

PROSPECTIVE ELEMENTARY TEACHERS' AWARENESS ABOUT BIODIVERSITY: FOCUSING ON THEIR ABILITY TO IDENTIFY LOCAL FLORA

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Abstract

Purpose of the study: This research aimed to investigate the awareness level of Prospective elementary teachers about the Local Flora.

Methodology: Seventy prospective elementary school teachers from the Education faculty of two universities were targeted to collect data. An ad hoc questionnaire was developed to systematically assess the ability of ECT to identify name, type, and annual/biannual/all seasons and their reasons behind climate change. Gender-based analysis was carried out.

Main Findings: The results indicate that they have little ability to identify the native flora from the habitat in which they are living. Lawrence Garden, Racecourse Park, Shalimar Garden, and the University itself were considered native flora as this is the location of the research. Little awareness of the native flora was found to be an obstacle to its teaching and therefore to its conservation.

Recommendations based on the study: It is suggested that workshops and training courses for prospective teachers should be planned to enhance their ability to identify flora which would lead to its conservation later on.

Originality of the study: Pakistan like the rest of the World has been affected by climate change last year, which have brought devastating rains, floods and landslides. This critical situation once again highlighted the biodiversity crisis which not only affects species but the functionality of ecosystems. Role of Education and educators in biodiversity conservation has been acknowledged as primary tool. Based on this understanding this research was made to foster and develop climate/nature conservation from the early teacher's understandings.

Keywords: Prospective Elementary Teachers, Biodiversity Awareness, Environmental Conservation.

INTRODUCTION

Around 33 million people, including approximately 16 million children, have been affected by this year's heavy monsoon rains in Pakistan, which have brought devastating rains, floods, and landslides (UNICEF, 2020). This year's floods - Pakistan's worst climate-induced natural disaster in years - have been caused by record torrential rainfall and melting glaciers in the country's northern mountains. The disaster has highlighted the stark disparity between countries that are the largest contributors to climate change and countries that bear the brunt of its impact. Pakistan produces less than 1% of global greenhouse gas emissions but its geography makes it extremely vulnerable to climate change (Fihlani & Fraser, 2020). Pakistan at this point, is paying in their lives and in their livelihoods for a climate disaster that is not of their making but it's among the 10 most affected countries in the world by climate change (Graham, 2020). According to the World Wildlife Fund (WWF), the main environmental challenges of the 21st century include environmental pollution, deforestation of natural areas, and biodiversity loss (Grooten et al., 2018). Biodiversity is the variety of different forms of life on earth, including the different plants, animals, and micro-organisms, the genes they contain, and the ecosystem they form (Rawat & Agarwal, 2015). Biodiversity act as a life support system for its vital role in the availability of everything in nature that human need to survive: food, clean water, medicine, and shelter.

Due to the complicated nature of the concept of Biodiversity, it is challenging to understand and to teach it. This leads nations not only to set strategies to conserve the environment but struggle for the social awareness of biodiversity. Document Convention on Biological Diversity states that the environment would be protected if people become more familiar with it (UNEP, 2013). No doubt, Schools are the best places for disseminating biodiversity knowledge and awareness to students and through students to their families and then to society. Bixler; Floyd & Hammitt (2002) opined that the understanding of biodiversity can be a learning process that occurs through an encounter with the natural world and its variability, i.e., with different species of plants, insects, and other animals (Bixler et al., 2002). This approach to promoting species knowledge in preschool education can be part of a useful educational strategy for biodiversity conservation (Beery & Jørgensen, 2018). Thus, there is a clear need to develop species diversity literacy in our society, going beyond the simple naming of species, by referring also to other domains of learning, including basic factual

knowledge, awareness, and understanding, as well as the development of skills and abilities in species observation and the application of knowledge (Hooykaas et al., 2019). Understanding biodiversity and related issues is underpinned by species literacy, thus species knowledge is fundamental to understanding the relationships between species and the environment (Martinez et al., 2020). Species literacy not only develops an individual's interest in biodiversity but also in sustainability and the environment. (Palmberg et al., 2015).

