Effects of authentic learning activities on Grade 7 learners' achievements in Natural Science: Cases of two regions in Namibia

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Abstract

The effects of authentic learning activities on achievements in Natural Science among Grade 7 learners in the Khomas and Omusati regions were investigated. This study used a quantitative research approach and deployed the quasi-experimental design. The targeted population consisted of 716 Grade 7 classes comprising of 180 classes (5 400 learners) in the Khomas region and 536 (16 080 learners) in the Omusati region with a total of 21 480 learners from the public senior primary schools offering Natural Science. The pre-test and post-test non-equivalent control group design was used. Numerical data collected from both experimental and control groups were compiled using SPSS. A T-test was used to analyse both pre- and post-tests' scores to determine whether learners' achievement scores from experimental and control groups were different at probability (p) level of 0.05. The experimental groups mean scores on the pre-test and post-test were 18.91 and 31.72 respectively; while the control groups had mean scores of 17.28 and 23.07correspondingly. These results indicated significant differences in the performance of the experimental groups and proved that authentic learning activities improve learners' achievements in Natural Science. Based on the study findings, it concludes that authentic learning activities given to the Grade 7 learners positively affect their achievements in Natural Science. We therefore recommend that schools should procure appropriate authentic materials for the effective teaching and learning of science concepts.

Keywords: *authentic learning activities, Natural Science, learners' achievements, effects, science concepts, teaching and learning, control group, experimental group*

Introduction

Teaching and learning Natural Science for conceptual understanding require the appropriate and effective teaching approaches and inquiry-based learning activities (Ilter & Kilic, 2015). The problem of teaching and learning Natural Science for deeper understanding is not only

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found in Namibian schools but also in other African and Western countries (Al Azri & Al-Rashdi, 2014). Some studies done in Namibia (Nakanyala, 2015 & Nghipandulwa, 2011) indicated that teachers concentrated on teaching rules rather than employing innovative strategies and activities in teaching and learning science content. Teaching rules encourages learners to memorize but not to think and reasoning. Uugwanga (2015) also found that teachers in Namibian schools prefer to use the lecture method, which is teacher-centred. Teacher-cantered is an approach when teachers are actively involved in teaching while learners are listening passively to the teachers as they teach and this approach is also used globally (Thompson-Krug, 2014). Uugwanga also concurs with Hoepfner (2014) who reveals that teachers are not making use of a variety of teaching strategies in their teaching and this affects learners' performance. Therefore, there is need to practice other constructivist approaches such as authentic learning activities in teaching and learning concepts of science.

The National Standardised Achievement Tests (SATs) results of Grade 7 Natural Science in Namibia have shown that learners scored under the basic achievement category over the past few years. At a regional level, Omusati region was one of the regions that had been performing below 60% while the Khomas region had performed above 60% in Natural Science (Ministry of Education, Arts and Culture, 2018). In 2018, Omusati region scored 53% whilst Khomas region only scored 60% (Ministry of Education, Arts and Culture, 2018). Due to unsatisfactory SATs results of Grade 7 learners in Natural Science, this study's main objective was to determine the effect of authentic learning activities on achievement scores among Grade 7 learners in the Khomas and Omusati educational regions. In order to achieve the objective of this study, the following research question was used *'What are the effects of authentic learning activities on achievement scores among Grade 7 learners in the Khomas and Omusati educational regions?'* The following hypotheses were also tested: *Ho:* There is no significant difference between the achievement scores of the Grade 7 learners who are exposed to authentic learning activities and those who are not. H_1*:* There is a significant difference between the achievement scores of the Grade 7 learners who are exposed to authentic learning activities and those who are not.

