



The Impact of Activity Based Learning on Students' Motivation and Academic Achievement: A study among 12th Grade Science and Environment Students in A Public School in Oman

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Abstract: *In recent years, there has been an ongoing debate about the impacts of using activity based learning strategies instead of traditional learning strategies in the classroom, and their appropriateness to increase student's motivation and attainment. The purpose of this study therefore is to determine the influence of activity based learning on students' achievement in comparison to passive learning and detect students' views towards activities. For this purpose, mixed research method was utilized, gathering data from a public school in Oman. Quasi-experimental research design with pre-test and post-test was used in the research with a sample of 24 male students from 12th grade. They were divided into two groups, namely; control and experimental group. The first group received traditional learning and the second group was taught through activity based learning strategy. After that, focus group interviews were held with 8 participants from experimental group to gather qualitative data. Independent sample t-test was used to analyse the quantitative data, whereas content analysis technique was used to analyse qualitative data. The result of the study indicated that activity based learning had a positive effect on students' achievement. Students believe that activity based learning enhance understanding, increase a sense of responsibility, create attractive learning environment and increase achievement. The study therefore contents that activity based learning has significant impact on student's academic achievement.*

Keywords: *Activity based learning, science and environment, academic achievement, students' motivation, students' perception.*

INTRODUCTION

One of the most important challenges that face educators globally is how to qualify competitive passionate students to be ready for job market. For that reason, pedagogue must search for best ways to actively engage students in the classroom. Through that, teachers will emphasize the understanding of the delivered knowledge and develop problem solving skills and critical thinking (Younis 2018). Decision makers think how to motivate students to create innovative solutions for the challenge that they face and move beyond just gaining knowledge passively (English and Kitsantas 2013). Students in classroom learn through two ways actively or passively. They learn passively by being receptacles of knowledge which mean they have no role in the learning process. On the other hand, students learn actively by participating in the learning process not

only listening. Seating passively in the class will cause attentiveness and lose of concentration. Students can be involved actively by using different types of strategies like group discussion, open question techniques, personal exploration, critical thinking, experiment, presentation, debates or role playing. There are many ways that teachers can implement in the classroom to ensure that students gain the targeted skills and knowledge which predicted to prepare person for real life world. One of the best kinds of these ways is activity based learning. According to Bhalli, Sattar & Asif (2016) best teaching and learning methods are those which make the students active contributors in the classroom.

Activity based learning refers to tasks that are offered in the classroom. Engagement in learning process and students' participation is the role element in activity based learning (Prince, 2004). The best definition for activity based learning by Bonwell and Eison (1991, p.19) is anything that involves students in doing things and thinking about the things they are doing. If the activity- based learning could be defined as a fruitful learning that will help students to grasp the required outcomes which are defined by the teacher himself (Kassir, 2013). Singal et al. (2018) described actively based learning commonly as student–centric which aim to provide challenging learning tasks, engaging and flexible learning for all students. Activity based learning provides scaffolding to students and make them connected to their classmates which enhance effort and motivation positively (Deci and Ryan 2000). According to Quin (2012) activity based learning which used sometimes interchangeably with another terms like cooperative leaning, collaborative learning, problem based learning or inquiry based learning typically defined as any educational strategy that engage student actively in the learning process. It includes a wide range of interesting activities. The student will be fully involved instead of receiving knowledge passively. It is known that the best books, and materials around the world will not make students interested about learning and willing to study hard if they are unmotivated. Unfortunately, Classes become dull and excitement decreased among students because they are not motivated. Changing the way of teaching is one of the factors that would bring excitement to the learning process and thus, increase motivation. One of the effects of reduced motivation is drop of students' achievement. Grade 12 students in Sultan Qaboos school in Buraymi got low grades in Science and environment subject, more than 50% of students got D in term 1 of academic year 2018/2019. For that reason, this study examines if there is a proof of improvement that could happened after the implementation of activity-based learning. The main objective of this study is to investigate the influence of the implementation of activity based learning strategy on students' achievement. Three objectives derived from the main One in this research; first, to understand the impact of activity based learning on students' achievement in previous literatures. Second, to investigate the impact of activity based learning on students' achievement through quasi-experimental design. Third, to understand the experience and perception of students whom have exposed to activity-based learning.