Species Knowledge can aid in developing a connection to the environment (Cox & Gaston, 2015). Further species identification instills within people a sense of identification and belonging to their habitat (Standish et al., 2013). Conversely, poor knowledge about the local environment could indicate a lack of relationship and identification between people and the immediate environment (Louv, 2010). To engage people in biodiversity conservation and gain public support, increasing awareness of biodiversity has been recognized as a good starting point. A deeper understanding can empower people to make informed decisions about their own lives or the world they would like themselves or their children to live in (Basak et al., 2020).

Furthermore, it is known that to understand biodiversity, it is crucial to know different species and their life conditions since biodiversity learning for children starts with observing plants and animals in the neighborhood (Wolff & Skarstein, 2020a). Thus, knowledge of species, interest in nature, and nature experiences are the factors that in childhood best promote interest in and understanding of environmental issues, biodiversity, and sustainable life (Palmberg et al., 2015).

Tsevreni (2018) found shortcomings and limitations in addressing environmental education in schools (Tsevreni, 2018). On the one hand, we find teachers' awareness of environmental problems and, on the other hand, the scarce environmental training they have received (Leite et al., 2018).

Researchers in different parts of the world focused on Biodiversity awareness and species identification and conducted several studies. Kvammen (2015) reported a decrease in the species awareness level of prospective teachers over the last 20 years (Kvammen, 2015).

In Norway, Tuula and Forode (2020) conducted a study to investigate early childhood student-teacher species identification skills and found relatively poor ability. In Finland Wolff and Skarstein (2020) found only two-thirds of the proposed species were identified by the prospective preschool teachers at the beginning of a biodiversity training program (Wolff & Skarstein, 2020b). Yorek et al (2008) found the best-known species for students were the exotic, domestic, or ornamental animals and plants, while native species were less known. Earlier Yorek et al., (2008), Almeida et al., (2017), and Díaz Encinas & Fuentes Navarro (2018) opined that a lack of knowledge about species and a bias towards preferring some species and rejecting others can hinder a true understanding of the role of species in ecosystems and the true dynamics of ecosystems, something that occurs both at the level of students and teachers.

In general, these and other studies highlight the lack of knowledge about biological species among the students and teachers. Being able to identify species is not just a matter of recognizing them, but is a preliminary step towards learning about their origin, evolution, relationships, etc. It also involves the observation of these species and the application of knowledge about them. The competence to know species therefore helps to understand two fundamental facts: the need for their conservation and our direct dependence on biodiversity networks, on which we are directly dependent (Aghamolaei et al., 2014; Karpas, 2015; Osborne, M, 2013).

Global agenda of sustainability and especially the recent floods in Pakistan, results of Climate change made it necessary to train prospective teachers in the area of environmental education and make them able to equip children with knowledge skills of biodiversity and sustainability for a successful green transition. Díaz & Fuentes (2018) also felt the need for training for pre-service teachers to provide them with the necessary knowledge about Environmental Education, so that they can train future generations in this subject (Díaz Encinas & Fuentes Navarro, 2018).

In teacher education and training faculties within Pakistani universities like others are offering environmental education at different levels. In Faculties of Education special modules are being taught to prospective teachers in accordance with HEC policy guidelines.

RATIONALE OF THE STUDY AND OBJECTIVE

Realizing the need of this type of research which is less in Pakistani context, especially for species identification in the surroundings, in and out of the school environment, the aim of the research is to investigate the awareness of prospective elementary teachers about the diversity of Local flora, especially those species that are common in our surroundings, in educational environment, in parks, in homes and alongside the streets. The research addresses the following questions

- Do prospective elementary school teachers have significant knowledge and awareness to identify the local flora in Lahore city?
- What do the Elementary School teachers think about the reasons behind local and global climate change?

METHODOLOGY

A quantitative research approach was applied. A survey technique was used to determine the awareness level of biodiversity through the identification of species in local flora and their perceptions about the reasons for climate change. For this, the ability of final-year students of the elementary education program to identify plant species in their environment and their perceptions were analyzed.

Sample

The population of the study consisted of all students enrolled in different degree and diploma programs of the Faculty of Education at A (a women's university) and B (a mixed university). Elementary education program and then its final year students from both universities were targeted to collect data. Further, 45 participants from women's universities and 25 from male students of mixed universities were randomly selected.