Theoretical framework

The theoretical framework that underpinned this study is the Social Constructivist Epistemology Theory (SCET). The SCET theory focuses on the learning of knowledge-based meaning and understanding of reality (Andrews, 2012; Mutekwe et al., 2013). The Social Constructivist Epistemology Theory is viewed through the researchers' lens in terms of social

constructivism as an epistemology. Mutekwe et al. (as cited in Mutekwe, 2017, p. 197) define social constructivism as an "epistemology that foregrounds the social construction of knowledge through interactive teaching and learning activities in the classroom." According to Alanazi (2016), constructivism theory was founded by Jean Piaget and is "considered one of the most influential constructivist theories in education" (p. 1). In support, Vygosky's (1978) social constructivist theory believes that learners' cognitive development is moulded by the social environment in which they live. In other words, learners' cognitive development can affect their achievements and performance in whatsoever way. Thus, social constructivism is a theory of knowledge (epistemology) that examines how learners learn by actively developing and constructing their knowledge to enable them to achieve and understand the real world.

The Social Constructivist Epistemology Theory is filtered through the researchers' lens in relation to the teaching and learning of Natural Science using authentic learning activities in science classrooms. The SCET emphasises the significance of how learners construct knowledge to understand and view the real world outside the science classrooms (Shumba, Ndofirepi, & Gwiragi, 2012). The theory stresses the importance of learners' thinking and focuses more on learning and creating meaning than the teaching and presentation of information (Andrews, 2012). According to Shumba, Ndofirepi, and Gwiragi (2012), SCET is about how "knowledge is constructed in the mind of the learners" (p. 14). The core expression of SCET is that teaching learners using authentic learning activities, enables them to construct and understand the real meaning of new information and concepts of science presented to them (Mutekwe et al., 2013; Shumba et al., 2012). It is important to mention that social constructivism emphasises that learners should actively participate in the authentic teaching and learning process and play an active role than their teachers. Therefore, in teaching Natural Science, learners are expected to actively participate in the lessons only when authentic learning activities are used. In fact, social constructivism focuses on three aspects, namely; learn, knowledge and reality (Galbin, 2014; Mogashoa, 2014). This implies that in authentic science classrooms, learners are encouraged to actively participate in learning of science concepts in order to acquire and construct knowledge in their mind as they learn. Thereafter, learners would be able to transform and apply the learnt knowledge into reality beyond science classrooms.

Literature review

What is authentic learning?

Authentic learning is a pedagogical approach that allows learners to explore, discuss and meaningfully construct concepts and relationships in real contexts that involve real world

problems that are relevant to the learners (Iucua & Marina, 2014). Similarly, Rule (2006) defines authentic learning as a "relatively new term that describes learning through applying knowledge in real-life contexts and situations" (p. 1). According to Morales (2015), authentic learning allows for the construction of meaning grounded in real-life situations and the learners' own personal experience. Lombardi (as cited in Neo, Neo, & Tan, 2012, p. 51) define authentic learning as learning that " focuses on real-world, complex problems and their solutions, using role-playing exercises, problem-based activities, case studies, and participation in virtual communities of practice." Therefore, using authentic learning approaches during teaching and learning of Natural Science enables learners to understand better as they connect the real activities to the real world (Pantiwati, Wahyuni, & Permana, 2017; Suryawati & Osman, 2018).

Authentic learning involves real-world problems and promotes thinking skills

When Natural Science teachers prepare their lesson plans for teaching, they should consider practicing authentic learning tasks that target the real-world problems. In addition, the authentic learning tasks should promote learners' participation and involvement with the possibility of being able to contribute to the society beyond their classroom settings (Moodley & Aronstam, 2016; Rule, 2006). In fact, to enable the Natural Science learners to address the real-world problems, they should be allowed and taught how to investigate the real problems within their own lives and communities before they fully engage themselves in solving some global problems (Moodley & Aronstam, 2016). In so doing, authentic learning tasks encourage and promote lifelong learning rather than passive learning (Rule, 2006). Natural Science pedagogy should involve authentic learning activities that promote theoretical inquiry and also encourage learners to demonstrate higher levels of critical thinking (Lau, 2011; Moodley & Aronstam, 2016; Rule, 2006). In Natural Science teaching, learners should be exposed to authentic learning where they are expected to acquire conceptual understanding that enables them to think and reason scientifically so as to overcome their daily obstacles. This implies that authentic learning fosters Natural Science learners to be critical thinkers who are able to make good decisions in life and who can work freely with other learners.

