

## **Unleashing the Potential of NFBEIs Content to Promote Environmental Literacy**

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### **Abstract**

The world is focusing on sustainable societies. The role of education is indispensable to promoting SDG 13 on climate change. Environmental issues are best tackled through education. Keeping this in view, this research was conducted to unleash the potential of non-formal basic Education Institutions (NFBEIs) to promote environmental literacy among non-formal students. The content analysis of science textbook (class 5) of non-formal basic education institutes was done in the context of environmental literacy by developing and validating a coding framework. The textbook was analyzed to find the extent of the phenomenon “remembering” is presented. For this purpose, remember sub-domain was assessed under the cognitive domain of Bloom’s taxonomy. Data was collected by thematic analysis. The findings of the study revealed that the text promotes ample amount of remembering level of the cognitive domain of Bloom’s taxonomy. The study recommends emphasis may be placed on the integration of real-life application of this phenomenon among students.

**Keywords:** *Nonformal Basic Education Institutions (NFBEIs), Remembering Sub-domain, Literacy*

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## Introduction

Non-formal education is a diverse field that focuses on literacy activities, skill development, economic awareness, environmental literacy, and community development (Affeldt et al., 2017; Fahmi et al., 2021). The spectrum of NFE is comprehensive. Non-formal basic education institutes are globally recognized for shaping community development and disseminating information through the NFE approach. Human beings need to have such an atmosphere where they can flourish and grow. A good and healthy environment helps us to develop our creativity and thinking (Pulecio, 2020). Today, the world has changed a lot, and the present generation is facing different environmental problems. Some of these problems are climate change, global warming, pollution, water and food scarcity, ecological disturbances, deforestation, and depletion of natural resources.

These problems are harmful to the physical health as well as to the mental health of individuals. These problems are not generated on their own but are caused due to human activities. Cutting of forests, use of plastics, burning of fuels, carbon emissions, increase in population, and piles of garbage are some of the major causes of environmental degradation (Goudie, 2018). As the United Nations initiated Sustainable Development Goals in 2016, education and the environment were in focus.

- SDG # 4 is Quality Education,
- SDG # 6 is Clean Water and Sanitation,
- SDG # 7 is Affordable and Clean Energy,
- SDG # 12 is Responsible Consumption and Production, and
- SDG # 13 is Climate Action

These all show the importance of education and environmental literacy in society. Pakistan is also part of the SDGs, and for this reason government of Pakistan is making efforts to bring positive changes in the education sector (Asif et al., 2020; Habib et al., 2021).

It is believed that non-formal education enables people to increasingly control situations that affect their lives. This goal could be achieved through a particularly educational process, which had a liberating influence on them (Boeve-de Paw & Halbac-Zamfir, 2020; Essomba et al., 2022; Simac et al., 2021). With non-formal education, environmental literacy can be given equal importance. Environmental literacy is the development of conscious, positive behaviour among individuals towards the environment (Carmi, 2013). It is the development of knowledge, skills and values to live sustainably to save Planet Earth (Handayani et al., 2021).

The government of Pakistan introduced the Single National Curriculum (SNC) in 2021. In Punjab, the books developed by the Punjab Curriculum and Textbook Board (PCTB) are used across the province in public and nonformal schools. Textbooks are the primary source of learning and information. Textbooks serve as the fundamental component of learning materials. Textbooks can develop understanding and involvement with desired concepts. In this study, content analysis of the Grade 5 Science Textbook was done in the context of environmental literacy.

Nonformal schools in Punjab are termed as Non-Formal Basic Education Institutes (NFBEIs). These schools are run by the local community under the umbrella of the Literacy and Non-formal Education Department, Punjab. These schools follow the same syllabus and books as formal public schools. Non-formal education has emerged as an alternative in recent times (Essomba et al., 2022; Kicherova & Trifonova, 2023). Steps should be taken to protect the Earth from pollution, global warming, depletion of resources and deforestation.