Instrument for Data Collection

An ad hoc questionnaire was developed to systematically assess the ability of ECT to identify name, type, and annual/biannual/all seasons and their reasons behind climate change. It consisted of two parts. For part 1, A List of the 15 most common species from local flora with their colored photographs was developed and attached to this questionnaire. Students were asked to write down the common names in Urdu and English of each of the species (1-15) and other required information related to them in prescribed columns. For developing a list of species, the Horticulture department was consulted. More than 35 species including herbs, shrubs, and trees were present in the total flora of Lahore city. From this list of 35 species, 15 most common plant species were selected to get related information about them through an ad hoc questionnaire. Among these 15, 3 were herbs and 7 were shrubs and 5 were trees. For part 2, an open-ended question was given as

What do you think about the reasons behind local and global climate change?

Evaluation of the Answers

For part 1, A three-point numerical scale (rating scale) that was used to assign a score to each plant species to measure the awareness level of EST was developed and used. It was set as

Incorrect identification/no response -----0

Incomplete but not incorrect-----1

Correct identification-----2

For example, A student who wrote the correct name in Urdu or English, Type(herb/shrub/tree), Annual/biannual/all season, was assigned 2. If a student did not write the correct name but its type and annual/biannual /all seasons answers were correct he/she got no marks (0). If he/she wrote the correct name but the other two answers were wrong, then 1 was assigned to him/her.

For part 2, key concepts were derived, and analyzed, and a list of reasons was developed.

DATA PROCESSING AND ANALYSIS

Equal variances of the two groups (i.e. male & female) were assumed for awareness/identification score, as the "Levene's Test for Equality of Variances" was insignificant for the research variable. After verifying the assumption of homogeneity of variances, the appropriate approach was used to report the significance through a t-test.

Identification of plant Species

Table 1: Species Identification Score of Male Elementary School Teachers and Female Elementary School Teachers

Groups	N	Mean	SD	df	t-value	p	d
Male EST	25	33.75	20.37	68	2.98	.002*	.479 *
Female EST	45	25.23	22.43				

* P < .05

* Cohen's d has calculated by using means & standard deviations of two groups

There is a significant difference ($p < .05$) in Species Identification Score as male teachers ($M = 33.75$, $SD = 20.37$) received higher scores than Female teachers ($M = 25.23$, $SD = 22.43$, $t [68] = 2.98$).

The Reasons behind local and global climate change

The main reasons reported by elementary school teachers are given below.

1. Deforestation

2. Industrialization
3. Lack of Planning
4. Urbanization

Few EST opined that lack of knowledge related to the effects of climate change on life might also be a reason. Non-serious behaviors of people towards biodiversity and sustainability were also mentioned by EST. On the other hand, one female elementary school teacher simply wrote I don't know. Another wrote when we move away from nature and Allah (GOD), then it would happen.

DISCUSSION

After Analysis, it was found that prospective school teachers had little ability to identify local flora although a significant difference was found in the species identification level of male and female school teachers as male EST scored higher than female. Another significant finding was that plant species having common utility values were more identified by both cohorts of ES Teachers. Species having less utility value were identified by only 2 participants. This may be due to the little exposure of Prospective EST teachers to close natural environments. Further, ESTs reporting of reasons behind climate change shows their deep concern for climate change although one did not know any reason.

These results were almost in line with research already conducted in different parts of the world. This study was limited to prospective and further elementary school teachers. This study can be conducted at other levels too. It is suggested that teacher training would be to include more content related to biodiversity in the immediate environment, both in terms of species and their conservation problems. Therefore, this is one of the ways to guarantee the role of education as a fundamental tool for the conservation of biodiversity and sustainable development.

Biodiversity is an essential aspect of our environment, and it is crucial to create awareness among elementary teachers about it. In the Pakistani context, there is a diverse range of flora found across the country, from the northern mountainous regions to the southern coastal areas.

Studies have shown that elementary teachers in Pakistan have limited knowledge and awareness about biodiversity, especially when it comes to identifying local flora. To address this, it is essential to focus on providing them with adequate training and resources to identify local flora.

Biodiversity is an essential aspect of our environment, and it is crucial to create awareness among elementary teachers about it. In the Pakistani context, there is a diverse range of flora found across the country, from the northern mountainous regions to the southern coastal areas.

