

INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES



The Effectiveness of Field Trip in Enhancing Students' Learning Outcomes in Biodiversity Subjects

Nadia Nisha Musa, Nur Atirah Hasmi, Sarina Muhamad Noor, Zulfadli Mahfodz, Hasnun Nita Ismail and Nafisah Mohd Isa@Osman

To Link this Article: <http://dx.doi.org/10.6007/IJARBSS/v8-i1/3960>

DOI:10.6007/IJARBSS/v8-i1/3960

Received: 26 Dec 2017, Revised: 19 Jan 2018, Accepted: 26 Jan 2018

Published Online: 29 Jan 2018

In-Text Citation: (Musa et al., 2018)

To Cite this Article: Musa, N. N., Hasmi, N. A., Noor, S. M., Mahfodz, Z., Ismail, H. N., & Isa@Osman, N. M. (2018). The Effectiveness of Field Trip in Enhancing Students' Learning Outcomes in Biodiversity Subjects. *International Journal of Academic Research in Business and Social Sciences*, 8(1), 918–929.

Copyright: © 2018 The Author(s)

Published by Human Resource Management Academic Research Society (www.hrmars.com)

This article is published under the Creative Commons Attribution (CC BY 4.0) license. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this license may be seen

at: <http://creativecommons.org/licenses/by/4.0/legalcode>

Vol. 8, No. 1, January 2018, Pg. 918 – 929

<http://hrmars.com/index.php/pages/detail/IJARBSS>

JOURNAL HOMEPAGE

Full Terms & Conditions of access and use can be found at
<http://hrmars.com/index.php/pages/detail/publication-ethics>

The Effectiveness of Field Trip in Enhancing Students' Learning Outcomes in Biodiversity Subjects

Nadia Nisha Musa^{1*}, Nur Atirah Hasmi¹, Sarina Muhamad Noor²,
Zulfadli Mahfodz¹, Hasnun Nita Ismail¹ and Nafisah Mohd
Isa@Osman³

¹ Faculty of Applied Sciences, Universiti Teknologi MARA, Perak Branch, Tapah Campus, 35400 Tapah Road, Perak, Malaysia, ² Institute of Halal Management and Science, Faculty of Business Management, Universiti Teknologi MARA, 40450 Shah Alam, Malaysia, ³ Faculty of Applied Sciences, Universiti Teknologi MARA, Perlis Branch, Arau Campus, 02600 Perlis, Malaysia

Abstract

Motivation in learning Biodiversity-related subjects is crucial in amplifying the learning interest towards subjects within the field of Ecology. Students' learning interest is piqued whenever interactive teaching techniques such as analogy role play, field trip, and laboratory experiment are utilised. Biodiversity-related subjects have long been embedded in the syllabus; beginning from the foundation-level content during primary education, up until tertiary level in university. However, lack of varieties in teaching methodologies may have contributed in students' dwindling motivation towards rich-content subjects. This is especially true for Biodiversity subjects as it consists a lot of information for all kingdoms—Eubacteria and Archaeobacteria, Animalia, Plantae, Protista and Fungi. Hence, a more interactive approach is needed to initiate and maintain the students' motivation in learning this subject. This study was carried out to specifically examine the effectiveness of a field trip in enhancing the performance of university students in Biodiversity subjects. Three instruments were used to achieve the objective of this study. These are the Instructional Strategies in self-access learning module, test papers and questionnaire. The respondents were the undergraduate students of higher learning institution in Perak, Malaysia. Data was analyzed using t-test, Pearson correlation analysis and multiple regression analysis. Result on the t-test showed a significant value in the test performance after the field trip activities. Pearson correlation analysis showed a significant relationship between each of the motivation elements with students' satisfaction during learning sessions while the regression analysis indicates two of the variables explain the satisfaction in learning through field

trip. Findings of the study verified the assumption that students' motivation is enhanced when the module and field trip are embedded within class instruction.