It is observed that there is no such environmental literacy, and people do not bother to save natural resources in Pakistan. The population of the country is dying due to poor environmental conditions such as smog, the spread of viral infections and food and water scarcity. There should be some workable measures taken to cater to environmental issues and to develop sustainable practices as a habit in Pakistani society (Iqbal, 2020). For this reason, the Government of Pakistan incorporated topics related to environmental literacy, climate change and sustainability approaches. Various studies have been done to highlight the importance of environmental literacy (Begum et al., 2021).

Research revealed that the Science textbook of grade 8 in Punjab has environmental education-related content. It is claimed that the content is only emphasizing on psychomotor domain instead of developing other domains of cognitive development. Teachers perceived that there was a dire need to improve the content of textbooks to boost the skills, knowledge and behavior of the learners. Learners must be provided with the chance to participate in activities which can develop behavioral changes among them (Shah et al., 2021).

## **Rationale and Significance**

This study is significant to critically analyze the status of environmental literacy presented in the Grade 5 science textbook. By identifying the presence and depth of environmental literacy, the research is a contribution to understanding how well the textbook prepares students

to engage with important environmental issues. The findings support the development and integration of enriched content that fosters greater environmental literacy within communities. This study contributes to the existing body of knowledge by bridging the gap between environmental education and cognitive skill development in the non-formal education sector of Pakistan. Mainly, environmental topics in formal curriculum settings were addressed only. Moreover, the use of Bloom's Taxonomy in this study provides a structured lens to evaluate how textbooks engage learners across different cognitive levels. The outcomes of this research provided valuable insights for textbook developers, curriculum designers, and teacher trainers, guiding them to align instructional material with the cognitive and environmental needs of today's primary level students. Furthermore, this study is expected to promote the adoption of sustainable practices by equipping students with both foundational knowledge and critical thinking skills.

### **Problems Statement**

Pakistan is currently facing serious environment related issues. Global environment changes including climate change, water pollution, air pollution, deforestation, and improper waste management are prevalent in the country which impacts its land and resources. Being most vulnerable country to environmental issues, Pakistan needs to educate people to handle environment sustainability issues tactfully. Education in this regard, is considered major contributor where textbooks approved by national and provincial curriculum boards/authorities play crucial role to train learners capable of critically analyzing and handling this issue. Despite the inclusion of texts on environmental literacy, the issue is not yet resolved in the country, indicating the need to investigate the quality and arrangement of text and activities on environmental issues, i.e. environmental pollution, conservation of natural resources, and sustainable practices etc. The aim was to give a qualitative input to science textbook/ curriculum developers and policymakers to enhance the effectiveness in the light of empirical evidence that examined the cognitive demands of environmental content in Pakistani science class 5 textbook.

### **Research Objective and Question**

The objective of the study was to analyse the science textbook of NFBEIs based on the remembering sub-domain (cognitive domain) of Bloom's Taxonomy regarding environmental literacy.

**RQ:** What are the basic concepts of environmental literacy based on remembering sub-domain of Bloom's Taxonomy incorporated into the grade 5 science textbook of NFBEIs?

## **Research Methodology**

This part explains the approach, design, method, population, data collection and analysis of the research.

**Research Design:** This study adopted qualitative research design. The content analysis method was used to examine the Grade 5 science textbook published by the Punjab Curriculum and Textbook Board (PCTB), analysing how environmental literacy themes were embedded and categorized through the lens of remembering sub-domain.

**Sample and Sampling Technique:** The sample consisted of the official Science textbook for Grade 5.

**Research Tool:** A self-developed coding framework was used as the data collection tool. The framework was developed using deductive approach after review of related literature. Indicators of remembering sub-domain are naming, listing, recalling and recognizing. Identification and definition were also included. Student learning outcomes, headings and exercise activities were analysed from textbook. The framework was forwarded to expert for validation, and the suggestions were incorporated to develop a clear and consistent framework. After validity following themes were used for analyses which helped to operationalize the environmental literacy.