Types of authenticity to consider during teaching and learning process

Iucua and Marina (2014) state that "authenticity in teaching involves features such as being genuine, becoming more self-aware, being defined by one's self rather than by others' expectations, bringing parts of oneself into interaction with learners" (p. 414). According to Breen, (as cited in Al Azri & Al-Rashdi, 2014, p. 250), there are four types of authenticity one

could consider when intent to use authentic activities in teaching and learning process. These are: text authenticity, learner authenticity, task authenticity, and classroom authenticity.

Text authenticity: According to Al Azri and Al-Rashdi (2014), the authenticity of text refers to the qualities of the texts or writings that are used in the teaching and learning process. The context in which the Natural Science concepts are taught and/or learned must present originality as a mean of quality source of information that aims to help learners to acquire conceptual understanding authentically (Herrebosch, 2016).

Learner authenticity: The authenticity of learners refers to the "ability of learners to interpret the meaning present in the text just like the native speakers do in the real world" (Al Azri & Al-Rashdi, 2014, p. 250). For instance, when Natural Science learners are taught authentic texts and clearly understand the real meaning of science concepts during the class practice, then these learners can demonstrate and apply their learned conceptual understanding practically in the real world.

Task authenticity: The authenticity of the tasks refers to the tasks or activities that are well-chosen by the teachers and are meaningful to the learners (Iucua & Marina, 2014). The well-chosen activities should enhance and promote Natural Science learners' participation to enable them to use authentic language during their learning.

Classroom authenticity: The authenticity of the classroom refers to the way the Natural Science classroom is set up. It is crucial to teach learners science concepts in an authentic learning classroom (Ilter & Kilic, 2015). Authentic Natural Science classrooms should contain the real science work and/or displays that attract learners' attention and stimulate their thinking capacities.

Teachers' roles in an authentic science classrooms

In authentic Natural Science classrooms, teachers are not necessarily there to teach and/or talk while learners are listening and paying attention to them (Rafi, 2015), but merely to try to provide learners with meaningful real-life learning knowledge (Christmas, 2014). Moreover, teachers' roles in the authentic Natural Science classrooms are to facilitate and guide the learning process (Christmas, 2014). In authentic Natural Science classrooms, learners take responsibility for their learning that reflects the real-world and requires them to know real objects and engage in authentic learning activities rather than engaging in rote learning activities (Iucua & Marina, 2014). According to Iucua and Marina (2014), teachers need to "create the authentic tasks that provide learners with reasons and rationales for learning" (p. 411). Iucua and Marina's sentiments suggest that science teachers should create authentic

learning environments that encourage learners to think critically, reason scientifically and explore the real-world independently (Lau, 2011). Overall, teachers in authentic Natural Science classrooms should make sure that learners are proactive and use hands-on activities during the teaching and learning process. In the end, learners' scientific skills and knowledge are developed (Magaji & Sa'eed, 2017).

Learners' roles in an authentic science classroom

In order to prepare learners for the real world, teachers need to teach learners to understand the real meaning of the universe in an authentic science classroom. In an authentic Natural Science classroom, learners should fully participate and engage in meaningful activities that interact with their own environment and that of the outside world (Christmas, 2014). Learners should use learning materials that stimulate their conceptual understanding and relate to their own real life experiences (Herrington & Herrington, 2008; Kovač & Kovač, 2011). Learners fully participate in their learning activities, monitor their learning progress and take responsibility for their own learning with the assistance of their teachers as facilitators (Rafi, 2015). During the learning process, Natural Science learners should engage in hands-on activities that encourage them to think critically and solve real-world problems logically.

