

**ENVIRONMENTAL KNOWLEDGE AND BEHAVIOUR OF SOCIAL STUDIES
PRE-SERVICE TEACHERS IN COLLEGES OF EDUCATION IN SOUTH-WEST,
NIGERIA**

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Abstract

The sustained misuse and exploitation of the environment by man has been linked to ignorance of the consequences of man's action and the need to change this behaviour had led to concerted efforts by some concerned environmentalists on how to arrest the deteriorating ecosystem, through education. Environmental Education in Social Studies, have been seen as a potent tool that can bring about positive attitude and behavior that are needed to protect the environment. Therefore, this study examined the environmental knowledge and behaviour of Social Studies pre-service teachers' in Colleges of Education in South-west, Nigeria. The study adopted the cross-sectional survey research design. The population for this study comprised all 200 level Social Studies Pre-service Teachers in all Colleges of Education in South-west, Nigeria. Participants for the study were chosen from six colleges of education from three states in South west. Simple random sampling technique was employed in selecting 60 students per institution totaling 360 respondents for the study. Two instruments namely: KECT ($r=0.88$) ERBS ($r=0.76$), were used to gather data. The data generated were analysed using the frequency, means and standard deviation. Results showed that 39.7% of the pre-service teachers had partial level of environmental knowledge and 60.3% had adequate level of environmental knowledge. Results of second research question shows that 6.7% of respondents rarely exhibited environmental responsible behaviour whereas, 68.9% occasionally exhibited environmentally behaviour and 24.4% of them frequently exhibited environmental responsible behaviour. Therefore, it was recommended that pre-service teachers at all levels should be exposed to environmental education. Also, emphasis should be based on simplifying the methods and strategies of teaching environmental education concepts.

Keywords: Social studies, Environmental education, Pre-service teachers, Environmental knowledge, Environmental behaviour

Introduction

It is a truism that human beings worldwide are confronted with several environmental problems. These problems, some of which have emanated from factors such as population explosion, growing demand for food, deforestation, near extinction of biological resources, poverty and uncontrolled use of the world's resources have negatively impacted on the conditions of living of the people. It is to be noted that most of these environmental problems have been accelerated by economic growth and industrialisation. As human beings continue to use nature's resources to better their lots and improve their quality of life, they have through exploitation of environmental resources contributed to the degradation of the ecosystem.

Today's environmental problems arose from the lifestyles of human beings. Human beings have been using a tremendous amount of nature's resources to better their lots and improve their quality of life. This situation has started to threaten the general and assimilative capacity of the environment. This threat has led to a movement in the school and educational system to consider environmental education as a panacea for solving the misuse of the environment. Hence, environmental education has been recently emphasised and integrated into many school subjects (such as Biology, Geography, Citizenship Education and Social Studies). Furthermore, environmental education has recently attracted much attention by parents, teachers, students, government and non-governmental organizations (Ohman, 2016).

In Nigeria, the environment faces lots of challenges and the rate at which renewable resources such as land, forest, freshwater, coastal areas, fisheries and urban areas, are being exploited increases beyond their capacity to regenerate. Increasing agricultural, industrial and other human activities result in increased land, water, and air pollution, putting significant stress on the ecosystems. While it is true that for long, Nigerians have seemed indifferent to protecting their environment and developing environmental literacy and responsible behaviour, through education (formal, non-formal and informal), but lately have grasp the opportunities to create accountable behaviours toward the environment and gain an understanding for sustainable future by becoming knowledgeable about the environment. They need to realise that Environmental Education is a crucial way of making people aware of their environment and the problems human beings may face due to their activities in the environment. Also that Environmental Education will enable them to have positive attitudes, as education means changing long-established attitudes. (Omosulu, 2015).

A healthy natural environment is a fundamental prerequisite for sustainable human development and survival. Nigeria faces the constant challenges of rampant poverty amid plenty, an increasing population rate, intermittent natural disasters, socio-religious upheavals and a dwindling resource base. The country is one of the most blessed countries regarding natural resources and human capital, but the people are among the world's poorest and less developed peoples. This paradox has partly emanated from over-exploitation of the environment, under-utilisation of environmental resources for development, and ignorance on the part of the people and their government about the nexus between humans and their environment (Gbadamosi, 2012).