### **Main themes of Remembering Sub-domain were:**

- Concepts of Climate Change,
- Biodiversity,
- Pollution,
- Water and Sanitation,
- Deforestation,
- Natural Resources,
- Eco-friendly Practices,
- Waste Management, and
- Sustainable Practices

There was no remembering-based content in the Grade 5 science textbook regarding Climate change, Deforestation, Eco-friendly practices, and sustainable practices.

### **Definition of the Key Terms**

*Non-Formal Basic Education Institutes.* In the current study, NFBEI Institutes of Punjab, which are small scale Institutes, where children of marginalized groups take part in educational activities.

*Textbook.* Textbook of science developed by PCTB for Grade 5 is provided to teachers of NFBEIs. This textbook is the primary source of information for the students of NFBEIs.

*Environmental literacy.* Environmental literacy is the development of cognitive, affective and psychomotor domains according to Bloom's taxonomy among teachers and students of NFBEIs. Environmental literacy helps individuals to live according to sustainable practices.

**Data Collection Procedure and Analysis:** Data were collected from the PCTB Science textbook for Grade 5 for content analysis for the chapters which contained information on environment. Key words were identified and themes were made. Keywords were made to locate relevant sections. The identified content was analysed and categorized according to remembering level. After coding the science textbook manually, the data were tabulated into matrices showing the presence of remembering domain of environmental literacy.

### **Grading Criteria of Subdomains of the Cognitive Domain of Bloom's Taxonomy**

| Low                        | Moderate         | High                       |
|----------------------------|------------------|----------------------------|
| Occurred less than 3 times | Occurred 3 times | Occurred more than 3 times |

## **RESULTS**

**Table 1**

*Analysis of the Basic Concepts of Environmental literacy Incorporated into the Grade 5 Science Textbook of NFBEIs (based upon the cognitive domain (Remembering sub-domain) of Bloom's Taxonomy)*

| Chapter                                     | Concept      | SLOs<br>(Page No)                                      | Occurrence in Text<br>(Page No) | Occurrence in Activities<br>(Page No) | Depth of Learners' Engagement |
|---------------------------------------------|--------------|--------------------------------------------------------|---------------------------------|---------------------------------------|-------------------------------|
| Ch. 1<br>Classification of Living Organisms | Biodiversity | 1. Understand the concept of extinction and endangered | 1.7 Biodiversity (p. 12 -13)    | Two activities (p. 12, 16)            | Low                           |

|               |           |                                                                                                                                                                                       |                                              |                               |      |
|---------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------|------|
|               |           | species and the role of human actions in the loss of biodiversity.<br>2. Write some measures for conservation of endangered species.<br>SLO (p. 01)                                   |                                              |                               |      |
| Ch. 4         | Pollution | 1. Define pollution and its types.                                                                                                                                                    | 4.1                                          | Four                          | High |
| Environmental | Air       | 2. Explain the main causes of water, air and land pollution.                                                                                                                          | Environmental pollution and its types.       | activities (p. 42-44)         |      |
| Pollution     | Water     | 3. Explain the effects of water, air and land pollution (unclean or toxic water, smoke, smog, excess carbon dioxide or other gases, open garbage dumps, industrial water, etc) on the | 4.2 Effects of Pollution on Life. (p. 42-45) | Exercise questions (p. 48-49) |      |

