of SPSS Data 22

Paired Sample T-Test is used to determine whether there is a difference between the pretest and posttest data. It can be seen in Table 6 that the significance gain is 0.00 meaning less than 0.05, then Ho is rejected and Ha is accepted. This shows that there is a significant difference between the pretest and posttest data and there is an increase in student learning outcomes after the treatment of the talking stick learning model assisted by video animation.

#### 3. Test the N-gain

The N-gain test is carried out to measure the increase in learning outcomes before and after learning is carried out. The following is the N-Gain score test on pretest and posttest values.

**Table 6.** Pretest and Posttest N-gain Results

**Descriptive Statistics** 

	N	Min	Max	Mean
Ngain_Score	32	,33	1,00	,6116
Ngain_Persen	32	33,33	100,00	61,1620
Valid N (listwise)	32			

Source: Processed Results of SPSS Data 22

It can be seen in Table 6 that learning using the talking stick model assisted by animated videos can improve student learning outcomes. The average N-gain value is 0.61. Based on these data it is known that student learning outcomes have increased after learning using the talking stick model of 0.61 included in the "moderate" category because it is greater than the interval value of 0.3 < g < 0.7 and for the N-Gain the percentage is 61, 16.

International Journal of Educational Best Practices (IJEBP) ISSN: 2581-0847

Vol 7 No 2 October 2023

#### **Discussion**

a series of teaching and learning processes using the talking stick learning model assisted by animated videos can improve student learning outcomes. This is because the talking stick model requires students to be better prepared to learn, quickly understand the material, always ready to answer questions, and express known answers. Based on the descriptive statistical analysis, it shows that the implementation of the talking stick learning model with the help of animation is carried out very well, this can be seen from the percentage gain for the indicators observed at each meeting that have increased. In addition, between the pretest and posttest data, there was an increase in student learning outcomes. It can be seen that during the pretest, 21 students had not reached KKTP with a percentage of 66% and 11 students had reached KKTP with a percentage of 34%, meaning that the level of student learning outcomes was still low. While at the time of the posttest 30 students had achieved KKTP with a percentage score of 94% and 2 students had not achieved a percentage of 6%, meaning that the level of student learning outcomes at the time of the posttest was high and there was a significant increase.

Based on these data, it can be concluded that after being treated with the talking stick model assisted by animated videos, the learning outcomes are higher than before being given treatment. This means that the application of the talking stick learning model assisted by animated videos can improve learning outcomes.

This is supported by the data from the paired sample T test which obtained a significance value of less than 0.05, meaning that there is a significant difference between the pretest and posttest. This is also strengthened by the average Gain value of 19.73 and the average N-Gain value of 0.61 which is included in the medium N-Gain category. There is a significant difference indicating that the application of the talking stick learning model assisted by video animation can improve student learning outcomes in social studies subjects at SMP Negeri 5 Pekanbaru.

Student learning outcomes increased because at the time of giving the pretest it was found that many students had not reached the KKTP. As many as 21 students, after being treated with the talking stick model learning assisted by video animation and being tested again by giving the posttest students who had not reached the KKTP experienced a decrease to 2 students. This means that the application of the talking stick learning model assisted by animated videos can improve student learning outcomes.

The results of this research are strengthened by several previous studies, such as research conducted by Sukadewi & Sumaryani (2016) explaining that there is an influence of the talking stick learning model assisted by mind mapping on biology learning outcomes. Research conducted by Sayekti et al., (2021) states that student learning outcomes have increased after using the talking stick method, as can be seen from student learning outcomes increasing from initially 62% in cycle I to 89% in cycle II, between cycle I and cycle II experienced an increase of 24%.

International Journal of Educational Best Practices (IJEBP)

ISSN: 2581-0847

Vol 7 No 2 October 2023

The increase in learning outcomes is caused by the experience of something new imposed by the learning model on student activities, so that students are braver to argue, ultimately increasing student understanding (Iwan, Wambrauw, et al., 2016). Yunita (2017) in the video there are pictures and sounds that attract students' attention so that students are enthusiastic about learning. This can be seen when learning is more focused on observing the video that is shown and enthusiastic when the stick is running. Pemahaman siswa akan suatu pembelajaran dipengaruhi oleh performa maupun media yang digunakan (Babang, 2020). Hasil penelitian ini juga senada dengan teori yang menyatakan bahwa faktor-faktor mempengaruhi hasil belajar yaitu karakteristik belajar peserta didik itu sendiri (Muliani, 2020).