Social Studies is a discipline that fosters a better understanding of human interactions with young learners' physical and social environments. It is concerned with the symbiotic relationship between human being and their physical and social environments. This symbiotic relationship and interaction deal with the realities of human existence, one of the reasons that Social Studies is seen as a field of study that deals with human's social, economic and political behaviour in the past, now and in the future. According to Ajiboye (2021), Social Studies deals with the study of man in his environment, focusing on almost every aspect of the environment and its survival. Social Studies is about the social and physical world: it is about people, what they do and how they interact with each other and the world. It is a problem-solving approach wherein human beings study and learn about problems and survive in the environment. It is a discipline about how man influences and is influenced by the physical, social, political, religious, economic, psychological, cultural, scientific and technological environments. The ultimate goal of education in Social Studies is the development of the socio-civic, personal and other aspects of the learner's behaviour. Social Studies provides the learner with rich opportunities to actively investigate issues, problems, consequences, and successes people encounter in their social interactions. It also requires the learner to perform higher thinking skills where the learner is expected to solve identified problems confronting the society or community where they reside (Ersoy, 2018, Demir, Iwkhacat and Kilcan 2019).

Social Studies is not limited to just a few academic areas alone; knowledge is of prime importance: the learner needs to know how to examine values, beliefs, and attitudes and the need to care for the natural environment. Social Studies' capacity to absorb new and emerging societal trends have placed the subject in a promising position in accommodating those emerging social, political, economic and other global challenges. Since human nature and problems are not static, the

dynamic approach of Social Studies education enables it to be used as a carrier subject for integrating most emerging trends such as security education, citizenship, civic, family-life, environmental education, and so on. (Abubakar, 2013).

Education in general, and environmental education in particular, as a solution to the environmental problems, have played essential roles in mitigating the debilitating effects of degradation on human beings in many parts of the world. Environmental education is a relatively new concept, especially when considering education involving everyday classroom teaching and learning. Environmental education is a process of recognising values and clarifying concepts to develop skills and added tools necessary to understand and appreciate the inter-relationship among man, his culture and his bio-physical surrounding (Schmitz & Da Rocha, 2018).

There is not yet a separate environmental education course and curriculum in the Nigerian education system. The subject related to the environment is in the science and technology education courses (Biology, Chemistry, and Integrated Science), Social Studies and the social sciences (Geography, Citizenship Education, Family Life Education). Since environmental education is interdisciplinary, it is meaningful to integrate environment-related issues and topics into different courses. Environmental education's chief aim is to develop and acquire environmentally responsible behaviour. It is, therefore, essential to make the students understand the ecological problems and cause-effect to take action on the environment and show responsible behaviours for the environment. So, one powerful way of raising awareness and developing responsible behaviour of students concerning the environment is education (Mohammed, Abdullahi Bello and Abdullahi, 2018, Sukman, Ramadhan & Indriyani 2020).

The aims of environmental education included: equipping the people with the values and attitude of concern for the environment and its problems; helping the people acquire those skills needed for solving environmental issues; providing opportunities to develop the necessary knowledge and commitment to protect improve the environment. Also, it aimed at encouraging the people to interpret the environment from a variety of perspectives and encourages the active participation of the people in solving environmental problems and; producing well rounded and responsible citizens that will perform their roles as the 'care taker' of our environment (Spinola, 2015). Some of the objectives of environmental education are to facilitate students' acquisition of knowledge, awareness and sensitivity to the environment and its allied problems; it is also meant to encourage students to

acquire social values, strong feelings of concern for the environment; develop the students' sense of responsibility and urgency regarding environmental problems to ensure appropriate actions to help solve these problems; assist learners in acquiring skills for working towards the solution of environmental problems. (Gbadamosi, 2012).

Educational institutions need to educate teachers who can better understand sustainability and help to bridge the gap between theory and education. This will play a key role in shaping future generations, enhancing sustainability activities and taking responsibility. Educational institutions and programs that will prepare teachers for sustainable education seem not to be doing their best. The education of teachers plays a vital role in achieving changes in teaching and learning in schools. Indeed, the professional development of pre-service teachers for sustainability is defined as a priority over priorities. Teacher education is seen as a critical strategy not adequately exploited at schools for sustainability. Educational institutions should take the lead in this regard to make the leaders of future generations conscious and vital thinkers about sustainability (Turgoglu, 2019).