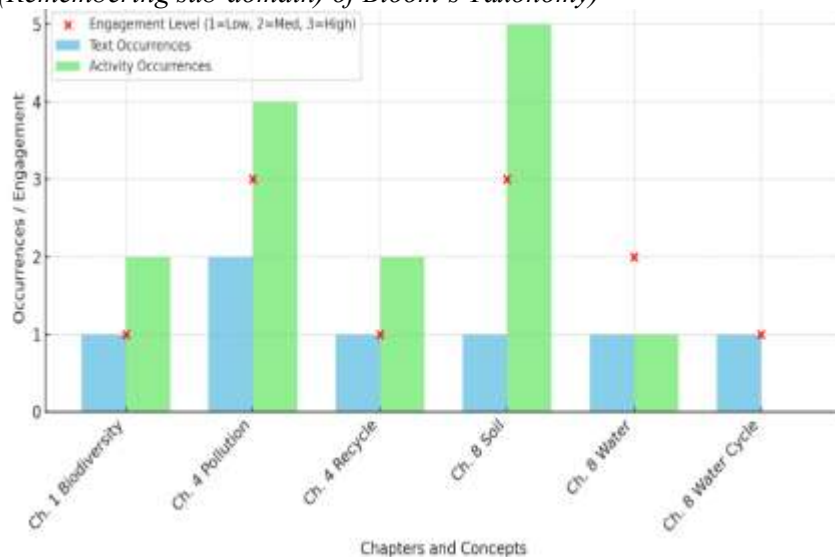
|                                |                |                                                                                                                                                             |                                                          |                                        |      |
|--------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------|------|
|                                |                | environme<br>nt and life.<br>SLO (p.<br>41)                                                                                                                 |                                                          |                                        |      |
|                                | Recycle        | 1. Investigate possibilities and suggest ways to reduce non-biodegradable materials. SLO (p. 41)                                                            | 4.5 ways to reduce Non-biodegradable Things. (p. 47)     | Two activities (p. 46, 49)             | Low  |
| Ch. 8<br>Structure of<br>Earth | Soil           | 1. Identify similarities and differences among the different types of soil.<br>2. Investigate the composition and character of different soils. SLO (p. 94) | 8.5 Soil (p. 98-101)                                     | Five activities (p.98-102)             | High |
|                                | Water          | 1. Describe the sources of water on the Earth. SLO (p. 94)                                                                                                  | 8.2 Importance of water.<br>8.3 Sources of Water (p. 97) | One activity (p.97)<br>One Constructed |      |
|                                | Water<br>Cycle |                                                                                                                                                             | 8.4 Water Cycle (p. 98)                                  | Response Question (p. 104)             |      |

Table 1 explains conceptual content analysis done on objective and research questions. This describes analysis of the basic concepts of environmental literacy incorporated into the science textbook of NFBEIs

(based upon cognitive domain (Remembering sub-domain) of Bloom's Taxonomy).

**Figure 1**

*Presence of Environmental literacy related Content into the Grade 5 Science Textbook of NFBEIs (based upon the cognitive domain (Remembering sub-domain) of Bloom's Taxonomy)*



Blue Columns = Occurrence of Content

Green Columns = Occurrence of Activities

**Biodiversity:** It indicates that the two SLOs were made for recall basic facts (p. 01) in which students were encouraged to gain knowledge about biodiversity. Basic knowledge is provided to students with less information. The language of the text is simple. This information is insufficient for students at grade 5. They need to have more information. In the next section, human impact on biodiversity and conservation of biodiversity are also mentioned in just one page (13). The human activities which are affecting biodiversity are mentioned. Some additional text is provided with little information with pictures. Although pictures arouse students' interest, however these pictures are only providing the look of the living organism. These need to be self-explanatory. There are two activities related to biodiversity in chapter 1. The first one is Activity 1.7 at page 12 which is good to motivate students to apply their knowledge. This is linked with students' attention towards the concept of biodiversity.

The second is a Constructed Response Question on page 16, which encourages students to investigate the reasons for the extinction of biodiversity. This can help students to encourage them to reduce the reasons for the extinction of biodiversity and to save endangered species. There are four recall-based questions in the exercise of unit 3 on subsection 32 which indicates that students are encouraged to have a solid grasp of fundamental concepts. The content regarding biodiversity, human impact on biodiversity and conservation of biodiversity is presented in simple language, but the depth of knowledge is too low. Each category is explained briefly, which is insufficient for 5th class students.

**Pollution:** It further indicates that four SLOs were made to recall basic facts (p. 32) in which students were encouraged to gain knowledge about pollution. This information is also less, which is opted to provide basic knowledge to students. The language of text is easy to understand and to the point. Some more elaboration is needed. Textbooks need to have more information regarding environmental pollution and its types so that students can get basic knowledge about the causes and impact of pollution which is affecting the climate and environment the most.