From some of the explanations that have been explained, it is concluded that a series of teaching and learning processes by applying the talking stick learning model assisted by animated videos can improve student learning outcomes. This is because the talking stick model requires students to be better prepared in learning, quick to understand the material, always ready to answer questions, and express the answers that are known as fully as possible.

#### **CONCLUSION**

Based on data analysis carried out using descriptive statistical analysis and inferential statistical analysis, it was concluded that the application of the talking stick learning model improved student learning outcomes in social studies subjects at SMP Negeri 5 Pekanbaru. Based on the existing findings, it can be concluded that in an effort to achieve maximum learning outcomes, it is best to carry out reforms such as implementing the talking stick learning model assisted by animated videos so that students are enthusiastic, play an active role, and do not get bored when learning. It can be seen that when the teacher shows an animated video, all the students focus on paying attention to the video being shown. When the stick was walking the students were very enthusiastic and energetic in running the stick, and when the music stopped the students had to answer questions, almost all students were able to answer the questions given. This has an impact on the learning outcomes obtained which have improved after being treated with the talking sick model assisted by animated videos. Judging from the implementation of the learning process, on average it was carried out in the good category, and the learning outcomes between the pretest and posttest had significant differences. This can be seen from the results of the paired sample t-test, which obtained a Sig value. (2-tailed) 0.000 < 0.05 so H0 is rejected, and Ha is accepted, meaning that the application of the talking stick learning model assisted by animated videos can improve student learning outcomes in social studies subjects at SMP Negeri 5 Pekanbaru. The increase in student learning outcomes is also proven by the N-Gain being in the medium category. This shows that it is very necessary to implement a fun learning model so that students are enthusiastic, play an active role, and improve learning outcomes.

International Journal of Educational Best Practices (IJEBP) ISSN: 2581-0847

Vol 7 No 2 October 2023

#### REFERENCES

- Andre Suhardiana, I. P. (2019). Talking Stick Learning Model as a Support for Mastery of English Vocabulary in Early Childhood. Pratama Widya: Journal of Early Childhood Education. https://doi.org/10.25078/pw.v3i1.704
- Andriyani, N. L., & Suniasih, N. W. (2021). Development Of Learning Videos Based On Problem-Solving Characteristics Of Animals And Their Habitats Contain in Science Subjects On 6th-Grade. Journal of Education, 5(1), 37–47. https://doi.org/10.23887/jet.v5i1.32314
- Babang, M. P. I. (2020). Preparing Web-Based Biology Learning Media on Animalia Material, Nematoda and Annelida Sub-Material for Class X High School Students. Spizaetus: Journal of Biology and Biology Education, 1(3), 19-22. https://dx.doi.org/10.55241/spibio.v1i3.14
- Bungsu, T. K., Vilardi, M., Akbar, P., & Bernard, M. (2018). The Influence of Learning Independence on Mathematics Learning Outcomes at SMKN 1 Cihampelas. Journal On Education, 1(2), 382–389. https://doi.org/10.31004/joe.v1i2.78
- Fathurrohman, F. (2019, November 30). Talking Stick Model and Speaking Ability. Scholastica: Journal of Education and Culture, 1(2), 213-224. Retrieved from https://jurnal.stitnualhikmah.ac.id/index.php/scholastica/article/view/615
- Ibrahim, A. S. E., Nadjamuddin, L., & Suyuti. (2017). The Influence of the Problem Based Learning Model on Learning Outcomes in Economics Subjects in Palu 1 Public High School Students. Tadulako University Journal, 5(4), 9–20. http://jurnal.untad.ac.id/jurnal/index.php/Katalogis/article/viewFile/8914/7084
- Iwan, Wambrauw, H. L., & Fidmatan, S. S. (2016). Implementation of the Talking Stick Type Cooperative Learning Model to Increase Students' Biology Interest and Learning Outcomes in Class XA Environmental Pollution Material at Yapis Manokrawi High School. Pancaran, 5(1), 12. https://jurnal.unej.ac.id/index.php/pancaran/article/view/2598
- Mesita, D. (2021). Efforts to Improve Learning Outcomes Social Sciences Theme Events in Life Through Question Students Have Strategy with Question and Answer Board Media for Class V Students Upt. Elementary School 30 Singgalang. Encyclopedia of Journal, 3(3), 226–233. https://doi.org/10.33559/eoj.v3i3.778.
- Muliani, E. (2020). The Relationship between Study Habits and Students' Social Sciences Learning Outcomes. Educational Journal of Elementary Schools, 4-7. https://doi.org/10.30596/ejoes.v1i1.4551
- Munir. (2015). Multimedia Concepts & Applications in Education. Bandung: Alphabeta. https://cvalfabeta.com