A critical factor for realising effective environmental education is teachers who know environmental issues through environmental education. There is no doubt that teachers play an essential role in raising ecologically aware citizens who advocate for a new social order concerning the protection of the environment. It is a fact that teachers who are knowledgeable about issues concerning the environment strive to successfully approach and practice student-centred learning, harnessing student strengths, demonstrating experiential teaching orientation, using collaborative techniques, involving external experts and continually pondering and planning lessons that address all aspects of the environment. Teachers who have strong environmental literacy and knowledge, have support in their schools, have positive environmental attitudes, environmental sensitivity, and receive environmental education support where needed (Aydemir & Cetin, 2019)

Teachers who strive to realise the damage to the environment instill environmental awareness and education in the students. Teachers are the most influential in educating children and adolescents to become future environmental advocate. Knowledge and skills in choosing teaching methods and teaching aid significantly influence the quality of learning. In addition, teacher actions and attitudes related to the environment are significant because they are the role models of their students now and in the future, because teachers' behaviour influences student behaviour. Environmental attitudes have been found to have a varying, usually minimal impact on pro-environmental behaviour. The

most widely accepted notion among scholars in environmental education is that the ultimate goal of environmental education is to influence behaviour and develop active citizenship. Environmental attitudes are commonly perceived as preconditions for achieving environmental behaviour. This is unexpected because we assume that people live according to their values (Spinola, 2015; Schemitz and Da Rocha, 2018).

In the findings of Ardain, Holthuis & Bowers (2018), an individual's attitude towards the environment is also an essential determinant of environmental activism/behaviour. Individuals who engage in this behaviour have expressed a caring attitude toward the natural environment. Environmentally active individuals also appear to be concerned about environmental quality in general and express a willingness to engage in activities to reduce environmental deterioration. In particular, these individuals represent a negative attitude toward environmental pollution and its effects. Environmental attitudes are seen as people's favourable or unfavourable feelings toward some feature of the physical environment or toward an issue that pertains to the physical environment. It is believed that people's attitudes towards the environment and the type of concern they develop towards the environment are associated with the degree to which they view themselves as interconnected with nature (Sulphey & Faisal, 2021).

Many studies have been carried out to indicate the factors associated with environmental responsible behaviour in countries of the world. However, studies in this area are very scarce in Nigeria, even when the importance of environmentally responsible behaviour is accepted in environmental education. Researchers in Nigeria have not adequately emphasised the issue of environmentally responsible behaviour in environmental education in their studies. The analysis of these studies gathered on environmental education pointed out a little attention to environmentally responsible behaviour, hence the need to examine the Environmental Knowledge and behaviour of Social Studies Pre-service teachers' in Colleges of Education in South-west, Nigeria

Our environment is ill and beset with problems, essentially the product of human activities. The environment is very much threatened by our activities which disturb the ecosystem. Consequently, there is an urgent need to educate the citizens on the pros and cons of their activities and interactions with the environment. We need to create awareness among the public on the environmental problems facing our country. Environmental Education is a veritable tool that can acquaint people with specific information about the environment to understand better the environmental issues that threaten man's

survival on this planet (Earth). In Nigeria's urban and rural areas, there is poor environmental care. People have a nonchalant attitude towards the environment without reflecting on the consequences. In the light of this, scholars emphasised the implications of uncared environmental perspective on environmental hazards like flood, soil degradation, soil erosion and pollution. It has also been pointed out that man's influence on the environment has increased run-off and flooding, destroying natural habitats

Research Questions

1. What is the Social Studies Pre-service Teachers' Environmental Knowledge Level in Colleges of Education in South-west Nigeria?
2. What is the Social Studies Pre-service Teachers' Frequency of Exhibiting Environmental Responsible Behaviour in Colleges of Education in South-west Nigeria?

Methodology

The cross –sectional survey research design was employed in the study. The design was considered adequate because it was used to collect data from respondents who had similar characteristics across a given geographical zone at a particular time. The population for this study comprised all 200 level social studies pre-service teachers in all colleges of education in South-west, Nigeria. The choice of the 200 level students was based on the fact that students in this group have acquired adequate knowledge of environmental education concepts and civic, environmental behaviour in Social Studies. Such students also constituted students preparing for practical teaching in primary and junior secondary schools during the (three months) Teaching Practice exercise. Samples for the study were chosen from six colleges of education from three states (Oyo, Ogun and Osun) out of the six states (Oyo, Lagos, Osun, Ondo, Ogun and Ekiti) in South- west, Nigeria. Out of the fourteen (14) public Colleges of education in the south west (5 Federal and 9 State owned Colleges of Education), two Colleges of education from each of the three States were randomly selected. The Colleges were selected due to the fact that they offer Social Studies and has been in existence for at least 3years to cater for the level of the participants. Simple Random Sampling Technique was employed in picking 60 students per institution totaling 360 respondents for the study.