This research is conducted to present a framework analysis about activity- based learning method impact on student achievement. The main question of this mixed methods design research examined the influence of activity- based learning strategy impact on students' scores:

- Is there any impact of activity-based learning on students' achievement?

The following sub-questions were addressed in this paper:

- What are the impacts of activity- based learning approach according to existing literature?
- Is there any difference in students' results between test after traditional method and test after activity-based method?
- What are students' perceptions about their experience with activity-based learning?

This research was conducted to prove the following hypothesis: 'Activity based learning method has significantly positive impact on students' feeling and achievement'. Quality of education in Oman and in the Arabian Gulf countries in general has been steadily improving. David, et al. (2017) account the tremendous growth in both expansion and excellence in education in the Arabian Gulf countries in the recent decades.

While different types of teaching methods have been studied and identified by another scholar such as inquiry-based learning, problem-based learning and collaborative learning. They examine their impact on students' achievement and motivation. However, there is a lack of researches that investigate the effect of activity-based learning. Except for some studies that explore the influence of activity based learning on motivation. In Omani context the researches on activity-based learning is almost non-existent. This is one of the ground breaking research in Omani context, because it points out to the effectiveness of activity based learning approach on students' marks in science and environment subject for grade 12 in Omani public school. Also, the results of this study will provide insight into students' perception of activity based learning and how it affects their learning process.

Literature Review

Studies of human learning led to the appearance of some of learning theories; the common and famous of which are constructivism and behaviourism. The principles underlying these theories of learning have greatly influenced education systems and instructional practices. Activity based learning is grounded in constructivism whereas, the skills-based method to learning is started from behaviourism. The behaviourist school appeared first before constructivism, it largely credited to Ivan Pavlov, the Russian physiologist (1849–1936). Behaviourist learning assumptions emphasize the external reactions of animals and humans and suggests that learning come across structure of behaviour in which learner should go through to gain new learning (Hull 1935; Pavlov 1960; Thorndike 1913; Watson 1924). School of behaviourism had significant implications on schools and teaching process. The practices related to school of behaviourism are characterized by drilling, repetition, individualized, group learning, and recently placing emphasis on inspiring and motivating students through both types of reinforcement. These practices represent the classic teaching method which used in the control group in this paper. The school of constructivist appeared early in the 20th century. It has roots in physiology and psychology (Driscoll 1994). The constructivist school differs from the behaviourist school, it differentiates in study between human behaviour and animal behaviour. The constructivist thoughts confirm that, social interaction play crucial role in cognitive development (Piaget 1970; Vygotsky 1978). A very significant assumption under the constructivist school highlighted the role of the experience assuring that individuals better learn through tasks (Dewey 1997). This assumption tells that learner when involved in activity, he/she will learn gradually the meaning of the concept and he/she can do his/her own role that ensures understanding. This theory supports to the issue that this paper will investigate and emphasize it. In education, thoughts of constructivist school emphasize the role of interaction, culture, experience, cognitive development and meaning building. Meaning building is an active procedure in which meaning is formed through personal experience and negotiation (Driscoll 1994). Many teachers are trying to change their teaching strategies to support writing and reading for critical thinking. They want to prepare their students not just to listen and memorize, but to solve, examine, create, question, debate, and interpret the material in their courses. Teaching strategies defines as ways, methods, styles and techniques that adopted by teacher in the class to deliver the concepts and to reach the targeted objectives. Teaching strategies are different techniques that teachers implement in the classroom to emphasize that students understand the concept easily. Teachers use different, unique, innovative teaching strategies to introduce concept to students using their gained experience and knowledge. Connectivism as a new influential learning theory offers theoretical understanding of learning in a digital age, which has both opportunities and challenges for teaching and learning (IGI Global, 2020). David (2013), offers a brief critical understanding of learning management system that help us understand the challenges and opportunities of embracing technology in teaching and learning.