International Journal of Educational Best Practices (IJEBP) ISSN: 2581-0847

Vol 7 No 2 October 2023

- Noviyanto, T. R. H., Juanengsih, N & Rosdiyatun, E. S. (2015). Using Human Respiratory Animation Video Media to Improve Biology Learning Outcomes. Edusain Journal, 7 (1): 62-63. http://journal.uinjkt.ac.id/index.php/edusains
- Putri, U. M., Gimin, G., & Hendripides, H. (2022). The Effect of Using Online-based Learning Resources on Learning Outcomes in Accounting Subjects in Institutional Accounting and Finance Skills Programs. Tambusai Education Journal, 6, 13501–13509. https://www.jptam.org/index.php/jptam/article/view/4572
- Pour, A. N., Herayanti, L., & Sukroyanti, B. A. (2018). The Influence of the Talking Stick Learning Model on Student Learning Activeness. Journal of Educational Research and Studies: e-Saintika, 2(1). https://doi.org/10.36312/e-saintika.v2i1.111
- Rachmawati, A., & Erwin, E. (2022). The Influence of the Think Pair Share (TPS) Learning Model Assisted by Animation Video Media on Primary School Student Learning Outcomes. Basicedu Journal, 6(4), 7637-7643. https://doi.org/10.31004/basicedu.v6i4.3613
- Sahiu, S., & Wijaya, H. (2017). The relationship between Extrinsic Learning Motivation to Psychomotor Learning Outcomes in Grade V Christian Subjects at Zion Makassar Elementary School. Jaffray Journal, 15(2), 231–248. https://doi.org/10.25278/jj71.v15i2.262
- Sayekti, S. P., Dahlan, Z., & Al-Faruqi, M.F. (2021). Application of the Talking Stick Learning Model in Improving Student Learning Outcomes in PAI Subjects for Class V Students at SDN 02 Mampang, Depok City. Dirosah Islamiyah Journal, 2(2), 232-245. https://doi.org/10.17467/jdi.v2i2.365
- Sugiyono. (2012). Quantitative, Qualitative and R&D Research Methods. Bandung: Alfabeta. https://cvalfabeta.com
- Sukadewi, N. K. A., & Sumaryani, N. P. (2016). The Effect of Talking Stick Learning Model Assisted by Mind Map on Learning Outcomes Biology. EMASAINS Journal, 5(1). https://dx.doi.org/10.55241/spibio.v2i1.30
- Yunita. (2017). The Influence of Learning Video Media on Science Learning Outcomes Judging from Student Activity. LP3M Journal of Bachelorwiayata University Taman Siswa Yogyakarta, 3 (2), 153-160. https://doi.org/10.30738/sosio.v3i2.1614
- Wahyono, P., Husamah, H., & Budi, A. S. (2020). Professional teachers during the COVID-19 pandemic: Review of online learning implementation, challenges and solutions. Journal of Teacher Professional Education, 1(1), 51–65. https://doi.org/https://doi.org/10.22219/jppg.v1i1.12462.

International Journal of Educational Best Practices (IJEBP) ISSN: 2581-0847

Vol 7 No 2 October 2023