Table 1.0. Distribution of Samples of Pre-service Teachers Per State and College

S/N	States	Samples per College	Percentage (%)
1.	Oyo ¹	60	16.67
2.	Oyo ²	60	16.67
3.	Osun ¹	60	16.67
4.	Osun ²	60	16.67
5.	Ogun ¹	60	16.67
6.	Ogun ²	60	16.67
Total		360	100%

Two instruments were used for the collection of data for this study; the first is the Knowledge of Environmental Concepts Test (KECT) which was one of the testing instruments for this study. This KECT was a 30-item multiple-choice test that cuts across all the environmental concepts and issues selected for this study. It was used to assess students' knowledge in environmental concepts in Social Studies and their competence in applying such knowledge in solving immediate and future environmental problems. The instrument was divided into two sections. Section A dealt with demographic data of the students such as name, school, school type, class and sex; section B consisted of the items on environmental issues and concepts with options A–D. The students were expected to tick only one answer for each item. The reliability co-efficient of the KECT using the Kuder-Richardson Kr 21 formula was 0.88.

The second instrument was the Environmental Responsible Behaviour Scale (ERBS) which was an open-ended questionnaire designed to gather pre-research information to develop the students' Environmentally Responsible Behaviour Scale (ERBS). The questionnaire consisted of four open-ended questions about eco-management, consumer action and economic action, individual and public persuasion and political action. In this way, the students were asked to indicate four behaviours that they had demonstrated and/or had planned to help prevent and solve environmental problems and issues in the last 12 months. The behavioural items for the scale were drawn in the following order: (i) six items for eco-management; (ii) five for consumer and economic action; (iii) eight for individual and public persuasion; (iv) seven for political action. The total number of items on the scale was 26. The responses of the items ranged from Very frequently-5, Frequently-4,

Occasionally-3 Rarely-2 and Never-1. VF=Very Frequently-5, F= Frequently-4, O=Occasionally-3, R=Rarely-2 and N=Never-1.

The validity of the instruments was done via face and content validity method, the instruments were vetted and scrutinised by experts in test and measurement and psychological tests and all corrections adequately effected. On the reliability of the instruments, a pilot test was carried out in a college that was not part of the principal analysis Cronbach coefficient method was used to test the reliability of the instruments. The reliability co-efficient for the KECT using the Kuder- Richardson Kr21 formula was 0.88 while the ERBS reliability co-efficient using Cronbach Alpha was 0.76. The data generated were analysed using frequency, means and standard deviation.

Results

Research Question One: What is the Social Studies Pre-service Teachers' Environmental Knowledge Level in Colleges of Education in South-west, Nigeria?

In order to answer this research question, Social Studies pre-service teachers' responses to a 30-multiple choice item on knowledge of Environmental Concepts Test was scored and cumulated. The minimum and maximum obtainable scores on this test are 0 and 30. However, scores of 0-10 were adjudged as low level of environmental knowledge, scores of 11-20 as partial level of environmental knowledge, while scores of 21-30 were adjudged as adequate level of environmental knowledge. The summary of the result is presented in Table 1.1.

Table 1.1: Social Studies Pre-Service Teachers' Environmental Knowledge Level

Knowledge Level	Score Range	Frequency (f)	Percentage (%)
Low	0-10	-	-
Partial	11-20	143	39.7
Adequate	21-30	217	60.3
Total		360	100.0

Result in Table 1.1 shows that none of the Social Studies pre-service teachers in colleges of education in South-west Nigeria had a low level of environmental knowledge. However, 39.7% of the pre-service teachers had partial level of environmental knowledge and 60.3% had adequate level of environmental knowledge. This implied that the majority of the Social Studies Pre-service Teachers in Colleges of Education in South-west Nigeria had adequate level of environmental knowledge.

Research Question Two: What is the Social Studies Pre-service Teachers' Frequency of Exhibiting Environmental Responsible Behaviour in Colleges of Education in South-west Nigeria?