Keywords: Biodiversity, Self-Access Learning, Field Trip

Introduction

Biodiversity is one of the major components that make up a dynamic ecosystem. As one of the top mega-biodiversity countries, Malaysia is rich in natural resources—home to an abundant amount of plants and animals' species including rare and exotic ones. Loss of biodiversity will cause a decrease in food and medicine supply. While the rapid growth of new technologies is crucial for human civilisations, the rapid modernisation in many areas as evident in the swift constructions of new buildings and roadways, have greatly disturbed the habitats of living organisms. Deforestation is one of the human activities which caused a great disturbance on the habitats. Therefore, it is of great importance that the awareness is fostered among the young and future generations on preserving the biodiversity. The Biodiversity subjects are taught from the foundation level which began as early as nine years old; progressively learning the subjects up to tertiary level of education in university. Initially, the students are introduced to five types of animal classes namely reptiles, mammals, birds, fishes, and amphibians. They learn the distinctive characteristics possessed by these animals in order to be able to classify them into their similar groups. In the secondary level of education, they will then begin to learn the biodiversity subjects in deeper magnitude, such as the mammals' choice of habitat and types of interactions. They also learn plants' species unique characteristics, including the reproductive cycle and the intra and interspecies competition. Even with such neat arrangements, one of the major problems with learning the subjects may be related to the content-rich nature of the subjects. Most students have difficulties in learning Biodiversity-related subjects because they are required to know details each of the family in all the kingdoms; Animalia, Plantae, Virus, Protozoa, Bacteria, and Fungi. This information overload can be too heavy to process, which explains why a lot of students struggle to maintain their intrinsic motivation to study biodiversity. Most undergraduate students have either inadequate knowledge in the subject matter or lack in the pedagogical knowledge required in learning the topic effectively. One of the effective methods in studying Biodiversity is through hands-on and real-life experience such as field trip experiences (Yusof, 2016). Due to the relatedness between theory and direct observations to enhance the understanding in the subject, this study seeks to: (a) Determine the effectiveness of the field trip in instructional strategies on the students' achievement in Biodiversity subject; (b) Identify students' satisfaction towards motivational elements from field trip on the Biodiversity subject.

Literature Review

Students' intrinsic motivation is necessary to trigger their initial interest in learning Biodiversity-related subjects. Classroom theories can appear to be difficult if the learners fail to locate the content relevance with real-life scenarios, which greatly affects their understanding of the subjects. One of the most effective methods in learning biodiversity is by having a field trip. Field trip is an effective method to promote learners' attention, confidence, and relevance because the program allows learners a chance to interact with experts to share their skills and knowledge with the fresh specimens (Nadia, Atirah, Zulfadli & Hasnun, 2017). Field trips allow learners to

become actively involved in the learning session rather than becoming mere recipients of knowledge as it can inhibit effective learning (Yusuf, 2006). The concept of a field trip is centered on gaining learning experience through direct observations and firsthand information. This concept is useful to overcome the problem that limited learners' satisfaction when studying a phenomena which cannot be demonstrated or brought into a conventional classroom. The instructor's lesson plan for the field trip is composed of students' observations as they collect fresh specimens, as well as an analysis of the data parallel with the classroom theory (Instructional Strategies Online, 2013). The trip is planned in order to experience theory in practice while boosting interactions among instructor and learners outside the classroom. Interactions in the new environment aid the teaching and learning process. Field trips were massively utilised in many fields to promote learners' motivation (Fakomogbon, Ibrahim, & Gegele, 2007) and enhance the learning outcomes (Laddawan, Charlie, & Peter, 2016). Intrinsic motivation is crucial for independent cumulative learning, especially in humans. From a biological perspective, the function of intrinsic motivation is to serve the success in knowledge attainment and skill acquiring to regulate homeostatic needs. The mechanisms involve only the brain, as the direction of specific responses can apparently be influenced by many properties of external stimulation, as well as by many internal variables such as stimulus intensity color, pitch, association with biological gratifications, as well as punishments (Berlyne, 1966). Intrinsic motivation has both advantages and disadvantages. While intrinsic motivation can be a long-lasting and self-sustaining, there is a constant need to foster motivation as it deteriorates with time. A variety of approaches is needed to motivate every student and connect their interests with the subject matter (Matt and Dale, 2002). Some of the components for motivations were attention in the beginning of the lesson and the relevance of the content with the surrounding life (James, 1995). Confidence level among learners is enhanced when they understand and performed successfully in the study content (Keller, 1987). Numerous studies have been done to enhance the effectiveness of intrinsic motivation's model in the education system. One of the models is ARCS model (Keller, 1987). For instance, the integration of the model has been used to boost students' motivation in Science subjects in various contexts. The results revealed a significant decrease of dropout rate from 44% to 22% (Chyung, Winiiecki, & Fenner, 1999). The results indicated that both students' motivation and achievement increased significantly after the classroom instruction is embedded with the motivational models (Feng & Tuan, 2005).

