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Capacity Assessment Of Elementary School Teachers For Imparting Environment-Based Education

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Abstract. Environment-based education (EBE) has gained significant attention amongst the world community, because the future of coming generations on earth will be dependent on conservation of environment for sustainable development. EBE has been adopted in many parts of the world but the most important actor in EBE is the teacher, who can integrate environmental context and concepts while teaching. The present study was conducted for capacity assessment of teachers ofModel Colleges in Islamabad, Pakistan for imparting EBE. For this study, a sample of 200 teachers (both gender) comprising100 science teachers and 100 humanities teachers were randomly selected from all 17 Model Colleges in Islamabad (10 Boys and 7 Girls colleges). The data were collected with the help of a pre-tested questionnaire using an interview approach in order to assess the general awareness of teachers about environmental issues as a measure to assess their capacity to integrate the environmental perceptions and perspectives in teaching. The result shows a gender difference as females were found better aware of and more sensitive to environmental concerns than males. The resultalso indicated that humanities teachers with non-science academic background have no clear perceptions about environmental issues, while science teachers have better understanding of the environmental aspects and expressed better understanding of the EBE concept. But teachers from humanities group were found more in favor of EBE than science teachers. On the basis of results, it is concluded that teachers lack capacity to deliver EBE. Therefore, it is suggested that teachers training programs should be developed for orientation to deliver EBE and practical activities integrating environmental aspects like training workshops, seminars, conferences, discussions, debates must be organized for teachers as well as for the students as it will induce a positive attitudinal and behavioral change in the society.

Keywords: Environment, elementary school teachers, curriculum, environment-based education, capacity assessment

INTRODUCTION

"Environment" is considered a "world around human" which influences human beings in many ways (Cai et al., 2016). The concept of environment is now being extended to include not only the biophysical natural environment, but also the man-made physical environment as well as the political, economic, cultural, technological, social and aesthetic environment (Hashemi et al., 2017). Environmental study is an approach to gaining a better understanding of the human environment and the impact of human life on it. Environmental concerns have grown at such a rapid rate (Negev et al. 2009) at the global, national, and local levels (Abas et al., 2017) in recent decades that they have become a major worry for the international community, particularly educational planners and curriculum developers (Boca, 2019).

Sustainable development, environmental conservation, and poverty alleviation were important subjects at United Nations summits in 1972, 1992, 1997, 2002, and 2012. With the opening of the International Conference on Human Environment in Stockholm in 1972 on a global level, as well as in

Pakistan, the notion of environmental education gained popularity and struck at the face of education. Later, in 1979 in Belgrade, the importance of environmental education was underlined, and then in 1977 in the Soviet Union, the Tbilisi conference was conducted, with environmental education as the main issue.

In the scenario of continuous change, Environment-based Education (EBE) should work to help each citizen to develop an awareness and sensitivity for the environment and solve related problems. Furthermore, this type of education must help each citizen to acquire knowledge and understanding needed to perform effectively to conserve the environment (Ramadhan &Indriyani, 2019). Environment-based education aims to promote willingness and ability to adopt lifestyles that are compatible with the use of environmental resources. It can also play an important role in developing a new global ethic. An ethic, which can develop attitudes and behaviors of individuals and societies, which are constant with humanity's place within the biosphere but developing a global ethic will not be an easy task (Otto &Pensini, 2017).Government and policy makers can and may order changes and new approaches to development and may begin to improve the conditions, but these are no more than short-term solutions unless the youth of the world are educated with such an ethic in mind(Liu et al., 2019). This kind of education has come to be called environmental-based education and in any education system teachers are the most important persons. Teachers are the most influential people among the society of any country as these are the individuals who expand the boundary of knowledge of students of any society. Teachers are the persons who make religious leaders, world known scientists, doctors, engineers and everything else between and they have ability to transform the thoughts and behaviors of individuals. Similarly, they have the ability to transform the behavior of young students for the environment through environment-based education (Braun &Dierkes, 2018).

Many teachers, administrators, school board members, and others in charge of curricula are ignorant of the EBE approach's effectiveness. However, experts have discovered that using the environment, from the classroom to the school yard, and from the home to local nature centers and parks, is a wonderfully effective way to fulfil educational goals and meet the requirements of our individual students (Yalmanci&Gozum, 2019).