In order to answer this research question, Social Studies pre-service teachers' responses to 26 items on Environmental Responsible Behaviour Scale (ERBS) was scored such that a Never response was allotted 1, Rarely response 2, Occasionally response 3, Frequent response 4, and Very Frequently response as 5. On this scale, higher score represents high frequency of behaviour exhibition. Therefore, negatively worded items (2, 4, & 8) were reversed before cumulating the responses for each student. The minimum and maximum scores obtainable from this scale were 26 and 130. In determining the frequency of exhibition, scores of 26-52 were adjudged as rarely, 53-78 as occasionally, 79-104 as frequently while scores of 105-130 were adjudged as Very Frequently in terms of frequency of exhibition. The summary of the result is presented in Table 1.2.

Table 1.2: Frequency of Exhibition of Environmental Responsible Behaviour by Social Studies Pre-Service Teachers.

Frequency	Score Range	Frequency (f)	Percentage (%)
Rarely	26-52	24	6.7
Occasionally	53-78	248	68.9
Frequently	79-104	88	24.4
Very Frequently	105-130	-	-
Total		360	100.0

Result in Table 1.2 shows that 6.7% of the Social Studies pre-service teachers in colleges of education in South-west Nigeria rarely exhibited environmental responsible behaviour whereas; 68.9% occasionally exhibited environmentally behaviour and 24.4% of them respectively frequently exhibited environmental responsible behaviour. The result further shows that none of the pre-service teacher exhibited environmental responsible behaviour very frequently. This implies that the majority of the Social Studies Pre-service Teachers in Colleges of Education in South-west Nigeria occasionally exhibited environmental responsible behaviour.

Discussion of Findings

With respect to the first research question formulated for this study, it was discovered that none of the Social Studies Pre-service teachers in colleges of education in South-west, Nigeria had low

level of environmental knowledge, majority of the respondents scored above average (that is, above 15) in fact none below 10 in the test, by implication of the study, it means majority of the pre-service teachers had adequate level of environmental knowledge, many of the respondents exhibited high competence on concepts that talks about environmental pollution, causes, effects and protection of the environment, due to their knowledge about the consequences of a misused environment they were ready to put in efforts towards protecting the environment. Knowledge of the environment entails both individual's knowledge on ecological behaviour and factual knowledge (e.g. knowledge on ecological concepts, knowledge of environmental problems and issues). Several research studies in environmental education have long investigated environmental knowledge and its different forms. Environmental knowledge has been observed to be one of the predictors which explained the variance in responsible behaviour and observed to be associated with environmental responsible behaviour. It reported a robust correlation between perceived knowledge of environmental action strategies and environmental behaviour (Akman & Alagoz, 2017).

In a research carried out by Sarikaya & Sarac (2018) and Borges (2019) it was discovered that sufficient environmental knowledge by students lead to students taking care of the environment and doing everything to control their actions against causing damage to the environment. It has been noted that students who have high environmental knowledge will also be well aware of taking actions to preserve their environment. High environmental knowledge as exhibited by pre-service teachers to a large extent increased their awareness of the environment.

The result of this study conformed with the research carried out by Alias (2019) where he discovered that one of the major reasons for high level of environmental knowledge by students was due to the fact that issues of the environment were variously included and discussed in the Social Studies curricula from primary schools to junior secondary schools and up to tertiary education in Nigeria, also the issues of the environment are discussed frequently on both print and electronic media, to create awareness for the citizens and this awareness often translate to increase in knowledge about the environment. This assertion is true because the Social Studies pre-service teachers developed their concepts knowledge since their early education.

On the second research question formulated concerning the frequency of exhibition of environmental responsible behaviour by Social Studies pre-service teachers of colleges of education in South-west, Nigeria, from the responses of the pre-service teachers it was discovered that 6.7% rarely exhibited environmental responsible behavior, 68.9% of respondents occasionally exhibited responsible behavior while 24.4% frequently exhibited responsible behaviour. From the findings, none of the pre-service teachers never exhibited very frequently environmental responsible behaviour, from their responses majority do not bother to report damage to appropriate authority nor do anything to stop or prevent others from damaging the environment, majority still indulge in littering their classroom environment, many also do not think it is their responsibility to report to appropriate authorities any damage to burst water pipe or inappropriate dumping of refuse in their environment. Many believe it is the responsibility of government to protect the environment or that they should purchase only environmentally friendly or reusable products as part of preventing environmental pollution and misuse.