**Types of Pollution:** In the next section, types of pollution are also mentioned in just two pages (42-43). Three types of pollution, air pollution, water pollution and land pollution are mentioned with figures. Although colorful pictures are presented to enhance the interest of students, these pictures are of bad quality. These need to be clearer.

There are two activities, 4.1 and 4.2 on page 42, which are average to motivate students to apply their knowledge. This is linked with students' attention towards pollution. The first activity is designed to give basic knowledge about pollution. This activity is helpful for students to get remembering-based knowledge of the cognitive domain of Bloom's Taxonomy. The second activity is developed to discuss pollution and its causes before the introduction of the types of pollution. Students see different types of pollution in their surrounding and they can help to develop their knowledge according to their observation. The third activity 4.3 is on page 44, which is also remembering-based. This activity encourages students to recall their existing knowledge about different types of environmental pollution.

Overall, the representation of the remembering-based content regarding pollution is high. This depicts the importance of this topic. The curriculum developers understand students of primary level need to have ample amount of knowledge regarding pollution, its types, causes and

ways to reduce it. The available content is remembering based which may be extended towards higher levels to get maximum output.

**Waste Management (Recycle):** On page 47, the text with heading 4.5 ways to reduce non-biodegradable things is mentioned. It is also providing less information to the students of Grade 5. Activity 4.5 on pages 46 and 47 is designed to give information about the decomposition time of different materials and their impact on environment. Although this is a good activity but also provides information only. Students are encouraged to focus on memorization instead of creativity or critical thinking. The exercise of this chapter contains 5 short questions, which are only knowledge-based to assess the memory of the students. These questions only enhance the remembering capacity of the students. Constructed response question and investigating part of the exercise focusing on the relationship between human activities and pollution. There is another activity in which students are encouraged to prepare organic fertilizer which can help students to make proper use of waste. The content in three categories of pollution and recycling is presented in simple language, but the depth of knowledge is too low. Each category is explained insufficiently, which provides less information for class 5<sup>th</sup> students. The content regarding waste management is low which depicts that curriculum developers do not pay much attention to it. This topic belongs to daily life of students which needs to be addressed more critically and comprehensively so that students understand the importance of waste management from earlier grades.

**Soil:** The introduction of soil, similarities and differences among different soils, the composition and characteristics of soil are discussed from pages 98 to 101. The text provides concise information. In the next section, the characteristics of soil are stated. The information is knowledge-based only. In the next section, similarities and differences among different types of soil are stated with the help of an activity. There is some interesting information related to “*Humus*” is presented in the textbook. Five activities are presented in the science textbook for the better involvement of students. Activity 8.3 on page 98 is helpful for students to experience the soil and its components. This activity encourages students to observe the soil closely and find out which different components are present in the soil of their surroundings. The second activity 8.4, is on page 99 is also observation related. It can help students to build some deep knowledge by identifying the different types of soil they placed in a jar. This activity can enhance the basic knowledge of the students regarding soil. Activity 8.5

on page 99 is the third activity which is added in the science textbook to improve the understanding of students regarding soil and its properties. This activity is like activities 8.3 and 8.4. Activity 8.5 is asking students to collect soil samples and observe their properties regarding texture, color, size, weight, moisture and the place from which the soil is obtained. This can help students to find out how soil from different places is different in texture, color, size, weight, and moisture. Activity 8.6 on page 10 is a discussion based. This activity encourages students to discuss different properties of the soil within the group and then with the whole class. This activity is helpful to improve speech capabilities but is very limited. Some students may perform better, and some students stay passive and do not engage themselves in the activity. Students are provided with some more information regarding the role of microorganisms in soil. The last activity related to soil is activity 8.7 on page 101. This activity is designed to develop observational skills among students. The students are advised to perform the activity, observe and record their response. Their responses are helpful in finding out the water absorption by different types of soil.