Environmental education has potential for future reforms by cultivating active and engaged citizens and boosting academic achievement across the board, not only in environmental science (Marcinkowski&Mrazek, 1996). A detailed understanding of the power and potential of environment-based education can be accomplished through educational research. Bringing this new essential information to the educational community and the general public can lead to a better future. Students exercise skills such as self-direction, methodical and critical thinking, competent data interpretation, well-responsive decision making, effective communication, flexibility in work style, and ethical behavior towards the environment in environment-based programs. Simply stated, environment-based education has the capability to prepare the people to live in the world in a better way and give them a sense of responsibility for the environment. There are few teachers who use EBE (Ernst, 2005) and few teachers who would like to use EBE, but these teachers do not teach by using the environment, instead they teach through supplemental curricula or more traditional, less intensive environmental education methods(Hart, 2013). Now a number of teachers support the educational efficacy of environment-based education in schools as it brings positive student outcomes in different subjects, improves critical thinking and motivates the students, improves classroom behavior, and produces leadership and character skills (Athman and Monroe, 2004; Cheaket al., 2002; Ernst and Monroe, 2006; Ernst, 2005; Glenn &Lozar, 2002; Powers, 2004; Wheelerat al., 2007). Despite the growing amount of evidence that supports the educational efficacy of this type of instructional approach in high-quality environmental education, relatively few teachers seem to practice EBE (McCrea, &Debettencourt, 2000).

In the U.S, environmental education programs have their roots in 20th century along with other programs like conservation education, nature study etc. In the 1970s environment education really struck the field of education in the U.S and it became a part of many school programs. Educators also started to include ecology and environment based topics in their curriculum and purpose of this addition was to help the students to understand the environment and effect of human activities on natural systems on which all life depends. Today, many schools in the U.S have EBE programs. After the publication of Rachel Carson's Silent Spring, Earth day celebrations (first time celebrated on 22nd April 1970) and political

ecology movement for cleaner air and cleaner water, protection of forest and wildlife species were also started (Strauss, 2006).

The significant barriers to implement EBE includes lack of proper training for teachers for implementation of EBE as according to the US survey of teachers; only 10% have had specific training on any environmental education teaching methods (McCrea &Debettencourt, 2000). There is no encouragement for teachers to use more issue or project-based, interdisciplinary EBE approaches (Kim, 2003). There is not any kind of professional development in teachers for implementation of EBE. Nationally produced curricula in most of the countries are primarily science-oriented rather than interdisciplinary and are not sufficient for implementation of EBE so lack of relevant curriculum and lack of interdisciplinary textbooks that incorporate project based learner-centered approaches and 'too much other material to cover' are the primary reasons why teachers are not able to implement environmental education (Jickling, 2003). Initial uncertainty may discourage teachers from using EBE and accompanying a new community-based project (Kudryavtsev, 2013). A variety of logistical barriers to environmental education presented by Ham and Sewing in (1988) and Monroe et al. in (2002) such as lack of planning, lack of time, lack of administrative support, transportation, and funding also affect the implementation of EBE. Environment-based education can demonstrate how the environment can be a useful tool for developing the skills in students which will be required to succeed in future (Adroinet al., 2018). Environment-based education includes a variety of programs and learning approaches, such as place-based education; the environment as an integrating context for learning (EIC) environmental service learning; investigating and evaluating environmental issues and action (IEEIA) (Robinson, 2019).

The educational system of Pakistan is one of the least-developed in the world. Despite changes since independence, the Pakistani educational system has retained its colonial character, an important factor preventing the reduction of illiteracy in Pakistan. In 1992, National Conservation Strategy (NCS) was developed and environmental education programs were started in different universities of Pakistan. NCS also emphasized to strengthen the educational curricula at all levels of education and to take measures to incorporate environmental education in formal and informal sectors. In 2005 National Environment Policy was formulated but up till now complete implementation of these initiatives is a challenge. According to the National Education Policy of Pakistan, 2009, environmental education shall be integrated as an integral part of education under curriculum reforms. Environmental education could not be implemented due to factors like poverty, discrimination, population, and environmental degradation in Pakistan and one of the major problem in implementation is also the lack of environmental attitude in people. One of the significant attempts in contributing towards environmental education in Pakistan was through 'Coordinated Environmental Education Project (CEEP)' from 1989-1992 which was implemented by the Ministry of Education, Pakistan in collaboration with the then Ministry of Environment (now Ministry of Climate Change). According to this project, a number of activities were aimed at training teachers and development of EE teaching aids was also carried out. EE has been integrated at all levels of education and initiatives were taken by government and non-government organizations like greening the curricula and integration of EE topics at primary and secondary levels, initiation of diploma, degree and master level programs. Further, a project titled, "Environment Education promotion" (2004-2009) was implemented by the Ministry of Environment and curriculum wing of the Ministry of Education.