The result of this study is confirmed by a meta-analysis of seventeen research studies carried out by Liu & Chen (2019) which revealed a correlation between knowledge and environmental behaviour, indicating that individuals who had a more excellent knowledge of environmental issues and how to take action tended to show more responsible environmental behaviours than those who did not possess this knowledge. The study examined 67 empirical studies regarding recycling behaviours. Their analysis indicated that recycling knowledge was the strongest predictor of recycling behaviour, and 87 % of the correlations regarding these two variables were found statistically significant. Another study examined the predictors of general responsible environmental behaviours. Their multiple regression analysis revealed that 21.8 % of the variance in responsible behaviour could be explained by the verbal commitment and perceived knowledge of ecology. (Suryani, Amin & Rohman, 2021).

A study with 226 teachers showed a significant positive correlation between responsible behaviour and teachers' perceived knowledge of environmental action strategies, environmental problems and issues, and ecology and environmental sciences. The significant correlations between responsible behaviour and teachers' perceived knowledge of environmental action strategies, perceived knowledge of environmental problems and issues, and perceived knowledge of ecology and environmental sciences were reported (Rahaman, 2016). Also, researchers reported a significant

positive correlation between environmental knowledge and environmental responsible behaviour of Dutch students. They reported knowledge of action strategies as the most potent single predictors of environmental responsible behaviour. Knowledge also contributed to behaviour in the other two studies, but their percentage was relatively low. Knowledge of action strategies alone explained nearly 40 % of the variance in environmental responsible behaviour scores (Verman & Dhull, 2017).

From the result of this study, it showed that the pre-service teachers exhibited some forms of environmental responsible behaviour, only that they do not do it frequently which could be due to some other factors aside from lack of environmental knowledge, this finding is supported by Al-Rabaani & Al-Shuili (2020) research which showed that increases in knowledge and awareness did lead to pro-environmental behaviour in most cases. Riekman (2018) also supported the findings which asserted that adequate knowledge of the environment usually translate to high level of exhibiting environmental responsible behaviour and the study of Al-Rabaani & Al-Amri,(2017) showed a strong relationship between environmental knowledge and behaviour.

Conclusion

The study examined the environmental knowledge and behaviour of Pre-service Social Studies teachers in colleges of education in South-west Nigeria. From the findings of the study, it was discovered that majority of the students did well in the knowledge aspect, but not many of them exhibited very high level of environmental responsible behaviour. While they showed competence on environmental knowledge on concepts such as pollution, causes, effects and solutions, even though they missed out on meaning of some concepts. On the other aspect, they lacked action when it comes to exhibition of high level of environmental responsible behaviour, some do not belong to clubs that address environmental protection or taking efforts to mobilise others towards the environment.

Recommendations

1. Emphasis should be based on simplifying method and strategies of teaching environmental education concepts that would enhance knowledge of environmental concepts which will invariably lead to change in learners behaviour.

2. Efforts should also be made to provide empirical evidence that will lead to increase in understanding environmental education concepts and pre-service teachers' attitudes and behaviour to environmental education and issues.
3. Relevant texts should be published that focuses on the realities of practical issues and ways of solving environmental problems.
4. There should be curriculum change that will lead to creation of vital environmental education concepts that will emphasise more on behavioural changes in learners as regards the environment
5. Pre-service teachers training curriculum should emphasize strongly on Environmental responsible behaviour especially on how to change the behaviours of learners towards taking action to protecting the environment.

References

- Abubakar, A. (2013). Role of social studies education in national development in Nigeria, *Academic Journal of Interdisciplinary Studies*, 2 (6), 23-30.
- - - Ajiboye, J.O. (2021). Teaching: In the classroom, as a regulator. An inaugural lecture delivered at the University of Ibadan, Ibadan. Thursday 18 February.
- Akmam, O. & Alagoz, B. (2017). A study on environment-oriented knowledge, attitude and behaviour level of teacher candidates. *Journal of Education and Practice*, 8 (1), 229-245.
- Alias, N.A. (2019). Correlation between knowledge, attitudes and behaviour towards river pollution. *International Journal of Modern Trends in Social Sciences*, 2(9), 31-38.
- Al-Rabaani, A. & Al-Amri, E. (2017). The effect using cartoons on developing Omani Grade 4 students' awareness of water issues and their attitudes towards using them in teaching social studies. *Journal of Social Studies Education Research*, 8(1), 35-46.
- Al- Rabaani, A.A. & Al-Shuili, A. (2020). Environmental knowledge, attitudes and behaviour among Omani post-basic education students. *European Journal of Social Sciences*, 60 (1), 29-38
- Ardain, N., Holthuis, N. & Bowers, A.W. (2018). Environmental education and K-12 student outcomes: A review and analysis of research. *The Journal of Environmental Education*, 49 (1), 1-17.
- Aydemir, A. & Cetin, T. (2019). Pre-service Social Studies teachers' cognitive structures regarding instructional technologies and materials. In T. Celtin, E., Hanizaoglu, Y. Dikmeuli & B. Kilcan (Eds.), *New Horizon in Educational Sciences*, (pp.73-86). Strategic Academic Publishing.
- Borges, F. (2019). Knowledge, attitude and behaviours concerning sustainable development: A study among prospective elementary teachers. *Higher Education Studies*, 9(2), 22-32.