Traditional teacher-centred teaching strategies have shifted with differentiated instructions, teachers directed strategies towards students' needs for learning. Teachers as Qahtani (2016) described them are facilitator, delegator, personal model and have experiences in teaching method. He advised them to use

different not one teaching style since learners have different learning abilities. Tomlinson in 2014 (cited in Qahtani 2016) stated that when teacher uses different teaching method, he/she will keep all students in mind when making lesson plans with different level of abilities. Teachers should choose teaching methods as Bhalli, Sattar and Asif (2016) conclude which ensure active participation and engagement of students. Also, should adopt a variety of styles of knowledge transfer which are more student-centred than teacher-centred. Innovation in science instruction can be reached by implementing a mixture of teaching styles and no one style is as powerful as using an integrated strategies approach. Engagement with teaching and learning from both teachers and students is very important to exercise activity based learning. Albasha & David (2019) recommend engaged teaching involves the use of activity based learning. Bashaireh & David (2019) inform that teacher's wellbeing is important for better pedagogic practices.

International literature contains various research results on the influence of activity based learning, and its impacts on academic achievement of the students and their attitudes towards subject which is applied in. Alasi (2018) in his study investigated the impacts of activity based learning strategy on the scores of second grade students. It was stated that students were able to understand the relationships between given data or models more correctly and easily as the activities performed. Through implementation of activities, the students explain the relationships that gotten from the problems or situation given in the activities correctly and quickly. Another study conducted with students, it was found that activity based teaching increased the students' success in comparison to traditional teaching (Kupcu 2012). In a similar research paper, Birgin et al. (2010) compared traditional learning and activity based learning in terms of their impacts on students' development regarding some topics in the subject. In the study, it was identified that activity- based learning influences the teaching of concepts positively. This learning strategy not only made the learning experience fun, but also learning became meaningful. Celik (2018) conducted a study, the goal of his study was to examine the impacts of activity- based learning on sixth grade students' achievement of mathematics subject in comparison to traditional learning strategy and detect their attitudes towards learning activities. He found that academic achievement for both groups – control and experimental - were positively increased. The role of leadership is important to support innovative teaching learning strategies. David & Abukari (2019) in their study accounted the impact of leadership in supporting teachers who will be able to deliver innovative teaching learning practices. Al Samkari & David (2019) suggested that staff engagement is vital for effective teaching. Al Hussein & David (2017) indicate that the role of instructional leadership is essential in encouraging innovative instructional practices. Daraghmeh & David (2017) pointed out that technology utilization is important for vibrant teaching and learning practices.

The literatures of relevant studies' findings show the significance of activity based learning strategy on students' attainment and their views about activity based learning. However, there are little researches that explore the impacts of this learning strategy on both achievement levels of students and their perception regarding science activities. Consequently, there is a need for further investigation on this subject. This paper is important in terms of filling this need in the literature. According to related literature previewed, no one was found to explore the perception of student towards conducting science's activities which is predicted to increase students' scores in science classes. This paper's finding will contribute to analysing the data obtained in related researches in the field. Making them available for stakeholders to employ the recommendation, which will help to reach better quality of learning and raise awareness about accomplishing permanent learnings.

Methodology

In order to meet the aim of this research, a mixed approaches study paradigm on pragmatic grounds has been selected to investigate the influence of activity based learning strategies and to explore its effects on students' achievement. For investigation purpose the scholar of this paper conducts a quantitative method using Quasi-

experimental approach and conducts qualitative research using focus group discussion approach. In this research paper, a mixed technique approach has been used in order to explain and answer the research questions, also to fulfil its purposes. Alasi (2018) believes that the employment of mixed methods and analysis of quantitative and qualitative data would enhance the data validity and it is the best way to meet the complex demands of children, families, educators, the policy audiences and stakeholders.