Usually education in Pakistan is dependent on several factors, such as the existence of cost-effective schools, better curricula, and awareness among parents and teachers about the importance of environmental education. However, the single most important factor in getting children to become aware of environmental education and its importance is by improving the structure of Pakistan's school system and giving the concept of environment and its importance at school level to the children.

Currently, there exist many obstacles on the road to a smoothly functioning system of education, in which environment is a common and major part of education. These include lack of teachers training programs, lack of understanding of environmental issues, lack of resources, over-centralization, and underdeveloped managerial capacity, lack of research institutions, school autonomy and poor information systems. However, there are several ways through which an environment-based education approach could be adopted in the education system of Pakistan. The foremost is decentralization of decision-making which can improve education administration as a highly centralized system does not respond as effectively to local needs. Though, education is a provincial chapter in Pakistan, delivery of quality education and curriculum design in terms of environmental education requires overall reform of

the education system. The conditions for implementation of EBE can be improved by improving the educational institute's autonomy. Currently, the Heads (Principals) of Government institutions have a limited decision-making capacity as they do not have control over issues like curriculum, teacher appointment, discipline, and evaluation.

The supervision and coordination of the educational institutes at the district and provincial levels can also help to improve the environmental conditions by implementation of EBE. By making the district the key level for planning and management, state-level and central education bodies can focus more on policy-making, resource management and regulation. It can be done by promoting good Principals and teachers to enhance the institutional capacity of district level organizations. The lack of sufficient manpower in the form of teachers is the most serious problem at the district and sub-district levels for implementation of EBE.

Expanding Pakistan's educational information and research base is one of the most critical challenges, as it would aid not only the implementation of EBE but also the advancement of education at all levels in Pakistan. The quality of the information system determines how well the education system is managed and administered. Decision-makers can't make good decisions if they don't have solid information. Research is also a necessary means for improvement of the education system in Pakistan and it will also be a tool to produce the ways for getting the desired goals by implementation of EBE. Pakistan currently has one institution that conducts educational research, the Academy of Educational Planning and Management, which focuses on basic education. However, this organization does not work on EBE, and its capabilities are hampered by a lack of funds, an institutionalized basis for collecting, processing, and analyzing data, a lack of technical support staff, and a lack of political clout.

Therefore, the present study has been designed to explore the capacity of elementary school teachers for imparting environment-based education in Model Colleges ofIslamabad, Pakistan. The existing human resources for the EBE implementation are the teachers serving in Model Colleges of Islamabad. The present study has spelled out the picture of human resources and their capabilities for EBE implementation. The results of the study can be utilized by the government agencies and policy makers working for the promotion of EBE. The research will be beneficial for the decision makers to make new frameworks to implement EBE by keeping in view the available resources so that teachers can actively engage to equip the future generations with a wise thought of conservation of environment. This study will also be significant for education department as the results will help to take decisions to improve the educational research as according to Kronlid and Öhman (2013), educational research is the formal, systematic application of scientific method to study educational problems and it will also help to make better decisions, to organize environment based activities, training workshops for the teachers to implement EBE in a better way as EBE helps the teachers to meet standards across multiple disciplines with a single curriculum. Environment-based education facilitates the development of citizens who understand the complexities of the relationship between resources and the economy. So, there is a need for a strong coordinated effort to devise some proper environmental education package for students to equip our future generations with the knowledge to preserve their environment and to improve the quality of the environment. Public participation and awareness are the prime requirements, which can be achieved only through environment-based education.

METHODOLOGY

Study area and data collection

The major purpose of this research study was "to assess existing human resource capacity for implementation of environment-based education (EBE) in Model Colleges of Islamabad, Pakistan." Therefore, the study uses a mix of qualitative and quantitative research methods for collection of data. The study population comprises of 200 teachers (male and female both) teaching at different levels in all 17 Model Colleges (10 for Boys and 7 for Girls) of Islamabad, Pakistan. The semi-structured questionnaire was used to collect data from randomly selected 100 science and 100 humanities teachers by interviewing them in order to assess the general awareness of teachers about environmental issues as a measure to assess their capacity to integrate the environment in teaching.