- Demir, F.T., Iwkhacat, S. & Kilcan B., (2019). Literacy in Social Studies education. In T. Cetin, E. Hanizaoglu, Y.Dikmeuli and B. Kilcan (Eds.), *New Horizon in Educational Sciences*, (p.267-278). Strategic Academic Publishing.
- Ersoy, F, (2018). Ethics in social studies education. In T. Cetin, A. Mulalic & S. Kaymakci (Eds.), *Current trends in Social Studies education*. (p.234-243) LAP LAMBERT Academic Publishing.
- Gbadamosi, T.V. (2012) Effect of service learning and educational trip in social studies on primary pupils' environmental literacy in Oyo township, Nigeria. Unpublished Ph.D. Thesis. Department of Teacher Education, University of Ibadan, Ibadan.
- Liu, W. & Chen, J. (2019). Modified two major environmental values scale for measuring chinese children's environmental attitudes. *Environmental Education Research*, <https://doi.org/10.1080/13504622.2019.1697431>
- Muhammed, S.N., Abdullahi, I.K., Bello, N.I. & Abdullahi, A.S. (2018). The need for implementation of environmental education in Nigeria – A review. *Dutse Journal of Pure and Applied Science*, 4(1), 280-288.
- Ohman, J. (2016). New ethical challenges within environmental and sustainability education. *Environmental Education Research*, 22(6), 765-770.
- Omosulu, R. (2015) Environmental problems in Nigeria: The role of education. *Journal of Studies in Humanities*, 7, 136-150.
- Payne, P. (2016). The politics of environmental education, critical inquiry and education for sustainable development. *The Journal of Environmental Education*, 47(2), 69-72.
- Rahaman, R.A. (2016). Attitudes and behaviour of Ajman University of Science and Technology students towards the environment, *Journal of Education*, 4, 69-88.
- Rieckman, M. (2018). Learning to transform the world: Key competencies in education for sustainable development. In A. Leicht, J. Heiss & W.J. Bajun (Eds.). *Issues and trends in Education for Sustainable Development*. (pp.40-59) UNESCO.
- Sarikaya, R. & Sarac, E. (2018). An analysis of pre-service teachers' attitudes towards environmental issues in terms of various variables. *Universal Journal of Educational Research*, 6 (1), 99-109.
- Schmitz, G.L. & Da Rocha, J.B.T. (2018). Environmental education program as a tool to improve children's environmental attitudes and knowledge. *Research Gate* 8 (2), 45-51.
- Spinola, H. (2015) Environmental literacy on 9th Grade students from Madeira Island (Portugal). *The Online Journal of New Horizons in Education*, 5(4), 28-36.
- Sukma, E; Ramadhan, S. & Indriyani, F. (2020). Integration of environmental education in elementary schools. *Journal of Physics* 3, 1-6: DOI:10.1088/1742-6596/1481/1021361-6.

- Sulphey, M.M. & Faisal, S. (2021). Connectedness to nature and environmental concern as antecedents of commitment to environmental sustainability. *International Journal of Energy Economics and Policy*, 11(2), 208-219.
- Suryani, S. D., Amin, M. & Rohman, F. (2012). The influence of the research-based monograph to improve pre-service teachers' knowledge, attitude and behaviour. *Journal Pendidikan IPA Indonesia*, 10(2), 292-302.
- Turgoglu, B. (2019). Opinions of preschool teachers and pre-service teachers on environmental education and environmental awareness for sustainable development in the preschool period. *Sustainability*, 1-35 doi: 10.3390/SU/1184925.
- Verman, G. & Dhull, P. (2017). Environmental education as a subject in schools. *International Journal of Advanced Research*, 5 (8), 1547-1552.