Research Questions

To guide this study, the following research questions were asked.

1. Is there any difference in Biodiversity test performance of students before and after exposure to a field trip experience?
2. Is there any difference in Biodiversity test performance between students exposed to field trip and those who were not?
3. Is there any relationship between motivational elements and students' satisfaction in learning Biodiversity subject via field trip?

Research Hypothesis

With regards to the study focus, the following research hypothesis were raised and tested.

Ho₁: There is no significant difference in Biodiversity test performance of students before and after exposure to field trip experience.

Ho₂: There is no significant difference in Biodiversity test performance of students exposed to field trip experience and those who were not.

Ho₃: There is no relationship between motivational elements and satisfactions of the students' in learning Biodiversity subject via field trip.

Materials and Methods

This study is an experimental study with quantitative method of data measurement. The participants in this study were undergraduate students enrolled in Diploma in Science at Universiti Teknologi MARA, Tapah Campus, Perak, Malaysia. They were within the age range of 19 to 20 years and were selected from semester four students in the Biology stream using purposive sampling. The size of the sample was determined based on the estimated number of students taking Biodiversity subjects in the ensuing semester. This study was conducted over a period of approximately twelve months. The sample for the study consisted of 139 respondents (treatment $n=70$; control $n=69$). The control group was taught using conventional method, while the treatment group was taught using printed module and field trip embedded with the motivational elements. The research instruments used for the data collection were Instructional Strategies in Learning Session (self-access learning module and field trip), Introduction to Biological Diversity Test (pre-test and post-test) and Questionnaire on Student's Attitude towards Introduction to Biological Diversity.

Instructional Strategies in Introduction to Biological Diversity

The Instructional Strategies were adapted from Keller (1987). Two topics chosen for this study were on Plantae and Animalia.

Module for the field trip: Topic Plantae

Self-access learning module was given in preparation for the field trip. Items were designed by introducing the four major groups of plant; Gymnosperms, Angiosperms, non-vascular plants, and seedless vascular plants. The classification group of plants from module is shown in Figure 1 below.

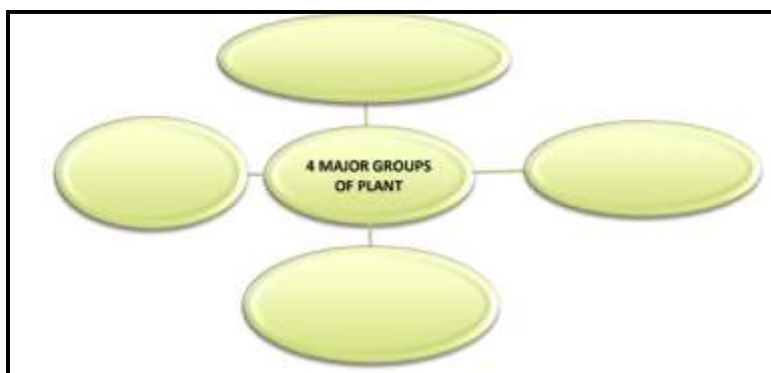


Figure 1: Four Major Group of Plants adopted from the Study Module

In the module, the life cycle of certain plants' species such as moss and fern are also included in order to stimulate students' interest and improve their understanding on the topic. Figure 2 is a diagram on the life cycle of ferns.