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Data analysis

The question items developed were mostly "Yes", "To some extent", and "No" type. The data were condensed in spreadsheet for further processing and subsequent analysis in MS Excel 2013. The descriptive statistical methods and techniques such as those dealing with the frequency distribution, percentages etc. were deployed for the initial probes. For the estimation of the frequency distribution percentages were calculated by using the following formula.

$$P = (f / N) 100$$

Where:

P = percentage f = absolute frequency N = total number of individual

RESULTS AND DISCUSSIONS

Education is a basic necessity of the nations and also has fundamental importance in the development of the nation. In a progressive society the teachers are the main pillars and are the main source to transfer knowledge and values to students and environment-based education is a way of putting one's potentials to maximum use. Teachers are playing an important role in the development of students as they can actively participate in the improvement of the environment. Teachers are the fundamental agents for the spread of knowledge in a systematic way so their role in attitude change must be recognized as they are important pillars for implementation of EBE in the educational system of the country. The academic qualifications of the teachers includes intermediate (4.5%), graduate (15.5%), and postgraduates (77.5%) and their teaching experience ranges from less than a year to more than 20 years.

General awareness of environment

The first part of the questionnaire was on general awareness related to environmental topics of daily routine like source of drinking water, water treatment/purification methods, water borne diseases, waste management etc. These questions were asked from teachers to check their basic awareness as these are the people who can play their part in the implementation of EBE through their knowledge and behavior. The findings revealed that 43% people get drinking water from "filtration plants", 22% of people get water from "water pumps", and 6 % people drink bottled water and the rest of 29 % people get water from "water supply". The result shows that people prefer to get drinking water from filtration plants. Upon inquiring how they treat their drinking water, the majority (49%) replied that they rely on water purification filters for water purification, followed by 'boiling' (28%) and a sizable majority (21%) don't know the water purification procedure. According to Hoselett(2018), water filtration can be used as an effective barrier for microbial pathogens and here again the results showed that most of the people prefer to filter the water to make it safe for drinking and do not prefer to use other water purification procedures which indicates their urge for clean drinking water. In response to water borne diseases, the majority (52%) of the respondents were of the view that hepatitis is waterborne, followed by typhoid (30%), malaria (10%) and respiratory diseases (8%). Out of these typhoid is basically water borne disease which is caused by Salmonella typhi and respiratory diseases may also be caused by water due to presence of Adenoviruses. According to Pal (2018), globally 1.8 billion people drink unsafe water and get diseases particularly in tropical and subtropical countries. Here the results show that the people have a concept of water borne diseases but they do not have a sound knowledge about it.

It was also explored that teaching staff was also showing responsible behavior towards domestic waste removal from household keeping in view the fact that house is an important part in an individual's life so household cleanliness is imperative (Fig 1). However, mix opinion was gathered regarding disposal of domestic waste/garbage depicting that majority of the respondents are unaware about the safe disposal of household waste and a sizable portion (24%) of the respondents considered open burning and open dumping as disposal options.

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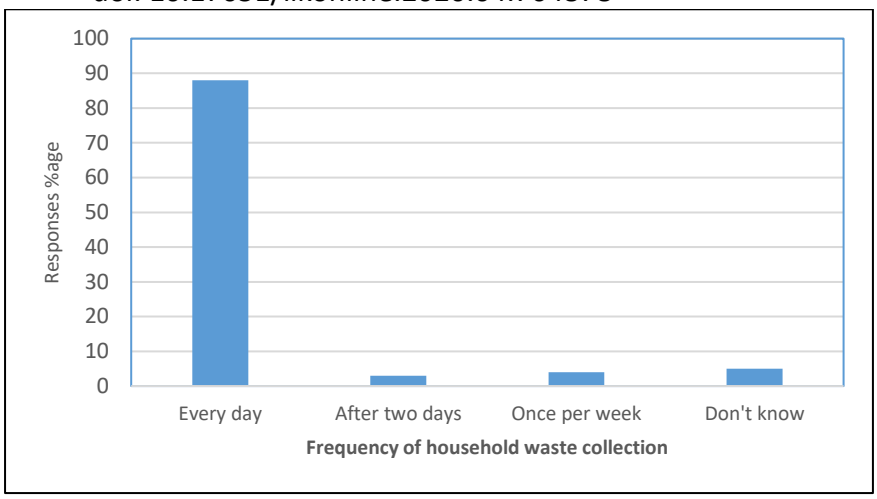

Fig 1: Frequency of household waste collection

The responses to questions related to air pollution, sources, its control; effects of overpopulation on the environment; avoidance of packaged food; usage of paper/cloth bags or plastic bags and preferring energy saving devices are condensed in Table 1.