**Natural Resources (Water):** Another environmental literacy-related topic which is added in the science textbook is Water and the water cycle. The introduction contains the importance and sources of water on page 7. This information comes under the umbrella of the Remember sub-domain of Bloom's taxonomy, which is provided shortly. The information provided is not according to the requirements of Grade 5 students. "*Interesting information*" and "*Points to ponder*" are presented in the text under subheading 8.3 Sources of water, but the information is not as much as required. Some more information may be added, such as ways to save water, ways to improve underwater resources, and ways to reuse water in industries. There is only one activity (Activity 8.2) in the science textbook related to water on page 97. This activity is only asking students to make charts regarding the sources of water and discuss these sources. This activity seems very limited, as students may not have that much knowledge regarding sources of water.

**Water Cycle:** The water cycle is described in subheading 8.4 on page 98 of the science textbook. The whole process of the water cycle is described in the subheading with a small figure. The information provided is to the point and useful for the students of grade 5. The language of the text is simple and easy to understand according to the level of grade 5 students. The information is provided in short, which is not enough. The information is related to the remembering sub-domain of Bloom's taxonomy.

There is 1 part of the constructed response question in the exercise where students are asked to label the diagram of the water cycle. As discussed earlier, this question is also related to the remembering sub-domain of Bloom's taxonomy, which only assesses the memorization of the students. So, this depicts that factual knowledge regarding environmental literacy is provided at a limited level, aligning with the "Remembering" level of Bloom's Taxonomy. Because this is a foundational level for students, in which they are assumed to recall previously learned material.

Remembering sub-domain is very crucial for students to build a knowledge base upon which more complex cognitive skills can be developed. This can be done through students' active text engagement with the recall tasks. This aspect is limited in the science textbook, in which students are limited in reinforcing their memory to understand basic concepts linked with biodiversity. Since recall is important, however, an overemphasis on rote learning without providing contextual understanding is also discouraged as it limits learners' potential to apply knowledge in real-world scenarios. So, this science textbook may emphasize the element of linking text with recall of students previously learned concepts. There are three recall-based questions in the exercise of unit 1 on subsections 1.7, 1.1.1 and 1.2.1. Most of the exercise of "Chapter 4 Environmental Pollution" is also based on memory-based questions where student is asked to give answers based on their memorization. In the same manner, the exercise questions of "Chapter 8: Structure of the Earth" are related to memory assessment. This indicates that students are encouraged to have a solid grasp of fundamental concepts.

The overall reflection on the remembering sub-domain is that there may be incorporation of diverse question types in the activities section, which may encourage students' deeper engagement and enhance the effectiveness of the "remembering" stage. Based upon this conceptual content analysis in this table, it is concluded that the breadth of knowledge is lacking, some images do not provide appropriate information, activities need to be more linking and engaging.

## **Findings and Discussion**

It was found that remembering-based knowledge regarding environmental literacy is provided at a strong level as compared to other levels. It was confirmed that there is a significant proportion of science textbook activities which fall under remembering-based content. Remembering-based content emphasizes building basic knowledge upon which more complex cognitive skills can be developed. The science textbook introduces students to basic

information and environment-related terms such as biodiversity, soil, water, and environmental pollution. Remembering-based content was unable to cover all basic topics such as air, conserve, soil erosion, deforestation, ecosystem, food chain, sustainability and climate change etc. Remembering is important, but an overemphasis on rote learning without providing contextual understanding limits learners' potential to apply knowledge in real-world scenarios. Students are encouraged to have a solid understanding of fundamental concepts.

The findings of this study align with previous research studies emphasize the dominance of remembering sub-domain-based content in the science textbook. There are some research studies which revealed that textbooks in Pakistan, at different grades and subjects, have overemphasis on rote memorization and do not support to enhance the cognitive development of students. It was revealed by Ebad-Allah (2022), Kamil et al. (2020) and Soomro (2024) that content of Science and English textbook at secondary level is remembering-based and does not promote problem solving skills among students. It was reassured with the analysis of this research that the grade 5 science textbook contains more remembering-based content and has overrepresentation of memory-based content.