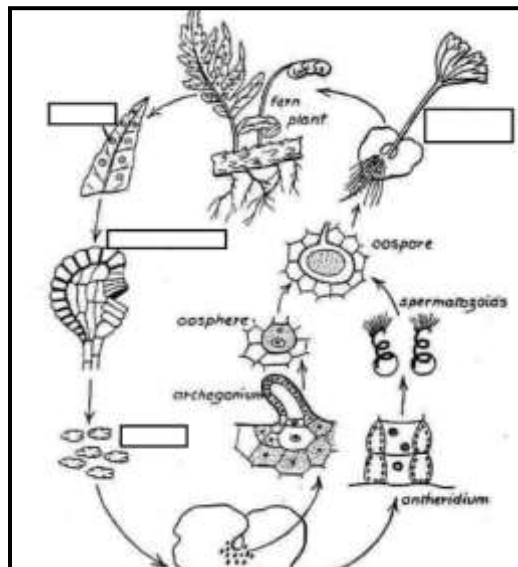


Figure 2: Life Cycle of Ferns Adopted from Study Module

Learners were asked to classify the unique characteristics of Gymnosperms and Angiosperms. The characteristics given were growth habit, reproductive structures, pollen grain transfer, fertilization, seeds, and the number of species. Learners then identified and compared the male and female Gymnosperms they learnt in theory with the fresh specimens. They used *Pinus* species collected from high land, Cameron Highlands, Malaysia. After identifying the male and female cones, they then began to draw the observed specimens. For the Angiosperms species, the learner studied the morphology and anatomy of the flowers using the fresh specimen.

Module for the field trip: Topic Animalia

In order to embed the variability of the instructions, items were constructed by giving the multiple-choices items for the topic as shown in Figure 3. Other than that, during the teaching delivery the instructor used variations of audio-visual presentations on the students.

Select the last common ancestor of all animals.

- A. Multicellular fungus.
- B. Unicellular yeast.
- C. Flagellated protist.
- D. Unicellular chytrid.

Select the cells in a sponge that are primarily responsible for trapping and removing food particles from circulating water.

- A. Mesoglea cells
- B. Choanocytes
- C. Epidermal cells
- D. Pore cells (porocytes)

Select the appropriate description of shark.

- A. Invertebrate chordate.
- B. Jawless fish.
- C. Cartilaginous fish.
- D. Bony fish.

Identify the developmental stage to be the first distinguish of a diploblastic embryo from a triploblastic embryo.

- A. Gastrulation
- B. Metamorphosis
- C. Cleavage
- D. Fertilization

Choose the vertebrate groups which may have lungs, or gills, and may use skin as a respiratory surface.

- A. Chondrichthyans
- B. Birds
- C. Amphibians
- D. Nonbird reptiles

Figure 3: Multiple-choice Items Adopted from Study Module: Animalia

Then, learners were required to differentiate between protostomes and deuterostomes while analysing the adaptations carried out by the insects. They were also given a mind map as an aid, in addition to fresh specimen of Mollusks and Joint-Legged Animals such as snails and clams. They were tasked to study the external morphology of the specimens and then complete the module in a classroom. Table 1 explain the activity, location and the significant of each activity conducted during the field trip.

Field trip

Activity	Location	Significance
Learners were briefed by an expert on the importance of various types of herbs. (The expert was an officer with qualifications in the Botany field)	Botanical Garden, Perak	Learners were able to relate the theory they have learnt in class when they classified the plant species with the fresh specimens. Learners realised the relevance of Biodiversity subjects with authentic, real-life scenarios. Learners were able to relate their previous experiences with the biodiversity subjects. Learner could identify their future career goals which are related to the activity.
Learners were asked to select a few types of herbs which captured their interest.		
Learners observed the selected animal species while also studying their behaviour. They were tasked to produce a documentary on an animal species of their choice.	Zoo Taiping, Perak	By showing the visual representatives of the important objects, the learners' attention is enhanced.

Table 1: Lesson Plan during the Field Trip

In order to stimulate the students' self-confidence, the instructor allowed the learners to learn independent and practice their knowledge during the field trip. Learners discussed their findings during the field trip in a complete report. They were given an explanation on the criteria for their assessment: a report which has clear objectives, clear steps for procedure, and diagrams to explain the procedure. They also need to write an accurate discussion and conclusion.

Introduction to Biodiversity Test (pre-test and post-test)

The second instrument used in this study was a Biological Diversity test. Both pre and post test consisted of twenty multiple-choice items. The tests were developed to test students' performance. The twenty items were drawn from Diploma in Science university syllabus. The validity of the test items was verified by experts in Biodiversity and Ecology fields.

Questionnaire: Student's Attitude towards Introduction to Biodiversity

Finally, the subjects were given a set of questionnaire on the motivational elements in learning Biodiversity subjects. It is divided into sections A and B. Section A contains questions on students' personal information. Section B is the attitudinal section consists of sixteen items to elicit information about the learner's preference towards learning Introduction to Biodiversity using field trip. Four components of intrinsic motivation were included; attention, relevance, and confidence. The items were constituted using five-scale point Likert-type scales. Items on the scales are anchored at 1=strongly disagree, 2= disagree, 3=neutral, 4=agree, 5= strongly agree. The questionnaire was given to the treatment group because the items were specifically constructed based on their learning styles using self-access learning module and field trip. The validity of the instruments was checked with the experts and the reliability of the questionnaires' items was analyzed using Cronbach alpha. The collected data is analysed qualitatively using frequency data.