Table 1: General awareness on environmental issues

Sr. No.	Items	Yes (%)	No (%)	To Some Extent (%)
1.	Air pollution and major causes	84	4	12
2.	Control of air pollution through promoting public transport	58	21	28
3.	Effects of overpopulation	79	6	15
4.	Use of paper or cloth bag instead of polythene bag	44	31	25
5.	Avoidance of packaged food	44	24	36
6.	Energy saving devices	92	3	5

The study also tried to assess the awareness level of the respondents related to ozone layer and found that 70% teachers were cognizant of the fact that ozone protects us from “harmful rays of sun” which can cause cancer in humans (Fig 2). The findings divulged that the concept of ‘biodiversity’ was known to 76% of the respondents and upon asking about the major reason of species extinction, then 35% people said that species become extinct “due to change in climatic conditions”, 20 % said that “hunting” is the major cause, 33% said that they become extinct as their “habitat is lost” and according to 12% “pesticides are killing them”.

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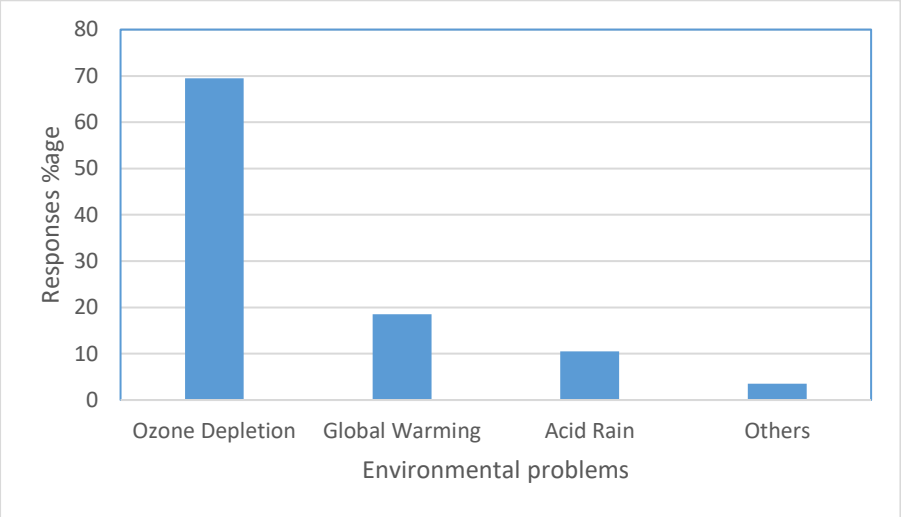

Fig 2: Awareness on environmental problems

Environment-Based Education

The next section of the questionnaire was based upon Environment Based Education. In this section twenty questions were asked from the respondents. All these questions were based upon the concept of EBE, importance of its implementation, integration of EBE into curriculum, importance of media in implementation of EBE. The basic purpose of this section in the questionnaire was to take the opinion of teachers and to conclude their thinking about EBE as it is important to know how much importance is given by the teachers who have to play the basic role in EBE implementation before its integration into curriculum (Table 2).

Table 2: Responses to environment-based education (EBE)

Sr. No.	Statements	Yes (%)	No (%)	To Some Extent (%)
1.	Have you ever heard about environment-based education?	77	6	17
2.	Can we integrate the environment-based education into formal education?	63	4	33
3.	Can environment-based education create awareness among the students to protect the environment?	88	2	10
4.	Is there any special training and planning required for the implementation of environment-based education?	78	4	18
5.	Will systematic approach be helpful for the implementation of environment-based education?	81	2	17
6.	Do you think that environment-based education is a product of science, public awareness of environmental issues and educational ideas?	83	1	16
7.	Do you think that environmental knowledge affects the behavior?	86	0	14
8.	Do you think that it is better to incorporate the environment-based education in	69	14	17