### **Conclusion and Recommendations**

It is concluded that the remembering-based subdomain is effectively presented in the science textbook. However, there may be incorporation of diverse question types in the activities section, which may encourage students' deeper engagement and enhance the effectiveness of the "remembering" stage. Biodiversity, environmental pollution, soil and water are basic concepts which are addressed in the science textbook.

1. It is recommended that depth of knowledge may be added by linking with previous knowledge of students and varied question formats may be integrated i.e. matching exercises etc. apart from this, activities for teachers in the classroom may also be added in which students may be encouraged to read some additional story books, internet sources etc. to reinforce memory and facilitate active recall.
2. It is recommended that the content may be expanded to incorporate more diverse and context-rich examples of environmental issues and their causes and effects. Activities should be designed to encourage inquiry-based learning, comparative reasoning, and real-world application. Open-ended questions, case studies, and scenario-based discussions should be integrated to deepen understanding and stimulate student engagement. Additionally, periodic content updates are needed to align examples with current global and local environmental challenges.

## REFERENCES

- Affeldt, F., Tolppanen, S., Aksela, M., & Eilks, I. (2017). The potential of the non-formal educational sector for supporting chemistry learning and sustainability education for all students—a joint perspective from two cases in Finland and Germany. *Chemistry Education Research and Practice*, 18(1), 13-25, <https://doi.org/10.1039/C6RP00212A>
- Asif, T., Guangming, O., Haider, M. A., Colomer, J., Kayani, S., & Amin, N. U. (2020). Moral education for sustainable development: Comparison of university teachers' perceptions in China and Pakistan. *Sustainability*, 12(7), 3014.
- Begum, A., Jingwei, L., Marwat, I. U. K., Khan, S., Han, H., & Ariza-Montes, A. (2021). Evaluating the impact of environmental education on ecologically friendly behavior of university students in Pakistan: The roles of environmental responsibility and Islamic values. *Sustainability*, 13(18), 10188.
- Boeve-de Pauw, J., & Halbac-Zamfir, R. (2020). Environmental citizenship in the context of primary non-formal education. *Conceptualizing Environmental Citizenship for 21st Century Education*, 179-191.
- Carmi, N. (2013). Caring about tomorrow: Future orientation, environmental attitudes and behaviors. *Environmental Education Research*, 19(4), 430-444.
- Essomba, M. À., Lleonart, P., Alfonso, L., & Bin, H. (2022). Education for sustainable development in educating Cities: towards a transformative approach from informal and non-formal education. *Sustainability*, 14(7), 4005.
- Fahmi, F., Fajeriadi, H., & Irhasyuarna, Y. (2021). Feasibility of the prototype of teaching materials on the topic of classification of living things based on the advantage of local Wetland. *BIO-INOVED: Jurnal Biologi-Inovasi Pendidikan*, 3(2), 113-118.
- Goudie, A. S. (2018). *Human impact on the natural environment*. John Wiley & Sons.
- Habib, M. N., Khalil, U., Khan, Z., & Zahid, M. (2021). Sustainability in higher education: what is happening in Pakistan? *International Journal of Sustainability in Higher Education*, 22(3), 681-706.
- Iqbal, M. P. (2020). Effect of climate change on health in Pakistan: climate change and health in Pakistan. *Proceedings of the Pakistan Academy of Sciences: B. Life and Environmental Sciences*, 57(3), 1-12.

- Pulecio, A. T. (2020). *The role of NFE programs in the development process of rural areas in Colombia: a study from NGOs' perspectives* (Master's thesis, Norwegian University of Life Sciences, Ås).
- Shah, N. H., Nazir, N., & Arshad, M. (2021). Analysis of Punjab textbook of general science in context of environmental education at 8th grade. *Pakistan Journal of Educational Research*, 4(3).
- Simac, J., Marcus, R., & Harper, C. (2021). Does non-formal education have lasting effects? *Compare: A Journal of Comparative and International Education*, 51(5), 706-724.