Importance of authentic learning activities in science pedagogy

According to Al Azri and Al-Rashdi (2014, p. 249), "authentic activities are the most important activities a teacher can and must use in class in order to make his/her teaching go smoothly and be effective in transmitting the necessary knowledge to all learners". Authentic learning activities are important in teaching Natural Science as they help learners to become more active inside and beyond the classroom environment (Kuuskorpi, 2014). This means that applying authentic learning activities promote learners' critical thinking so that they become more proactive when they engage in any platform where they can discuss and interact with each other socially and/or academically. Through authentic learning activities, learners acquire scientific concepts and knowledge-based understanding in a meaningful way (Frey et al., 2012). Therefore, employing authentic learning activities in teaching Natural Science may positively contribute to the learners' thinking and scientific skills that they will apply in their life. For authenticity to be effective and possible, Natural Science teachers must be knowledgeable and skilled in how to implement and facilitate the authentic learning activities in the teaching and learning of Natural Science. Thus, the well facilitated authentic learning activities tend to encourage learners to like Natural Science, as a result the learners' academic achievements are likely to improve.

Criticisms of using authentic activities in science pedagogy

Despite the fact that the use of authentic learning activities provide learners with opportunities to operate at all four domains (*cognitive, affective, psychomotor and conative*) of learning (Manickavasagam & Surwade, 2017; Revees, 2017; Wilson, 2017), some researchers criticise the use of authentic learning activities. Kilickaya and Miller, (as cited in Al Azri & Al-Rashdi, 2014, p. 252), claim that authentic learning activities have "no value", they only "add a burden on teachers" and are "too difficult and time consuming to select, edit and prepare." Similarly, Flowerdew and Peacock (as cited in Peñamarí & Benavent, 2011, p. 90) also argue that an "authentic text may not be authentic for a specific class, just because a text is authentic does not mean it is relevant" and "authentic texts are often too difficult linguistically." Equally, Peat and Taylor (2006) found that authentic materials might be expensive to buy and to collect. Authentic materials referred to the teaching and learning aids and/or resources which are regarded as beneficial tools in the teaching and learning process. In other words, authentic materials are real-life or genuine materials such as magazines, newspapers, posters, television shows, computer videos, camera, electric circuit, magnifying glass and so on. All the above criticisms were raised based on the research that was conducted internationally and it is worth noting that no similar research has been conducted in Namibia. This would have given a clear guidance upon this study as to whether the study would fill the gap existing in related literature or address the issues based on other researchers' recommendations from the Namibian context.

Research methodology

Methods and design

A quantitative research approach with a quasi-experimental design of pre-test and post-test non-equivalent control group design was used (Creswell, 2014). Numerical data were collected from learners in both the experimental and the control groups in which learners' achievements were tested. The targeted population consisted of 716 Grade 7 classes comprising of 180 classes (5 400 learners) in the Khomas region and 536 (16 080 learners) in the Omusati region with a total of 21 480 learners from the public senior primary schools offering Natural Science. The population had male and female learners from the ages of 10-18 years old. The sampling was a two-stage process. The first stage involved selection of four schools in each region. Then the second stage involved selection of one Grade 7 class in each selected school. A sample of eight Grade 7 Natural Science classes (four Grade 7 classes in the Khomas region and four classes in the Omusati region) were randomly selected from the targeted population. A total number of 213 learners participated in this study (they wrote both the pre- and post-tests). Simple random

sampling (Creswell, 2014) was also used to select four schools per region (two schools for experimental group and other two schools for control group) but the leaners were not randomly assigned to groups. The criterion for the selected schools was that these schools needed not to have been adjacent to one another to avoid the possibilities of data contamination. In this case, when two schools were found to be adjacent to one another, simple random sampling with replacement was used.