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Sr. No.	Statements	Yes (%)	No (%)	To Some Extent (%)
	curriculum?			
9.	Do you think that there will be difficulty in course if it is based on environment?	15	55	30
10.	Have you ever participated in activities addressing on environmental issues?	38	35	27
11.	Can media play an important role for environment-based education?	75	7	18
12.	At which level can we get better results by introducing the environment-based education?	School 78	College 18	University 4
13.	Do you think that environment-based education is an approach to science that merges environmental thinking, science and life practices?	70	4	26
14.	Do you think that raising basic awareness can play an important role in the implementation of environment-based education?	87	3	10
15.	Have you ever thought to teach your subject using examples from nature like animals and plants etc.?	81	6	13
16.	Do you think that environment-based education can be helpful for building up of attitude of respect and sense of responsibility towards nature and environment?	74	10	16
17.	Do you think that recourses on earth are everlasting and humans have the right to use them the way they want?	30	48	22
18.	Do you think that the socioeconomic status of the people can affect the implementation of environment-based education?	47	14	39
19.	Do you think that the environment based knowledge can improve environment related behavior of individuals?	78	1	21
20.	Do you agree that the human activities are the major cause of environmental degradation?	85	5	10

The result shows a positive attitude of teachers to integrate the concept of EBE into the formal education system. . The result shows a gender difference as females were found better aware of and more sensitive to environmental concerns than males. The result also indicated that humanities teachers with non-science academic background have no clear perceptions about environmental issues, while science teachers have better understanding of the environmental aspects and expressed better understanding of the EBE concept. But teachers from humanities group were found more in favor of EBE than science teachers.According to findings of Boca, (2019) students' innate curiosity may not be satisfied by the formal education system but by relating learning to their lives and EBE takes advantage of students' natural interest in the world. According to studies by Cummin et al. (2000) and Kenneth (2003), the students who experience "real life" issues develop perceptions which bring a change in their behaviors. It was also said by Ernst and Monroe (2006), 'Environment as an Integrating Context of Learning '(EIC) form of education system empowers the students to be responsible for their own learning and to reflect

their learning by connecting it to their communities. According to Cummins et al. (2000) and Kenney et al. (2003) students hold real life learning experiences throughout their lives, therefore, they often show and engage in environmentally responsible behaviors.

Training and planning help in development of any concept and it also affects the productivity of a system in a better way as it creates a healthy working environment and proper training of teachers can improve the quality of education and the teachers cannot play their role to improve education unless they are not trained properly (Varela-Candamio et al., 2018). Teachers must be given opportunities to attend workshops and seminars and also refresher courses should be organized related to the environment as it will expose teachers to new ideas and they will be able to bring innovation in curriculum (Jekayinfa et al., 2008).

Another important dimension of propagating the concept of environmental education is through media which is endorsed by majority (75%) of the teachers and also corroborate with the assertions made by Saikia (2017) that media can also be used to enhance the concept of EE because media (electronic, print and social) and educational institutes can execute their prominent role by explicating positive environmental attitude and behavior.Environmental education has the ability to create awareness which leads to understanding and in turn ability to create the potential and capacity for appropriate actions (Baco, 2019).

CONCLUSIONS

This study was designed to assess the teachers' capacity to impart environment-based education in Model Colleges of Islamabad. The study identified that teachers were aware of the importance of environment and environmental education to the extent that they showed significant importance towards the use of safe drinking water, solid waste management, energy conservation, decent and affordable mass transit system, role of media in raising EBE awareness etc irrespective of their teaching experience and academic qualifications. Moreover, female teachers were found to be more concerned about integration of environmental perspectives in curriculum and EBE implementation than male teachers. This is a good indication as their role in society as nurturer, protector and caregivers. However, the majority of respondents were found unaware of environment related organizations in Pakistan and also not cognized of basic environmental terms mainly because of having no or less opportunities to participate in workshops, seminars, conferences etc. related to the environment.

According to teachers, students could play an important role in EBE implementation by improving concept based learning and helping to manage environmental problems. It was also concluded from the study that most teachers agreed that EBE could be an effective approach for effective teaching, improving critical thinking, imparting learning skills and reasoning power of students, changing their attitudes and value with respect to the environment. It is concluded further from this study that teachers with science education background have better knowledge about environmental issues and showed better understanding of EBE concept as compared to teachers with humanities background in their education. It is also obvious from the study that people from humanities group are more in favor of incorporating EBE into the education system and society. Therefore, it is highly recommended that teachers training programs should be developed for orientation on delivering EBE and practical activities based on environmental aspects like training workshops, seminars, conferences, discussions, debates related to environment must be organized for teachers as well as for students as this will induce a positive attitudinal and behavioral change in the society. In this regard, an effective education policy should be devised to implement EBE and this policy must be made by involving all relevant stakeholders. Education "For" and "From "the environment is as necessary as education "About" the environment. So education for and from the environment should be included in the curriculum to achieve the real objectives of environmental education.

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