Quantitatively the research will focus on the analysis of students' scores collected regarding their exam marks in two different periods of time before and at the end of the learning session to end up with the findings and the interpretation process of the results. A quasi experimental study design with pre-test and post-test was used. In this model, two groups are formed. First group is called the control group, while the second is called the experiment group. Qualitatively data was collected through focus group discussion with the students from experimental group whom thought through activity based learning to obtain their views regarding activity based learning strategy. Focus group questions were assessed by one educational expert -inspector- to check validity and reliability. Validity of the questions in this research were conducted in the following steps: First, design the discussion questions based on the activity based learning principles. Then, these questions were inspected by one inspector from Curriculum and Instruction Department in Ministry of Education in Oman. The final phase of the questions' construction process was held by taking the inspector's opinions into account. Then, choose students who will volunteer for participation. For that reason, 8 students out of 12 from experimental group were selected through non-probability convenient sampling for focus group interview. The researcher took notes during data collection procedure. Moreover, the interview was recorded and transcribed for documentation and revision purpose.

According to Mertens (2010), study sample is defined as a full set of components that consist of similar features on specific subject that is related to the standards of sampling. The population of this study consist of 24 male students. They were represented by two main groups. The first group is control group consists of twelve science and environment students from grade 12, while the other group is experimental group and consists of twelve science and environment students also from grade 12. All students are from Sultan Qaboos School in Buraymi City, which is around 250 Km away from Muscat capital of Oman. This school is recognized as implementing activity based learning strategies in its classes, mostly in its science classes. Students were distributed for two equivalent groups experimental group as well as control according to their marks achieved at the end of term 1 of academic year 2018/2019. The researcher keened on that each group fits all of the mixed abilities student of above average, average and below average students. In this paper, complete anonymity of information is guaranteed, and private information of the participated school is preserved.

Results and Analysis

The tests result of both groups control and experimental group were analysed by using independent- sample t- test. At the beginning, students of both groups were examined one day before the lesson. Test paper then assessed and analysed by the researcher. Table 1 shows the difference in means in pre-test exam for both group control and experimental group. This test was conducted before implementing activity based learning strategy. After that, independent t-test analysis of pre-test scores for both groups was conducted via SPSS. The statics from table 1 shows no significant difference between pre-test scores of both groups.

Table 1: Groups Statistics of Pre-Test's Scores.

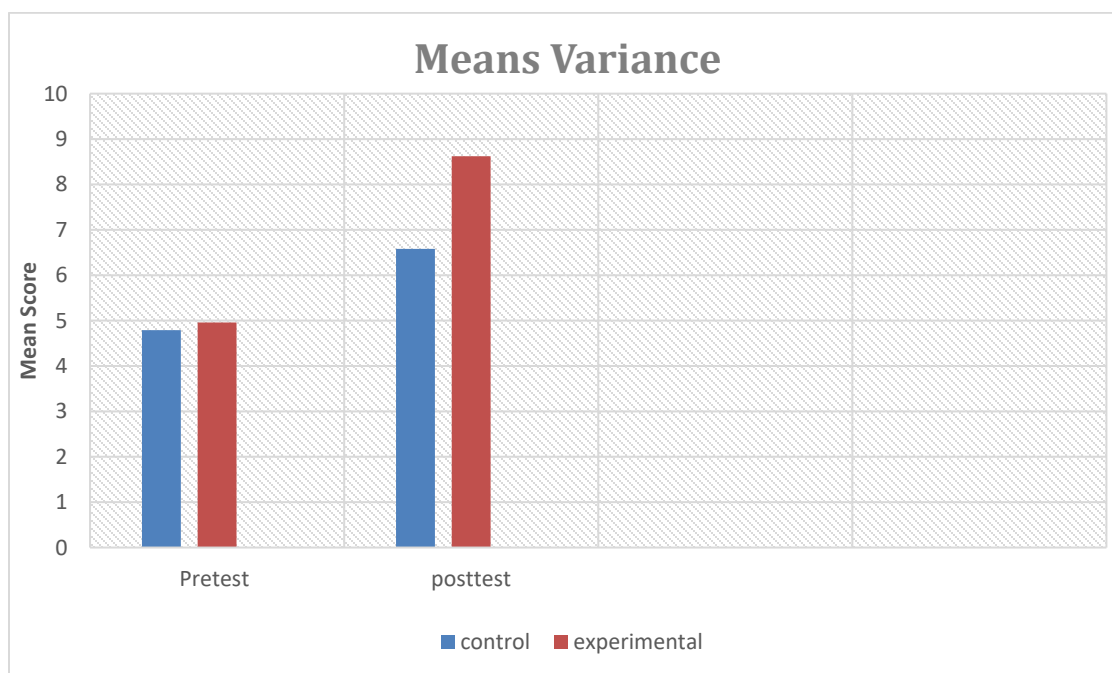
Pre-test score	Group	N	Mean	Std. Deviation	Std. Error Mean
	control	12	4.7917	1.87639	.54167
	experimental	12	4.9583	1.45318	.41950