Data collection procedures

Permission to collect data was sought from the relevant offices and stakeholders in writing. At each school, the main purpose of the study was well explained to the school principals and the participants. A pre-test of 40 minutes long was given to the learners at the eight schools for the main study. After the pre-test; the researchers taught learners at Schools C_1, C_2, X_1 and X_2 in Khomas region and Schools C_3, C_4, X_3 and X_4 in Omusati region. At control groups (Schools C_1, C_2, C_3 and C_4), the researchers used the lecture methods; whilst at experimental groups (Schools X_1, X_2, X_3 and X_4), the researchers used authentic learning activities. Five lessons (one lesson per day) on the topic of 'electricity' of 40 minutes each per school were taught. It is worth noting that the schools that participated in this study were paired (e.g. C_1 with X_1; C_2 with X_2; C_3 with X_3 and C_4 with X_4) during data collection period based on their analogous profiles. The aim of pairing the schools was mainly for logistics purposes such as the allocation of teaching time on the schools' timetable and the reduction of the researchers' travelling costs. However, these schools were not adjacent to each other to prevent the possibilities of learners communicating with each other across the schools, this might have led to data contamination. Learners in the paired schools wrote the pre-test on the same day, they were taught the topic 'electricity' for five days and they also wrote the post-test on the same day. Then, learners' pre- and post-test papers were marked in order to compare their achievement scores.

Data analysis

The quantitative data from both pre- and post-tests' scores were captured using the Statistical Package for Social Sciences (SPSS) (Version 25) in which a T-test was used analyse and determine whether the learners' achievement scores from experimental and control groups were different at probability (p) level of 0.05.

Research ethical consideration

The data collection process only commenced when the researchers had obtained ethical clearance from the Ethics Committee of the University of Namibia followed by permissions

granted by the Executive Director in the Ministry of Education, Arts and Culture as well as Directors of Educations of the Khomas and Omusati regions, school principals, and learners' parents/guardians. The participants were asked to sign a consent form as an agreement to participate in the study. The participants were also assured of confidentiality, privacy and anonymity to the effect that no real names were going to be used (Gay et al., 2011). According to Turcotte-Tremblay and Mc Sween-Cadieux (2018), maintaining confidentiality is essential as it builds trust relationships between the researchers and participants whilst, breaching of confidentiality can harm the characters of the participants. The researchers also made sure that participants' participation was a free will exercise (Creswell, 2014).

Results

Pre- and post-tests' results

To measure learners' achievement scores, they were given a pre-test and post-test on a topic of 'electricity'. The hypothesis below was tested to find out whether the control group and the experimental group' achievement scores where statistically significant.

H_o: There is no significant difference between the achievement scores among Grade 7 learners who are exposed to the authentic learning activities and those who are not.

H_1: There is a significant difference between the achievement scores among Grade 7 learners who are exposed to authentic learning activities and those who are not.

Control group's performance on the pre- and post-tests

Table 1 below shows the performance of the control group on the pre-test and post-test.

Table 1: Control group's pre- and post-tests results

Paired Samples Statistics

Group	Tests	N	Mean	Std. Deviation	Std. Error Mean	$t_{calculated}$	df	Sig. (2-tailed)
Control Group	Pre-test	97	17.28	4.479	.455	-10.547	96	.000
	Post-test	97	23.07	6.888	.699			

$p<0.05$

As seen in Table 1, the control group's mean *(M)* score = 17.28 and Standard Deviation *(SD)* = 4.479 on the pre-test and *M* = 23.07 and *SD* = 6.888 on the post-test. Furthermore, the control group's scores between the pre-test and post-test indicate [$t(96) = -10.547$, $p = 0.000$, $t_{critical}$ =

1.985]. Therefore, the results attribute that there is a statistically significant difference in the control group's pre-test mean scores compared to the post-test mean scores. This attests to the fact that learners who were not exposed to authentic learning activities had also improved their achievement scores from pre-test to post-test through lecture method.

Experimental group's performance on the pre- and post-tests

Table 2 shows the performance of the experimental group on the pre-test and post-test.