Data Analysis, Results and Discussions

Biodiversity subjects which have been implemented in the curriculum seems to have a vital function in increasing youngsters interest in the ecosystem. Therefore, the need to have an exposure with the real fresh specimens is indispensable because the subject contained information related to hands on experiences. This study seeks to determine the effectiveness of the field trip in instructional strategies on the students' achievement in Biodiversity subject and the motivational elements during the field trip to their satisfaction. Prior to the preparation for pre-test, students were taught using the conventional methodologies in classroom from the beginning of the topic. The items in the test covered all the subtopics in the related learning content with the level; knowledge, comprehension, and application from Bloom's Taxonomy. They, the treatment group was exposed to field trip activities and subsequently a post test was carried out. In the findings, the result of the dependent t-test shows that there is a significant difference in the pre-test and post-test for treatment group in Introduction to Biological Diversity Test ($p < 0.05$) as shown in Table 2. With this result, H_{01} was therefore rejected.

Pre-test		Post-test		t-test	p-value
Mean	S.D.	Mean	S.D.		
26.98	6.19	80.30	13.08	41.9	< 0.05

Table 2: Dependent t-test between Pre-test and Post-test for Treatment Group in Introduction to Biological Diversity Test

Further, to understand the effect of the field trip on learning as compared to conventional classroom method, a post test was conducted on the control group and the treatment group. In a comparison between these two groups, a significant difference is identified between the students' performance in the post-test for Biological Diversity Test where $p < 0.05$ as stated in Table 3. With this finding, H_{02} was therefore rejected. The result indicates the implementation of the field trip and the series of interactive methodologies in learning the subjects such as module, peer coaching, video presentations, and documentary-making did enhance the performance among the treatment group. From the activity, learners gained more confidence in

the subject and became more aware of the relevance of the topics covered during class. Besides a boost in their confidence level, most of the learners felt a sense of satisfaction when they were able to share their skills and teach their friends on how to complete the projects and assignments that they were assigned with during the field trip. This is because the instructor encouraged the learners who have already completed their tasks to help their friends during the outdoor activity.

Control		Treatment		t-test	p-value
Mean	S.D.	Mean	S.D.		
19.64	4.91	23.05	5.78	-3.761	< 0.05

Table 3: Independent t-test between Control and Treatment Group for Post-test in Introduction to Biological Diversity Test

In order to achieve the last objective, a set of questionnaire was given to the learners in order to identify students' motivation towards field trip as one of the instructional strategies in the Biodiversity subject. The Cronbach alpha value for the 16 items questionnaire was 0.94. Therefore, the item scale was consistent and reliable for measuring. A Pearson correlation test was conducted in order to determine the relationship among the motivational elements in field trip; attention, relevance, confidence and satisfaction. Table 4 exhibits the inter-correlation values between variables. The Pearson's r value shows positive significance correlation for all variables with the value of r ranging from 0.87 to 0.93 and significance at $p < 0.01$. A significant relationship between the students' attention, relevance, and confidence to their satisfaction in studying Biodiversity related subject during the field trip. With this result, H_{03} was therefore rejected.

Variables	(1)	(2)	(3)	(4)
(1) Attention	1			
(2) Relevance	0.89**	1		
(3) Confidence	0.93**	0.92**	1	
(4) Satisfaction	0.87**	0.90**	0.93**	1

** $p < 0.01$

Table 4: Pearson Correlation between Variable and Satisfaction in the Field Trip

It was found that students who went for a field trip have a high motivational elements related to their satisfaction. Having field trips in their study method enhanced their engagement, which also increased the feeling of satisfaction. Satisfaction is the element that can be achieved and sustained if the students are able to relate the importance of the topic with their past experiences. The findings indicate most of the students felt that they enjoyed completing the field trip and participating in the discussion activity. They became interested in topics as they are able to relate their current lesson with previous experiences, including those during Secondary level. They were also able to stimulate their memory on the basic understanding of the topic which helped them to initiate the discussion of the topic at the beginning in the classroom.