The mean of control group is 4.79 and 4.96 for experimental group. Standard of deviation is 1.88 for control group and 1.45 for experimental group. So, we can conclude that both groups were at the same level before the implementation of activity based learning strategy. After the treatment introduced for one group only, 12 students in the experimental group were taught through activity based learning. Other 12 students from control group were taught through classical way. The post-test was introduced to both groups to investigate the impact of the treatment on students' achievement. Students' papers from experiment group and control group were marked and analysed. Independent t-test analysis of post-test scores for both groups was conducted via SPSS. Table 2 present the average scores of post-tests for both groups.

Table 2: Groups Statistics of Post-Test's Scores.

Post-test scores	Group	N	Mean	Std. Deviation	Std. Error Mean
	control	12	6.5833	1.36237	.39328
	experimental	12	8.6250	1.13067	.32640

It indicates that the mean scores increased in both groups. However, there are a significant increase in the mean score of the experiment group. It increased from 4.79 to 6.58 in the control group, whereas experimental group showed better improvement in the test's result. The mean post-test score for the experimental group increased from 4.96 to 8.62. Furthermore, standard of deviation was better for experimental group, it was 1.13 which means that the level of the students was convergent. For the control group the standard of deviation was 1.36 which is less convergent than experimental group. The graph No.1 below shows the difference of the means of pre-test and post-test for both groups control and experimental.



Graph 1: Comparison Between Pos-Test & Pre-Test Means for Both Groups.

It indicates that students' mean scores of post-test in the experimental group is higher than students' mean scores of control group. Whereas, the mean scores were almost the same in pre-test for both groups. Focus group interview was conducted to answer the third question of the research questions, which was "What are students' perceptions about their experience with activity-based learning?". Eight students contributed in the discussion to get further clarify about their opinions and get better insight to the activity

based learning. There were 4 main questions asked during the focus group discussion: "What are the advantages of activity based learning method?"; "What skills did you gain through the use of activity based learning method?", "What are the disadvantages that could appear in this method?". "What you prefer activity based learning method or traditional method?". There were six themes extracted from students' views after discussion content analysis, namely: "Enhance understanding", "Interesting atmosphere", "increase achievement", "increase a sense of responsibility", "waste time" and "teaching strategy". Below is a summary of students' opinion and responses from focus group interview:

Enhance understanding: The participants emphasized that the understanding of the taught concept is very essential in every teaching method. Activity based learning ensure active role of student through direct experience. Also, this type of strategy – activity based learning -enhances performance by providing a realistic practical sense of the learnt topic for the student.

Interesting atmosphere: The second theme was interesting atmosphere guaranteed by implementing activity based learning. Students said that class became more interesting and joyful learning environments was provided. Emotional state of the student is important, so students should be happy and interested in the taking topic. when they like the lesson they will become motivated and they will become more learnable.

Increase achievement: The third theme extracted from students' views was that activity based learning increases students' achievement. Students emphasize that using activity based learning is help students to gain more score in the exams. Because information and knowledge are transmitted and stored better in the brain through this method. They added, that activity based learning strategies ensures removal of blocks that hinder new learning, it helps to retrieval information easily especially in the exams and encourages higher-order thinking skills.