Table 2: Experimental group's pre- and post-tests' results

Paired Samples Statistics

Group	Tests	N	Mean	Std. Deviation	Std. Error Mean	$t_{calculated}$	df	Sig. (2-tailed)
Experimental Group	Pre-test	116	18.91	6.089	.565	-30.382	115	.000
	Post-test	116	31.72	6.599	.613			

$p<0.05$

Table 2 shows the experimental group's mean *(M)* score of 18.91 and *SD* = 6.089 on the pre-test and *M* = 31.72, and *SD* = 6.599 on the post-test. The results further indicate the experimental group's pre-test and post-test scores [$t(115) = -30.382$, $p = 0.000$, $t_{critical} = 1.981$]. Therefore, the results indicate that there is a statistically significant difference between the pre-test mean scores and the post-test mean scores of the experimental group. This confirms that learners who were exposed to authentic learning activities improved their achievement scores immensely from pre-test to post-test.

Control and experimental groups' performance on the pre-test

Table 3 shows the performance of the control and experimental groups on the pre-test.

Table 3: Control and experimental groups' pre-test results

Group Statistics

Test	Groups	N	Mean	Std. Deviation	Std. Error Mean	$t_{calculated}$	df	Sig. (2-tailed)
Pre-test	Control	97	17.28	4.479	.455	-2.195	211	.029
	Experimental	116	18.91	6.089	.565			

$p<0.05$

Table 3 shows that the experimental group scored higher than the control group on the pre-test. The experimental group's mean score was 18.91 and standard deviation of 6.089. The control group's mean score was 17.28 and standard deviation of 4.479 on the pre-test. The mean scores of the two groups on the pre-test show [$t(211) = -2.195$, $p = 0.29$, $t_{critical} = 1.971$]. This means that both groups' mean scores were closer to each other and it seemed that learners in both groups had almost the same knowledge and understanding of the topic before intervention. Therefore, the study concludes that there was a significant difference between the control and experimental groups before the intervention.

However, in order to ensure that the post-test mean scores of the two groups were not due to the initial differences, learners in the experimental group were taught Natural Science on the topic of electricity using authentic learning activities while learners in the control group were taught using a normal teaching (lecture) method as an intervention. Thereafter, the same post-test was given to both groups to determine the effect of authentic learning activities on learners' achievement scores on the topic of electricity.

Control and experimental groups' performance on the post-test

Table 4 shows the performance of the control and experimental groups on the post-test.

Table 4: Control and experimental groups' post-test results

Group Statistics

Test	Groups	N	Mean	Std. Deviation	Std. Error Mean	$t_{calculated}$	df	Sig. (2-tailed)
Post-test	Control	97	23.07	6.888	.699	-9.332	211	.000
	Experimental	116	31.72	6.599	.613			

$p<0.05$

Table 4 indicates that the experimental group achieved higher scores $M = 31.72$, $SD = 6.599$ as compared to the control group $M = 23.07$, $SD = 6.888$ on the post-test. The post-test mean scores of the control and experimental groups indicate [$t(211) = -9.332$, $p = .000$, $t_{critical} = 1.971$]. Therefore, the H_o is rejected in favour of the H_1 and the researchers conclude that there is a statistically significant difference in the post-test achievement scores of the control and experimental groups. In other words, experimental group learners outperformed control group

learners on the post-test. This means that authentic learning activities seem to have had a positive impact on learners' achievement scores on the topic of electricity.

Discussion

Both control and experimental groups were given the same pre- and post-tests. The findings from the pre-test indicated that the experimental group scored higher than control group. The findings are in line with the results reported by Ghanbari, Esmaili, and Shamsaddini (2015) and Ullah, Tabassum, and Kaleem (2018) who found that their control and experimental groups' mean scores on the pre-test were almost similar. This means that both groups seemed to have almost the same knowledge and understanding of the topic on 'electricity' before the intervention. As far as the pre-test mean scores were concerned, learners in both groups were taught Natural Science on the topic of 'electricity' starting at same level. Learners in the experimental group were taught using authentic learning activities while learners in the control group were taught using a normal teaching (lecture) method as an intervention. Thereafter, the same post-test was given to both groups to determine the effect of authentic learning activities on learners' achievement scores on the topic of 'electricity' then the groups' post-test mean scores were compared as given in Table 4.