Further, a multiple regression analysis was used to test if attention, relevance and confidence significantly explained the students' satisfaction during field trip. The results of the regression indicated the three variables were able to explained 94% of the variance in satisfaction among students during field trip. The results further explained relevance ($\beta=0.27$, $p = 0.19$) and confidence ($\beta= 0.75$, $p = 0.00$) were significance to satisfaction of the students during field trip. The fact that students' satisfaction were explained by students' relevance and confidence proved the importance of maintaining the relevancy in the study content and confidence level which contributed to their sense of satisfaction and motivation. The implementation of field trips in the lesson plan helped the instructor to initiate and sustain the students' confidence during lessons. The realization of the study content to their surrounding environment also enhanced the satisfaction in learning. Details of information as presents in Table 5.

Factors	Beta	t-Value	Sig
Constant		0.907	.368
Attention	-0.73	-0.621	.537
Relevance	0.27	2.401	.019
Confidence	0.75	5.569	.000
R-Square	.944		
Adjusted R-Square	.941		
Sig. F-Change	.00		
Durbin-Watson	2.00		

Dependent Variable: Satisfaction

Table 5: Regression Analysis Regarding Prediction Students Satisfaction

Conclusions

Based on the findings, the intrinsic motivation of Science students is improved by utilising field trips as one of the methodologies in learning biodiversity-related subjects. It is important to maintain the students' attention early on from the beginning of the semester by stimulating their interest to learn and proving the relevance of the subjects with real life implications so that it would improve the students' learning satisfaction. Ultimately, intrinsic motivation is a crucial part in improving academic performance. Students' awareness of the concepts in biodiversity would be enhanced if the learners gain satisfaction in the learning process. It seems that more concrete practice would be needed to moderate any limitations it might impose on the instructional methods.

Acknowledgement

The authors thank the financial support from Universiti Teknologi MARA (600-RMI/DANA 5/3/ARAS 34/2015).

Corresponding Author

Nadia Nisha Musa, Faculty of Applied Sciences, Universiti Teknologi MARA, Perak Branch, Tapah Campus, 35400, Tapah Road, Perak, Malaysia, nadianisha@perak.uit.edu.my

References

- Berlyne, D. (1965). *Structure and Direction in Thinking*. New York: John Wiley and Sons, Inc.
- Chyung S. Y., Winiiecki, D., & Fenner, J. A. (1999). Evaluation of effective interventions to solve the drop-out problem in adult distance education. In B. Collis, & R. Oliver (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia & Telecommunications* (p. 51-55). Charlottesville, VA: AACE.
- Fakomogbon, M. A, Ibrahim, A. I., & Gegele, W. B. (2007). *An introduction to vocational method*. Ilorin, Nigeria: Onigba.
- Feng, S. L., & Tuan, H. L. (2005). Using Arcs Model to Promote 11th Graders' Motivation and Achievement in Learning about Acids and Bases. *International Journal of Science and Mathematics Education*, 3, 463-484.
- Instructional Strategies Online. (2003). *What are Field Trips?* Retrieved from olc.spsd.sk.ca/DE/PD/instr/strats/fieldtrips/index.html
- James, A. M. (1995). A Study of Intrinsic Motivation in the Mathematics Classroom: A Personal Constructs Approach. *Journal for Research in Mathematics Education*, 26(3), 255-257.
- Keller, J. M. (1987). Strategies for stimulating motivation to learn. *Performance and Instruction Journal*, 26, 1-7.
- Laddawan, K., Charlie, C. C., & Peter, R. (2016). Using Social Media to Enrich Information Systems Field Trip Experiences: Students' Satisfaction and Continuance Intentions. *Computers in Human Behavior*, 63, 256-263.
- Matt, D., & Dale, W. (2002). *Learning to Teaching and Teaching to Learn Mathematics: Resources for Professional Development*. *Mathematical Association of America*, 2002, 163.
- Nadia, N. M., Atirah, N. H., Zulfadli, M., & Hasnun, N. I. (2017). Implementation of ARCS Model to Promote Tertiary Level Students Achievement in Learning Biodiversity Subjects. In *International Conference on Social and Behavioural Sciences* (p. 21). Singapore: Headway Global Research Consultancy.
- Yusuf, A. (2006). Effect of field trip method of teaching on students' performance in Social Studies. *Ilorin Journal of Education*, 2, 7-17.