Previous research studies have highlighted the lack of awareness and knowledge about biodiversity among elementary teachers in Pakistan, especially when it comes to identifying local flora. [Abbas et al. \(2021\)](#) assessed elementary school teachers' knowledge and awareness of biodiversity in Pakistan and found that the teachers had limited knowledge and awareness of biodiversity, and there was a significant gap between their knowledge and the curriculum requirements. Similarly, [Riaz et al. \(2016\)](#) found that the teachers had a limited understanding of biodiversity and its conservation, and there was a need for professional development programs to improve their knowledge and attitudes.

To address this issue, it is essential to focus on providing elementary teachers with adequate training and resources to identify local flora. Field trips to local parks, gardens, and nature reserves can be incorporated into the curriculum to help teachers become familiar with the different plant species found in their region. Workshops and training sessions can also be organized to provide teachers with the necessary knowledge and skills to identify local flora.

Providing teachers with relevant resources, such as field guides, books, and online resources, can further aid them in identifying local flora. For example, "A Field Guide to the Common Trees and Shrubs of Pakistan" by Tariq Mahmood Khan is a valuable resource for teachers and students alike, providing detailed information and illustrations of common plant species found across the country ([Khan, 2007](#)).

Biodiversity is an essential aspect of the natural world, and its conservation has been recognized as a key environmental challenge. Islamic teachings emphasize the importance of preserving the environment and its biodiversity, as they are seen as a manifestation of Allah's creations.

Islam teaches that every living being on earth has a purpose and should be respected and protected. In the Quran, Allah says, "And there is no creature on [or within] the earth or bird that flies with its wings except [that they are] communities like you" ([Quran 6:38](#)). This verse emphasizes the importance of biodiversity and the interconnectedness of all living beings.

Furthermore, Prophet Muhammad (peace be upon him) taught the importance of conservation and protection of the environment. He is reported to have said, "Whoever plants a tree and it bears fruit, Allah will reward him for it as a charity" ([Bukhari](#)). This teaching emphasizes the importance of not only preserving the environment but also actively working towards its improvement.

In Islamic history, many scholars have written about the importance of biodiversity and the environment. For example, [Ibn Al-Qayyim](#), a famous Islamic scholar from the 14th century, wrote extensively about the environment and its preservation. He emphasized the importance of preserving the environment and the role of humans in doing so.

CONCLUSION

In conclusion, Islamic teachings emphasize the importance of biodiversity and the preservation of the environment. Muslims are encouraged to respect and protect all living beings, and the preservation of the environment is seen as an act of worship. By following these teachings, we can work towards a more sustainable and balanced world.

In conclusion, creating awareness about biodiversity and local flora among elementary teachers in Pakistan is crucial to ensuring that future generations develop a strong connection with the environment and understand the importance of preserving it. By providing adequate training and resources, we can help teachers identify local flora and pass on this knowledge to their students.

These previous research studies emphasize the importance of increasing awareness and knowledge about biodiversity among elementary teachers in Pakistan. By addressing this issue, we can help ensure that future generations have a strong understanding of the value of biodiversity and the need to preserve it for the future.

One way to do this is by incorporating biodiversity and environmental education into the elementary teacher training curriculum. This can include field trips to local parks, gardens, and nature reserves to help teachers become familiar with the different plant species found in their region.

Additionally, workshops and training sessions can be organized to provide teachers with the necessary knowledge and skills to identify local flora. These sessions can be conducted by botanists, environmentalists, and other experts who can share their knowledge and experience with teachers.

It is also important to provide teachers with relevant resources, such as field guides, books, and online resources, to help them identify local flora. For instance, "A Field Guide to the Common Trees and Shrubs of Pakistan" by Tariq Mahmood Khan is a valuable resource for teachers and students alike, providing detailed information and illustrations of common plant species found across the country.

AUTHOR'S CONTRIBUTION

Dr. Moafia Nader: Conceptual framework, Overall research design, and language check

Dr. Fakhra Aziz: Scale development. Data Analysis and its interpretation, Result discussion

Dr. Sadaf Jabeen: Final check of academic writing, data collection, correspondence for publication

Dr. Rabia Tabassum: Writing references and after completion of research, formatting and reviewing the article

Dr. Mahvish Fatima Kashif : Data collection, and language check

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