The learners' achievement scores show a significant difference between the experimental and control groups. That means, the increase in the mean score of the experimental group from pre-test to post-test as compared to the control group mean score, supports the studies by Gambari, Shittu, Ogunlade, and Osunlade, (2017), Hussein and Elttayef, (2017), Krishnan, (n.d). and Widyawati and Trisanti, (2017) who found out that their experimental group showed a significant improvement in academic achievements compared to the control group. The high performance of the experimental group on the post-test seems to support the views of Gull and Shehzad (2015) who argue that the intervention within the experimental group often has a positive effect on learners' academic performance. This study result is also in line with the views of McCarthy and Lockwood (2013) and Sahin and Namli (2016) who suggest that authentic materials motivate learners to fully engage with others; inspire learners to learn by doing; and motivate learners to become academic achievers. Similarly, Moodley and Aronstam (2016) state that authentic learning activities promote a theoretical inquiry and also encourage learners to demonstrate higher levels of critical thinking.

Based on the findings of this study, authentic learning activities seemed to enhance learners' acquisition of science concepts and enabled learners to observe the reality of science. When

learners fully acquired science concepts and understood the reality of science, they tended to out-perform learners who were not exposed to authentic learning activities. Nonetheless, the results also indicated that learners in both groups improved their academic achievements from the pre-test to the post-test. The increased control group's mean score on the post-test seemed to indicate that learners benefited from extra teaching given to them on the topic of 'electricity' and improved their understanding of electricity under the traditional approach. These results agree with the findings of Shivaraju, Manu, Vinaya, and Savkar (2017) who found that all their learners overall mean scores on the post-test scores showed a highly significant improvement compared to their pre-test scores. The findings of this study therefore provide strong evidence on the effects of authentic learning activities on learners' achievements.

Study implications

This study's research implications show that the use authentic learning activities in Natural Science could improve learners' achievement. Specifically, in regions where Grade 7 learners have performed poorly, the purchase of appropriate and relevant authentic teaching and learning resources could assist not just teachers in their daily practice but also learners in grasping the science content. Thus, educational stakeholders are encouraged to supply the necessary authentic learning resources to supplement the existing ones.

Conclusion

The study results indicated that the experimental group's mean of 18.91 was higher than the control group's mean of 17.28 on the pre-test. This means that both groups' mean scores were closer to each other and it seemed that learners in both groups had almost the same knowledge and understanding of the topic before intervention. The results on the post-test for the two groups revealed that the experimental group had a mean of 31.72 while the control group's mean was 23.07. This shows that the experimental and control groups' scores on the post-test were significantly different. The higher performance of the experimental group on the post-test seems to support Gull and Shehzad's (2015) view that interventions within the experimental group often have a positive effect on the learners' academic performance, because authentic learning activities enable learners to be proactive in their learning. Based on these study's results, it can be concluded that the authentic learning activities given to the Grade 7 learners seems to improve and positively affect their achievements in Natural Science. Therefore, the use of authentic learning activities / materials in teaching and learning Natural Science should be advocated for and supported in both rural and urban schools.

Recommendations

The Ministry of Education, Arts and Culture (MoEAC) should advocate the use and integration of authentic learning activities in teaching Natural Science lessons as well as invest more in buying authentic materials and try to upgrade science laboratories from Senior Primary Phase upwards. Natural Science teachers should be provided with continuous professional development training to incorporate authentic learning activities in their lessons to improve their learners' academic achievements as opposed to the more frequent use of lecture method.

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