Increase a sense of responsibility: According to student perception, activity based learning strategy can enhance students' responsibility toward their self and society. Students believe that sense of responsibility can be developed when the teacher give a space for the student to make some decisions – not all making by teacher – and allow them to choose their preferred way to learn. Also, activity based learning give opportunities for student to pursue their interests and develop their skills in different ways. Furthermore, students engaged directly in the learning process in activity based learning more than other methods. students involved in higher-order thinking tasks such as synthesis, analysis and evaluation, because students have to use these levels of thinking not only remembering as in classical method. Students agree that their responsibilities in the new method were obvious compared to the old style.

Activity based learning waste time: Some student claimed that activity based learning waste student time in accomplishing one activity and effect other content time. They argued that we don't have time for student-centred activities, due to high number of students in the class, also we don't have time to conduct more activities in the lesson because there's too much content to cover. On the other hand, other participants in the focus group discussion defended this strategy and listed the benefit of activity based strategy. And how it helps low weak student to develop and involve in the learning process. At the end of session students were asked about their preferred teaching strategy whether traditional strategy or activity based learning strategy. Their votes were 7 to 1, seven prefer activity based learning and one student only prefers lecture style because he was used to this style of teaching.

Discussion and Conclusion

Literature review was used to build a base for this research and answer the first question. It shows that activity based learning has a positive impact on the teaching and learning process. Students' interaction, feeling, motivation, engagement, comprehension and achievement, all affected positively due to implementation of activity based learning method.

The second research question was answered based on the statistical analysis of data gained. Both pre-test and post-test comparisons were conducted in the experimental group that taught through activity based learning and the control group that received classical old style education. When comparing the pre-test scores of the traditional learning control group students and experimental group students in learning the “bacterial growth and development” topic in the 12 grade science and environment book, there was almost no difference in the mean scores between students in both groups. On the other hand, there was a noticeable difference found in favour of the experimental group students in terms of the post-test scores. Results of the post-tests for experimental and control group have shown that students in the experimental group have scored significantly higher than students in the traditional learning group. The mean difference was more than 2 degrees in favour of the experimental group. In this research, it was found that the activity based learning group students were academically more successful than the traditional learning control group students.

Qualitative method was utilized to answer the third question which investigated students’ opinion about activity based learning method. Students’ feelings and perceptions were positive toward activity based learning educed from focus group interview with students from experimental group. Thus, it can be concluded that activity based strategy may increase the students’ achievement and positive perception in comparison to traditional strategy. The reason for this improvement according to student’s view could be that activity based learning enhance understanding through reinforcing long lasting learning due to direct experience. Also, they attributed this improvement to students’ role in helping each other during learning process. Another reason that could lead to this improvement is the interesting atmosphere that activity based learning generating during lesson.

This result agrees with the findings of other research where activity based learning and traditional learning were compared in terms of impacts on students’ achievement. Al Muhaimeed (2013) conducted a related study in Saudi Arabia, but on teaching English language. The final statement of his study was that activity based learning helps students to acquire English language better through increasing their achievement scores. The finding of current study agrees with the finding of Batdi (2014), he pointed out that the quantitative and qualitative findings of his research investigation about the impact of activity based learning had positive effectiveness on students’ academic achievement. Additionally, the finding agrees with the finding of (Celik 2018; Camaci 2012). These studies investigate the impact of activity based learning of math on student achievement. They gotten the conclusion that activity based learning strategy increases academic success. It was also concluded that, in learning based on activities, the topics of learning were grasped better Rubin et al. (2014), teaching enriched with activities affect student perceptions positively (Kosterelioglu and Yapici, 2016). The result and the finding of this project recommend teachers to implement activity based learning strategy frequently when teaching science, because the finding showed improvement in students’ achievement when activity based strategy used compared to traditional method. the findings in the research were limited to the male students, one school only and limited number of the students in both groups experimental and control groups. Also, this study was limited to a short period and one topic only. This research is conducted in Sultan Qaboos School in Buraymi only, so it’s limited to one governate out of 11 governates in Oman.

This research paper opens the door for further investigations for examining the effectiveness of activity based learning strategies in Omani context, that help provide database for researchers and educators. Moreover, expanding sample population, time of intervention or investigating another dependent variable are potential points for future studies. Also, female schools could be included in the future investigations to examining both genders’ views and achievement, as it was one of the limitations of the current research.

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